

**DEVELOPMENT OF A MODEL TO SUPPORT PRIMARY EYE-CARE SERVICE
PROVISION IN RURAL SOUTH OMO ZONE, ETHIOPIA**

by

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I declare that the above thesis is my original work. All sources I used or cited have been indicated and acknowledged by means of complete references.

The author also states that the thesis applies to original verification software and meets the accepted originality requirements.

Furthermore, I declare that I have not submitted this or any part of the work for examination to Unisa for a similar qualification or to any other educational institution.



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ABSTRACT

Primary eye-care is an important component of comprehensive eye-care services, enabling communities to enjoy high-quality basic services. However, due to various factors, the community does not use the service properly. The purpose of this study was to develop a model to support optimal provision and utilisation of primary eye-care services by exploring and describing the provision and use.

The study applied a three-phased exploratory sequential mixed method research design in four districts of the Southern Omo Zone, Ethiopia, that involved qualitative and quantitative data collection and analysis. The study population was adult service users, primary eye-care workers, mid-level healthcare workers, and primary eye-care units. Qualitative data was collected through 6 focus group discussions and 12 in-depth individual face-to-face interviews. A purposive sampling technique was used to select study participants. Quantitative data was collected using 103 self-administered questionnaires and 32 checklists. A simple random sampling technique was used to select respondents. ATLAS.ti version 23.2.2 and SPSS version 28 were used to analyse the data.

The study results reveal different determinants and barriers to the provision and use of primary eye-care services. The emerging themes of the study were the perspective of the community and service providers, preference for the service, barriers to service, and suggestions for improvement. Only a third of primary eye-care units were ready in infrastructure, equipment, and service delivery. Less than half of primary eye-care service providers were found to have intermediate knowledge and skills required to provide services. Multivariate analysis showed serving more patients per month [AOR 25.44; 95% CI 4.06-159.45], receiving additional training [AOR 100.49; 95% CI 3.96-2,551.58], and

having a first-degree [AOR 23.92; 95% CI 4.88-117.23] had a statistically significant association with knowledge and skill.

The use of primary eye-care services is low and fenced with many barriers. Therefore, this study developed an integrated community-based primary eye-care model to support optimal service provision. Experts validated the developed model. The model is new to the country and will greatly contribute to improving the provision and use, resulting in a reduced burden of avoidable blindness and low vision.

Keywords

Barriers to service; integrated eye-care workers; knowledge of primary eye-care service providers; midlevel health care workers; primary eye-care; primary eye-care model, primary eye-care workers; readiness of primary eye-care units; service utilisation; skills of primary eye-care workers.

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DEDICATION

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LIST OF ABBREVIATIONS

AMD	Age-related Macular Degeneration
AOR	Adjusted Odds Ratio
CHWs	Community Health Workers
CI	Confidence Interval
COR	Crude Odd Ratio
CREC	College Research Ethics Committee
CWs	Community Workers
DHIS	Demographic Health Information System
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focused Group Discussion
HEWs	Health Extension Workers
HMIS	Health Management Information System
IAPB	International Agency for Prevention of Blindness
IECW	Integrated Eye-care Worker
INGO	International Non-Governmental Organization
ISS	Integrated Supportive Supervision
MOH	Ministry of Health
NGOs	Non-governmental Organizations
NTD	Neglected Tropical Disease
PEC	Primary Eye-care
PECU	Primary Eye-care Unit
PECWs	Primary Eye-care Workers
PHC	Primary Health Care
PHCU	Primary Health Care Unit
PHI	Public Health Institute
PHWs	Primary Health Workers
RHB	Regional Health Bureau
SAFE	Surgery, Antibiotics, Facial Cleanliness and Environmental Hygiene
SDG	Sustainable Development Goal
SECU	Secondary Eye-care Unit
SOP	Standard Operating Procedures
SPSS	Statistical Package for Social Science
TBA	Traditional Birth Attendants
TECU	Tertiary Eye-care Unit
TT	Trachomatous Trichiasis
UEHC	Universal Eye Health Coverage
UHC	Universal Health Coverage
UK	United Kingdom
UNISA	University of South Africa
USA	United States of America
VAS	Vitamin A Supplementation
VI	Visual Impairment
WHO	World Health Organization
WRV	World Report on Vision
ZHD	Zonal Health Department

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Primary eye-care is an important component of comprehensive eye-care services that allows communities to enjoy basic high-quality services. However, owing to various determinants, communities do not use this service. This study focuses on exploring and describing the primary eye-care service provision in the four districts of the South Omo area of Ethiopia. Therefore, the experience of primary eye-care service provision and use, barriers to primary eye-care services, the knowledge and skills of service providers, and the readiness of primary eye-care units in equipment, infrastructure, and service delivery were explored and described. This chapter presents an overview of the study and the chapters.

1.2 BACKGROUND

Eye diseases that cause visual impairment and blindness and that could be prevented or treated are major health problems in many developing countries. Underdeveloped countries usually carry the greatest burden, having three-quarters of the blind and visually impaired global population (Malik, Mafwiri & Gilbert 2018:176). The World Health Organization (WHO) (2022c:164) reported that 2.2 billion people globally have visual impairment, more than half of which can be prevented or treated. Of those visually impaired, three-fourths live in underdeveloped countries (WHO 2022b:63). Like many sub-Saharan African countries, in Ethiopia, 91.2% of blindness and 87.4% of visual impairment are avoidable, preventable, or treatable (Morka, Yibekal & Tegegn 2020:2).

The use of eye-care services is defined as the practice of using eye-care services to prevent and cure eye problems and promote eye well-being (World Health Organization and the United Nations Children's Fund (UNICEF) 2020:10). Symptom identification, eye examination, visual acuity measurement, eye health education, diagnoses, and early referral are identified as basic components of primary eye-care (Gilbert, Faal, Allen & Burton 2021:70). A good primary eye-care programme should involve the community to

ensure equity, intersectoral collaboration, and sustainability for a better impact (Khanna, Sabherwal, Sil, Gowth, Dole, Koyyadiyil & Chase 2020:337). To increase access to eye health care by integrating eye-care services into primary health care, the WHO introduced a package named the Primary Eye-care Package for Africa Region (WHO AFRO PEC) package for sub-Saharan African countries (Aghaji, Burchett, Hameed, Webster & Gilbert 2020:2).

Aiming for the development of a viable comprehensive system that ensures the best possible vision for all citizens, the Vision 2020 initiative was launched by the Ethiopian government in 2002 (Morka et al 2020:3). This national initiative covers adequate human resources, infrastructure, and technology for eye health in addition to controlling avoidable blindness (Teshome, Soboka, Salamanca & Calise 2021:10).

Shortage and failure to use eye-care facilities were identified as the underlying reason for blindness in most developing countries (Aghaji et al 2020:10). Many sub-Saharan Africans have inadequate or no access to eye-care services (Teshome et al 2021:11). Only one third of Africans have access to randomly distributed facilities that provide eye-care services. A study conducted in Nigeria to evaluate the feasibility of the AFRO PEC approach determined that there was a large gap in the trained workforce for health and integrated supervision, proving that almost all facilities enclosed by the study did not have complete human resources for eye-care (Aghaji et al 2020:10). In a similar study conducted in the Gurage Zone of Ethiopia, only 7% of public health facilities provided eye-care services and only 20% were equipped, according to the country's standard, for eye-care service (Teshome et al 2021:1).

Aspects such as lack of awareness, lack of infrastructure, corruption, unrest, direct and indirect costs of treatment, limited finance to eye-care services, and absence or shortage of dedicated eye-care personnel were reported as obstacles to accessing eye-care facilities according to studies carried out in sub-Saharan Africa (Cicinelli, Marmamula & Khanna 2020:321; Ebeigbe & Ovenseri-Ogbomo 2014:98).

1.3 DESCRIPTION OF THE STUDY PROBLEM

In Ethiopia 1.6% and 3.7% of the population are blind and visually impaired (Morka et al 2020:1). Most of these eye conditions are avoidable, preventable, or treatable. According

to the Ethiopian Ministry of Health (2016:36), there is an unmet need for basic eye-care services nationwide. However, in 2016, only 47 secondary eye-care units (SECU) and 4 tertiary eye-care units (TECUs) provided services throughout the country. The WHO (2020) recommended an ophthalmologist-to-population ratio of 1 to 0.25 million population, but in Ethiopia, the ratio of ophthalmologists to population was 1 to 1.5 million population which is far below the standard (Ethiopian Ministry of Health 2016:37).

A study carried out in Hawassa, Ethiopia, to evaluate eye-care services usage and correlated factors found that only 41.7% of adults 40 years and older had used primary eye-care services in the last 5 years (Morka et al 2020:5). As compared to the presence of high burden of blindness and low vision in the country this utilisation rate is considered low. Further study conducted in Ethiopia to measure the knowledge of health extension workers in primary eye-care showed that a large gap in knowledge and skill among primary eye-care service providers exists (Hailu, Tekilegiorgis & Aga 2010:130).

In the 5-year National Strategic Action Plan for Eye Health, the Ethiopian Ministry of Health identified leadership and governance, community engagement and empowerment, human resources for the development of eye health, and inadequate infrastructure as gaps in the provision of eye-care services in the country (Ethiopian Ministry of Health 2016:16). Factors such as poor understanding among service providers felt that the need for eye-care service, the indirect cost of treatment, the need for an escort, social engagement/belief and being female were reported as among the key barriers to accessing primary eye-care in Ethiopia (Teshome et al 2021:5).

Primary eye-care as an initiative was designed to serve the largest and most marginalised communities in the world. Although the design and operating models were prepared with the assumption of creating great impact, the implementation modality and the observed challenges were not well studied, especially in the majority of the sub-Saharan African countries, including Ethiopia. Although Ethiopia endorsed the WHO Universal Primary Health Care Package and the WHO AFRO PEC Package for sub-Saharan regions, its implementation has not been well studied. Similarly, studies on primary eye-care services, in general, are poor, especially in the rural community of the South Omo Zone (Ethiopian Ministry of Health 2016:41).

The presence of over 1.9 million blind and 4.6 million visually impaired population, the lack of facilities offering eye health services, the presence of knowledge and skill gaps among service providers, barriers to the use of the service, and most importantly, the absence of a standardised primary eye-care model in the country were the main reasons for conducting this study.

Therefore, this study explored and described the primary eye-care service provision and utilisation in four districts of the Southern Omo Zone, Ethiopia. Furthermore, the study assessed the knowledge and skills of service providers and the readiness of primary eye-care units in equipment, infrastructure, and service delivery. By integrating the findings, a primary eye-care model was developed and evaluated by experts to support the optimal provision of eye-care services to Ethiopians.

1.4 THEORETICAL FRAMEWORK

A theoretical framework is defined as a structure that supports the theory of study (Grant & Osanloo 2014:16). It is not a readily available concept; mostly it will be developed based on the basis of similar studies in the field. A good theoretical framework connects the study to existing knowledge. Having a theoretical framework will give the researcher a chance to identify the limits of previous generalisations (Bouso, Poles & Monteiro 2013:143; Bowling 2014:143).

During this study, the interventional theoretical framework, intervention complexity, developed in 2005 and cited in Gericke, Kurowski, Ranson and Mills (2005:285) was adopted as a conceptual framework to inform the setting of priority in health. The framework was developed to expand or introduce health innovations to assist planners, policymakers, and programme managers. The development of the framework considered disease burden, cost-effectiveness, affordability, and political feasibility in health policymaking (Gericke et al 2005:285).

The framework measures health interventions using four variables as a domain. Usage, delivery, intervention characteristics, and government capacity. With these domains, initially, the framework assessed capacity gaps to identify the technical density of an intervention. This study applied the framework to assess primary eye-care workers' skills and knowledge gaps. The second variable of the framework was to identify a means to close the identified gap. In this study, the framework was applied to identify the gap in

both provision and use. The third component of the framework was to identify an intervention framework in a scalable and easy-to-address manner. At this stage of the framework application, interventions were compared based on the mode of delivery and their technical complexity. The model development used this domain of the framework. The final phase of the framework was the prioritisation of the intervention plan for research and development.

Reducing the technical complexity of interventions was vital in achieving health-related goals (Aghaji, Burchett, Oguego, Hameed & Gilbert 2021b:1). The framework was used to measure the likelihood of incorporating primary eye-care into existing primary healthcare systems. This study applied the framework to explore and describe primary eye-care service provision in the four districts of the South Omo Zone, Ethiopia. The use of the primary eye-care service, the barriers to service, knowledge and skills of the service providers, and the readiness of the primary eye-care units in equipment, infrastructure, and service delivery were explored and described. The study chose the framework considering the content, quality, and alignment with the study topic (Bennett, Wang, Moore, & Nagle 2017:186). Figure 1.1 presents the theoretical framework of the study.

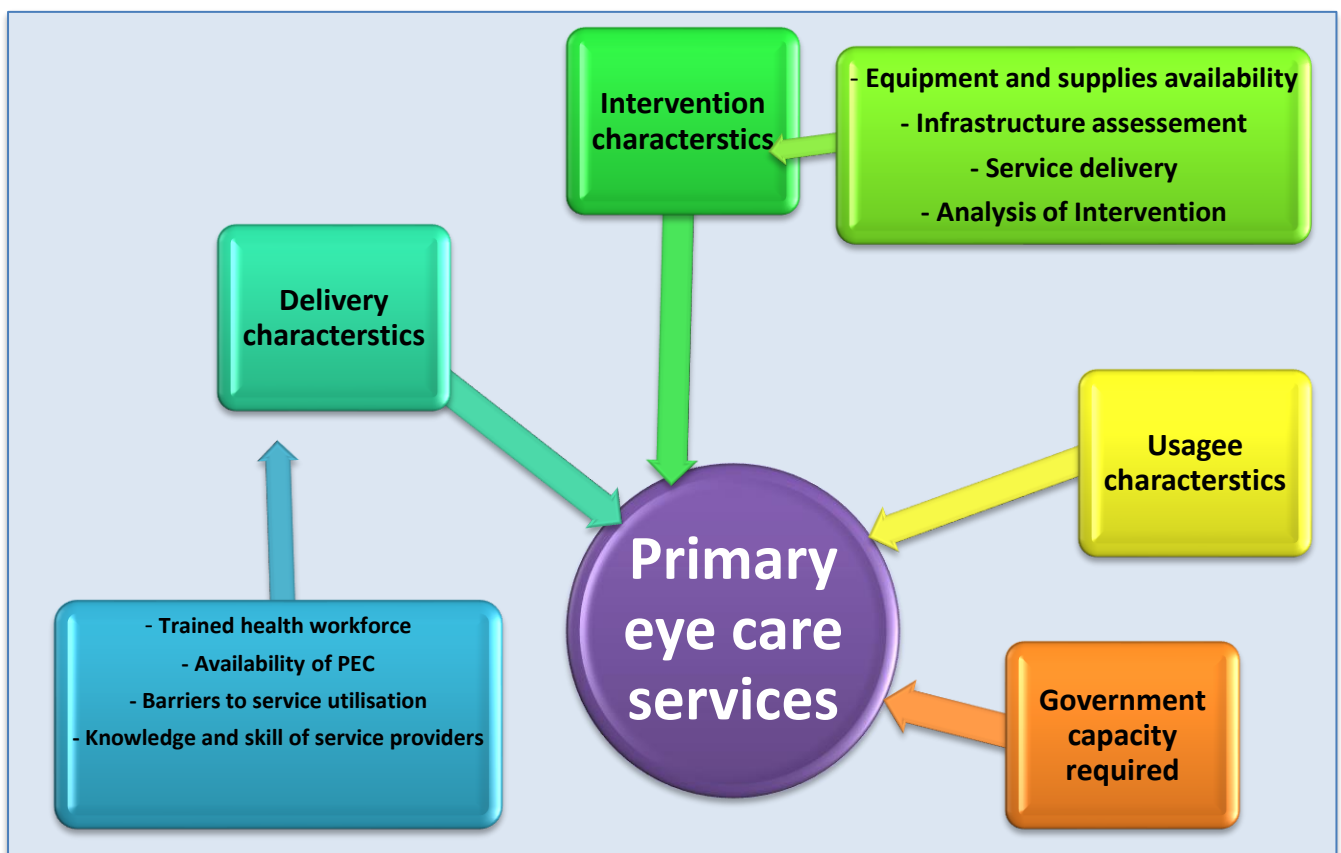


Figure 1.1 A theoretical framework for primary eye-care

(Derived from Gericke et al 2005:285)

1.5 DEFINITION OF KEY CONCEPTS

In this section, only the definition and application of the concepts of primary eye-care, use of primary eye-care services, primary eye-care worker, and primary eye-care model are presented. A detailed description of each of the key concepts is presented in Chapter 2.

1.5.1 Primary eye-care

Primary eye-care is defined by the WHO as fundamental eye-care available to the wider community irrespective of socioeconomic status to provide care and identify the disease before it becomes a serious medical problem (WHO 2022d:14). In these definitions, primary eye-care services refer to the identification and management of common ocular morbidities and accurate diagnoses and referral of complex conditions. Preventive, promotive, curative, and rehabilitative activities are accompanied by early case identification and referral, eye examination, and diagnosis supplemented with visual acuity measurement and health education with a focus on an individual eye-care problem are components of primary care (Gilbert et al 2021:70; Graham 2017:86).

In this study, primary eye-care refers to those eye health services provided to the rural community of the South Omo area, Ethiopia, at the health centre level, which incorporate preventive, promotion, curative, and rehabilitative activities.

1.5.2 Primary eye-care service use

The use of primary eye-care services is defined as the use of eye health services by individuals to prevent and promote eye well-being and the treatment of eye diseases (WHO 2018a:49). The definition incorporates the acquisition of eye health information and the identification of current status. The use of eye-care in the above definition of WHO incorporates components of comprehensive eye-care services that prevent, promote, treat, and rehabilitation eye health (Teshome et al 2021:2). In this study, the above definition of the WHO was used to refer to primary eye-care service use.

1.5.3 Primary eye-care workers

Primary eye-care workers (PECWs) refer to the clinical officers and nurses that provide basic eye-care services in primary health facilities (WHO 2018b:30). The WHO Regional Office for Africa defines and categorises the clinical components of PEC service provisions into three tasks that PECWs must perform. Identification and treatment of common ocular morbidities such as xerophthalmia and conjunctivitis, diagnosis, treatment, and referral of eye conditions such as lid laceration, corneal ulcer, Trachomatous Trichiasis, and diagnosis and referral of conditions such as vision loss, cataracts, and pterygium (Hailu et al 2010:130).

In summary, PECWs are expected to identify and treat common ocular conditions, diagnose other conditions, describe possible interventions, support patients in making decisions, and ensure active participation of all concerned. In developed countries, specialised personnel, such as ophthalmologists and optometrists, are PEC service providers, but in sub-Saharan Africa, mid-level healthcare cadres who have received short-term training in the area are PEC service providers (Hailu et al 2010:131).

In this study, primary eye-care workers refer to mid-level health cadres including health officers, clinical nurses, public nurses, and integrated eye-care workers, who provide basic PEC services at the health centre according to the above WHO standard.

1.5.4 Primary eye-care model

The WHO (2020:10) defines a model of care in health as the conceptualization of how services should be provided, including organisational processes, care processes, and service management. The care model evolves to meet the health objectives and priorities of the population and improve the performance of the health system.

The primary eye-care model is defined as a statement that carries the most important components of primary eye-care in a way that indicates its conceptual meaning, mandatory indicators, and service delivery and care provision (Misra, Vashist, Malhotra & Gupta 2015:80). This definition of the primary eye-care model was applied to this study.

1.6 PURPOSE OF THE STUDY

The main purpose of this study was to develop a model to support optimal primary eye-care service provision by exploring and describing primary eye-care service provision in the rural South Omo area in Ethiopia.

1.7 RESEARCH OBJECTIVES AND RESEARCH QUESTIONS

1.7.1 Objectives

This study was conducted with the following objectives:

- Objective 1: To explore and describe the experience of adults who used primary eye-care services in the four districts of the South Omo Zone, Ethiopia.
- Objective 2: To explore and describe the barriers faced by primary eye-care workers during the provision of primary eye-care services in the four districts of the South Omo Zone, Ethiopia.
- Objective 3: To assess the knowledge and skills of primary eye-care workers in the four districts of the South Omo Zone, Ethiopia.
- Objective 4: Assess the readiness of primary eye-care units in equipment, infrastructure, and service delivery in the South Omo Zone, Ethiopia.
- Objective 5: Develop and validate a primary eye-care model to support the optimal provision of eye-care services.

1.7.2 Research question

The study responded to the following research questions (R.Q.):

- R. Q. 1: What are the experiences of adults who used primary eye-care services in the four districts of the South Omo Zone, Ethiopia?
- R. Q. 2: What are the barriers faced by service providers during the provision of PEC services in the four districts of the South Omo Zone, Ethiopia?
- R. Q. 3: What are the knowledge and skills gaps among primary eye-care workers in the South Omo Zone, Ethiopia?

- R. Q. 4: What is the level of readiness for the equipment, infrastructure, and service delivery of primary eye-care units to provide primary eye-care services in the Southern Omo Zone, Ethiopia?
- R. Q. 5: How could a PEC model be developed and validated to improve the provision of primary eye-care services in the Southern Omo Zone, Ethiopia?

1.8 RESEARCH PARADIGM

The philosophical perspective or paradigm refers to perceptions and orientations shared by the research community (Creswell & Plano-Clark 2018:66; Kivunja & Kuyini 2017:26). A study paradigm implies the scientific principles or belief system of the researcher that guides the situation or the study setting. Positivism, constructivism, and pragmatism are commonly used as paradigmatic orientations by many researchers (Mohajan 2018:35; Ross-Man & Rallis 2017:88).

For this study, the pragmatic paradigm was used. The pragmatic paradigm arises from the reality that any given situation does not necessarily subscribe to positivism or constructivism (Polit & Beck 2018:309). The positivist paradigm mostly relates to objective or quantitative studies and the constructivist relates to subjective or qualitative studies. Unlike the other two, the pragmatic paradigm is credited with openness, mainly due to it giving access to the researcher to not strictly follow a fixed research approach or data collection method (Creswell & Plano-Clark 2018:83).

The mix of positivist and constructivist perspectives in a single study will give the researcher the opportunity to show the advantages of both perspectives (Mohajan 2018:35). The researcher chose this paradigm because of its advantage of creating flexibility and openness. Furthermore, the pragmatic paradigm allowed the researcher to view primary eye-care from different perspectives, approaches, and methods. Most importantly, the use of the pragmatic paradigm helped the researcher triangulate the findings using qualitative and quantitative results. Triangulation supported the development of an integrated community-based primary eye-care model discussed later in Chapter 6.

1.9 STUDY DESIGN AND APPROACH

The research approach mainly refers to procedures designed to mix the researcher's point of view with research methods to respond to the research questions under study (Creswell & Plano-Clark 2018:86; Leavy 2022:12). A research design also sets procedures, and techniques to be applied to collection and analyse of the data to respond to research objectives or questions (Boru 2018:2; Igwenagu 2016:4). The purpose of the research area will also be used as a basis for selecting an appropriate design. Choosing an appropriate research approach requires a coordinated plan to incorporate existing views with that of the researcher and the method to be selected (Creswell & Plano-Clark 2018:86; Farghaly 2018:5; Thomaszewski, Zarestky & Gonzalez 2020:4).

This study applied an exploratory sequential mixed-method research design. The exploratory sequential mixed method approach is among the best research approaches having a mix of qualitative and quantitative methods (Creswell & Plano-Clark 2018:94). The reason for using the research design method was to better explore and describe the primary eye-care service provision in the study area by applying a mix of qualitative and quantitative procedures sequentially. Therefore, the researcher opted to follow this approach.

The exploratory sequential mixed-method approach is composed of three phases. The first phase will be qualitative data collection and analysis. The second phase will be the development of quantitative instruments, and the last phase will be the collection and analysis of quantitative data (Creswell & Plano-Clark 2018:94). Accordingly, the experiences of adults aged 40 years and older and the experience of service providers were triangulated with the knowledge and skills of primary eye-care workers and the readiness of primary eye-care units in equipment, infrastructure, and service delivery in the four districts of the study area.

1.9.1 Phases of the study

This study was conducted in three phases.

Phase I of the study was qualitative data collection and analysis. During the qualitative study, data was collected through in-depth individual face-to-face interviews and focused

group discussions (FGDs). The result of a qualitative study conducted with this design is presented from the study participants' point of view (Kalu & Bwalya 2017:51; Setia 2016:264). Data was analysed using the qualitative analysis software ATLAS. ti version 23.2.2.

Phase II: During this phase, the researcher developed quantitative data collection tools based on the findings of Phase I. Consequently, a standard self-administered questionnaire and checklist were adopted.

Phase III: In this phase, quantitative data was collected, and information was gathered through a self-administered questionnaire and checklist. Descriptive statistics were used to analyse the data using the Statistical Package for Social Sciences (SPSS) version 28.

After the completion of quantitative data collection and analysis, data integration, model development, and validation were carried out. The findings were discussed in different categories and supported the development of the primary eye-care model. Discoveries from different literature were an addition to the study findings in the development and validation of the model according to Chinn and Kramer (2011).

1.10 STUDY SETTING, STUDY POPULATION, SAMPLING, AND SAMPLE SIZE

1.10.1 Study setting

As explained in Bowling (2014:192), the study setting is a vital element of a research design because the result and interpretation of the findings profoundly depend on it. The study setting must incorporate contexts such as the experimental, social, and physical contexts in which the study was carried out (Majid 2018:3).

This study was carried out in four districts of the South Omo Zone, Ethiopia. Ethiopia is in the Horn of Africa and is the second most densely populated country on the continent after Nigeria, having a population of 127 million in 2023 (World Population Prospects 2023). The South Omo Zone is one of the 15 administrative zones in the Southern Nationality and Peoples Regional State, having 10 districts and a total population of 863,721. The Zone is located at the Southern tip of the country and shares international borders with Kenya and South Sudan. According to the Annual Health Sector

Performance Report, the community residing in six of the ten districts is pastoralist, unlike most Ethiopians who are agrarian (South Omo Zone Health Department 2023:4).

1.10.2 Study population

A study population is a group of people who share common characteristics and sources for a sample labelled by the researcher (Majid 2018:3). Therefore, all adults and all healthcare workers in the four districts of the South Omo Zone were the study population for this study and the source from which the sample was drawn.

A target population is a group of the entire population from whom a sample can be taken (Polit & Beck 2018:243). Therefore, all adults 40 years and older and all mid-level healthcare workers in the four districts of the South Omo Zone were the target population of this study and the from which the sample was drawn.

An accessible population is the segment of the target population that is reachable to the researcher (Polit & Beck 2018:243). Therefore, adults 40 years or older who used primary eye-care services in the last six months and who resided in any of the four districts of the South Omo Zone, trained and certified primary eye-care workers who actively provided eye-care services, and mid-level healthcare workers found providing eye-care services in any of the four districts were the accessible population for this study.

1.10.3 Sampling

Sampling is defined as a systematic procedure by which the investigator chooses representative groups of people, events, or any other relevant part to collect pertinent information about the subject under study (Rahi 2017:3). Details of sampling techniques are presented in Chapter 3.

1.10.3.1 Sampling techniques

Following the use of an exploratory sequential mixed method design, qualitative and quantitative sampling techniques were used. Maximum variation, purposive, and simple random sampling techniques were applied in different phases.

Phase I (qualitative phase) – non-probability purposive sampling is the first choice when seeking study participants who have in-depth information about the topic under discussion (Gray, Grove & Sutherland 2017:499). Furthermore, it is used to select participants who can provide detailed information about the topic under study (Ames, Glenton & Lewin 2019:3; Kumar 2014:17). A purposive sampling technique was applied to draw the sample for focus group discussions (FGD) and in-depth individual face-to-face interviews.

During Phase I (qualitative phase), two groups of participants participated in exploring and describing the use and barriers to primary eye-care services in the four districts of the South Omo Zone, Ethiopia.

Group I: FGDs were organised with adults 40 years and older who have accessed PEC services in a public primary eye-care unit in the past six months and were willing to participate in the study.

Group II: In-depth individual face-to-face interviews were organised with primary eye-care workers who worked in a public primary eye-care unit for the past 12 months.

Participants were purposively selected for both groups using the inclusion and exclusion criteria stated below. Inclusion criteria imply characteristics that a person must possess to be a member of the study. In contrast, exclusion criteria are criteria used to reject a person from a study (Burns & Grove 2017:518).

Inclusion and exclusion criteria for the qualitative phase

Inclusion criteria applied for the focus group discussions were: adults, 40 years and older, who have accessed primary eye-care services in a public primary eye-care unit in the last six months and those 40 years and older who were willing to be part of the study. Adults with comorbidity and those unwilling to participate in the study were excluded from the FGD.

Similarly, during the in-depth individual face-to-face interview those certified eye-care workers who had worked in a public primary eye-care unit for at least a year, were permanent employees of the unit and who had provided primary eye-care services during

the study period were included. On the other hand, those mid-level healthcare workers who did not receive an official/additional certificate to provide eye-care service, but were providing eye-care service and part-time workers were excluded from the study.

Sample size

Represents study participants to be used to answer the research hypothesis. Usually, the sample size must be sufficient to address the subject under study. Most importantly, the sample size shall be determined based on the study purpose and design (Beins & McCarthy 2012:43; Setia 2016:264).

Sample size for the qualitative phase

Data saturation level is considered as the sample size in qualitative studies (Hennink & Kaiser 2021:7). Consequently, during Phase I (qualitative phase), data was collected with in-depth individual face-to-face interviews and focus group discussions to explore and describe the use and barriers of primary eye-care services until saturation of the data was reached.

Inclusion and exclusion criteria for the quantitative phase

Group I

The inclusion and exclusion criteria applied for the quantitative study with mid-level healthcare workers were: any mid-level healthcare professional providing primary eye-care in a public primary eye-care unit for at least a year, a permanent employee of the unit and who has provided primary eye-care services during the study. On the other hand: those mid-level healthcare workers who were not providing primary eye-care services and part-time workers were excluded from the study.

Group II

The inclusion and exclusion criteria used for the quantitative study to assess the readiness of PECU in equipment, infrastructure, and service delivery were: public primary eye-care units that had provided service for at least six months, had at least one trained

and certified primary eye-care worker and provided services on a routine basis. Whereas, those service facilities with less than six months of service provision experience and units that did not provide PEC services routinely were excluded from the study.

Sample size - quantitative phase

An online sample size calculator, Rao Soft, was used to estimate the sample to assess the knowledge and skill of PECWs in the four districts of the South Omo Zone in Ethiopia. Before the study, 141 registered healthcare workers providing primary eye-care services were reported in the four districts of the South Omo Zone, Ethiopia (South Omo Zone Health Department 2023:5). Taking into account a 95% confidence interval (CI), a 5% margin of error, a 50% population proportion, and a population size of 141, the sample size was 104.

To assess the readiness of primary eye-care units in equipment, infrastructure, and service delivery, all 32 functional primary eye-care units that met the selection criteria and were found in the study area were incorporated.

1.11 METHOD AND PROCEDURE OF DATA COLLECTION

Data collection is a procedure for collecting data systematically to resolve research questions (Brink, Walt & Van Rensburg 2018:65; McEwen & Wills 2011:213). Based on its exploratory sequential mixed methods research design approach and the pragmatic paradigm applied during the study, the data collection process involved both qualitative and quantitative data collection procedures. Data was collected in four districts in the South Omo Zone, Ethiopia, concerning primary eye-care services as shown in Table 1.1. The following are the phases and data collection procedures applied during the study.

Table 1.1 Summary of data collection methods and participants/respondents

Phases	Method of data collection	Participants/respondents
Qualitative phase	Focused group discussion	Adult service users
	In-depth individual face-to-face interviews	Primary eye-care workers
Quantitative phase	Self-administered questionnaire	Mid-level healthcare workers
	Checklist	Heads of primary eye care units

During Phase I (the qualitative phase); data was collected through FGDs and in-depth individual face-to-face interviews. Consequently, the pre-tested semi-structured guide was used to collect data through FGDs (Annexure L) and in-depth individual face-to-face interviews (Annexure M). The objective of the qualitative data collection was to explore and describe the use and barriers of primary eye-care services amongst adults, 40 years and older, and primary eye-care workers. Data collection was carried out in primary eye-care units and selected sites in the village, where the community spent time together. There was no cost incurred by the study participants for transportation to the data collection site.

The researcher was the main data collector and ensured the application of all ethical protocols during the study. Furthermore, strict procedures were followed to ensure the safety of the researcher and the study participants, including obtaining clearance from all gatekeepers before data collection, careful and wise selection of data collection venues and times, and adherence to basic principles of ethics as discussed in Sections 1.13 and 1.14.

Phase II (instrument development); was the development of a quantitative data collection tool. During this phase, the researcher adopted a checklist and a self-administered questionnaire based on the findings of the qualitative phase of the study.

During Phase III (the quantitative phase); data was collected using a structured questionnaire and a checklist adopted during the second phase of the study. Pre-tested tools were used to collect data from primary eye-care workers and primary eye-care units. Before the application, the statisticians validated the questionnaire and checklist for their content. The focus of quantitative data collection was to describe the knowledge and skills of primary eye-care workers and to assess the readiness of primary eye-care units in equipment, infrastructure, and service delivery to support the development of the primary eye-care model. Quantitative data collection was carried out in primary eye-care units

and study participants were staff of the unit; therefore, no cost was incurred by study participants for being part of the study.

1.12 METHOD OF DATA ANALYSIS

Data analysis refers to the application of systematic techniques to recapture, illustrate, and evaluate collected data. Usually, data analysis involves data cleaning, transforming, and modelling to extract useful information for decision making (Bowling 2014:234). Data management and analysis were performed according to the sequential phases of the exploratory mixed-method design (Creswell & Creswell 2018:307). Both qualitative and quantitative data analysis methods were used for the analysis and interpretation of the findings.

Qualitative data analysis

For analysing the qualitative data ATLAS.ti version 23.2.2. qualitative data analysis software was used. The results were presented in themes, categories, and sub-categories created to respond to the first two objectives of the study (Ravindran 2019:40).

Quantitative data analysis

During this phase, data entry was performed using Epi-info data management software version 6, and data analysis was performed using SPSS version 28 software with the support of a statistician (Annexures R & S). Descriptive statistics were used. In descriptive statistics, tables, graphs, means, and frequencies were used to present data. The association of variables was processed using a logistic regression model. The crude odds ratios were calculated to determine the variable's strength of association, and the adjusted odds ratios were used to control the effect of confounders. The bivariate analysis at a significance level of 0.25 was included in the multivariate analysis. Finally, the association of predictor variables with the outcome variable was presented using the adjusted odds ratio (AOR) with their 95% confidence interval (Apuke 2017:6).

Data integration and model development

The final step of the analysis was the thematic integration of the findings of the qualitative and quantitative data analysis. Consequently, the findings of the FGDs, in-depth individual face-to-face interviews, self-administered questionnaires, and checklists were integrated using a built-in approach. Details of the approach and procedures followed during data integration were presented in Chapter 6. The findings were discussed in different categories and supported the development of the primary care model. The results from different types of literature were an addition to the study findings in the development and validation of the model according to Chinn and Kramer (2011).

1.13 ENSURING RIGOUR

Threats to research trustworthiness, reliability, and validity can never be eliminated but can be minimised at a glance (Creswell & Hirose 2019:24). Rigour in a study is ensured by following standard procedures and providing adequate justifications (Stenfors, Kajamaa & Bennett 2020:597). To ensure the rigorousness of the study, the researcher followed the following criteria during each phase of the study.

1.13.1 Trustworthiness of the study

To improve the trustworthiness of this study, the researcher followed the following trustworthiness criteria. Credibility, dependability, confirmability, transferability, authenticity, and weakness minimisation (Amin, Nørgaard, Covaco, Witry, Hilman, Cernasev & Desselle 2020:1479; Creswell & Hirose 2019:24). Details of the criteria are discussed further in Chapter 3.

Credibility in qualitative research, refers to the plausibility of study results from the participant's point of view, not the researcher's (Creswell & Hirose 2019:126). Polit and Beck (2018:415) describe credibility as trust in the findings and communication of results. To ensure credibility, the researcher used an H1 audio recorder, a smartphone, and hardcopy documents of the narratives on the experience of using primary eye-care.

The study result demonstrated the degree to which the researcher has accurately and fairly demonstrated the lived realities of Ethiopian adults with respect to the provision of

primary eye-care services in the rural South Omo Zone, Ethiopia. The researcher had a prolonged engagement with the phenomenon participants in the study and gathered in-depth data that helped the researcher understand the experiences of the participants. The researcher also conducted a peer review and debriefing with the supervisors and independent experts in the field of eye-care to ensure that the research processes were logically conducted and the results were well reported.

Dependability refers to the loyalty and uniformity of the study findings and the level of documentation of the research process (Creswell & Hirose 2019:124). The researcher used a coder and supervisors to assist in the analysis and interpretation of the findings to finalise the emerging themes. The researcher also documented all scientific procedures followed during the study.

Confirmability is a process of repeatedly checking the findings during data collection and analysis to make sure the findings are consistent if also carried out by others. The researcher strictly evaluated the confirmability during data collection and analysis (Bowling 2014:289). The study used different data collection methods to evaluate confirmability, and the researcher adopted the concept of member checking with in-depth individual face-to-face interview participants to return to participants with clarity and confirmation of narrations shared by participants.

Transferability is similar to external validity/generalisability in a quantitative study and refers to providing evidence that the findings can apply to other populations, situations, or contexts (Creswell & Hirose 2019:128). The study applied exploratory sequential mixed-method research to ensure the triangulation of data from multiple settings.

Authenticity refers to the level to which the researcher collected the different viewpoints and principles of the study participants and created change between participants and study areas during data analysis (Polit & Beck 2018:415). The applied methodology of the study guided the authenticity of the study. To ensure the authenticity of the study, the researcher collected data directly from the study participants and presented their responses in questionnaires.

1.13.2 Phase III (quantitative phase) – validity and reliability

Reliability is justified by the level of obtaining the same result using the same instrument more than once. Furthermore, it refers to the consistency of the measure obtained (Gray et al 2017:690). Most of the time, reliability is closely associated with subjectivity. If the researcher advocates subjectivity, the level of reliability will be compromised (Creswell & Hirose 2019:128). The researcher kept an audit trail for future and interested scholars who would wish to investigate further on the phenomenon. The study used statistical expertise to assess the association between study findings and conclusions. The study also used Cronbach's Alpha to ensure the reliability of the study.

Validity is a mandatory requirement of research measured by the degree to which scientific methods have been followed throughout the process. Validity in a study can be measured and maintained by selecting an appropriate study time, choosing an appropriate methodology and sample methods, and allowing the respondent to choose independently (Walliman 2015:1445).

During this study, an appropriate time to conduct the study was selected, scientifically proven and sound sampling and analysis methods were used, and the rights of the respondents were ensured. Furthermore, the researcher used a statistician to scrutinise and validate the content and relevancy of the questions posed to the participants (Gray et al 2017:690).

1.14 ETHICAL CONSIDERATIONS

In this section, procedures taken to protect the rights of the participant and conduct the study safely are discussed (Arifin 2018:30).

1.14.1 Permission to conduct the study

This study followed all applicable ethical issues and protocols. First, the researcher's request for permission to conduct the study was submitted to the College of Human Sciences Research Ethics Committee (CREC). Following the request, ethical clearance was granted from the College of Human Sciences Research Ethics Review Committee of

the University of South Africa for a year with reference number 58528660_CREC_CHS_2023 (Annexure A).

Following approval of the ethical clearance from the University of South Africa, the researcher submitted permission to conduct the study to the Southern Ethiopia Public Health Institute and the South Omo Zone Health Department and received approval. Similar ethical clearances were received from the four district health offices before data collection (Annexures C-H).

Informed consent means the subjects' agreement to participate voluntarily in the prospective study to collect information about the study (Manti & Licari 2018:146). Informed consent involves the grant of permission to participate in the study after sharing information with participants (Gray et al 2017:327). In this study, the researcher collected signed informed consent from all participants in the focused group discussion, the in-depth individual face-to-face interview, and the self-administered questionnaire before the beginning of the actual study (Annexure I & J). Participants were informed that they have the right to withdraw their participation from this study at any time they wish.

The principle of autonomy obliges the researcher to ensure that participants have the autonomous right to self-determination and understand that they have the right to decide whether to participate in the study or not (Gray et al 2017:327). During the study period, each participant signed an informed consent (Annexure I & J).

The principle of justice refers to the right to fair and equal treatment during the study by ensuring that the selection of participants is based on the study requirements rather than any convenience (Manti & Licari 2018:146). In this study, the right to fair treatment was ensured by applying distributive justice to avoid imposing unfair treatment or discriminating unfairly against participants. Participants were selected and enjoyed fair treatment without judging their beliefs, social standing, lifestyle, etc.

Privacy may be compromised by introducing intrusions into the lives of the participants (Kokolakis 2017:123). The researcher ensured that the privacy of the study participants was maintained throughout the data collection by keeping the data under the strictest measures to protect the participants.

Confidentiality refers to the responsibility to ensure that the data collected should not be disclosed in any way to unauthorised persons, to protect anonymity during data collection (Gray et al 2017:323). During this study, the researcher maintained the safety of the collected data and protected them through encrypted passwords on the soft copy materials, and the hard copies were kept in a locked safe.

Anonymity refers to the names and identifiers of the data to protect confidentiality. Participants were asked to not identify themselves or write their names in any material related to the data. The researcher did not link the participants to the collected data (Gray et al 2017:323). During this study period, the researcher used codes to identify participants.

Beneficence states that research should be of some good contribution to people, as it imposes the moral duty of the researcher to not harm the participants; Beneficence advocates activities to maximise benefit and minimise harm (Polit & Beck 2017:134). During this study, the researcher fulfilled the agreed upon international and national basic moral obligations and ensured that the study had a positive contribution to the people (FDRE, Ministry of Health 2014:21).

The researcher did not use his professional standing to exploit the participants. The researcher-participant relationship was kept professional. The researcher informed the participants that they had a right to participate freely in this study without being coerced in any way against their own will and discharged all their responsibilities.

Non-maleficence refers to the researcher's obligation to avoid or minimise harm; therefore, it requires that the research does not intentionally trigger harm to study participants (Motloba 2019:40). In this study, the researcher ensured that there was no physical harm. To mitigate the discomfort that may have occurred due to the prolonged time of the data collection, the research involved only voluntary participants, and data collection was carried out at the most convenient time and place preferred by the participants. Furthermore, the researcher ensured the dignity and safety of the study participants according to the standard ethical procedures of the study.

Conflict of interest occurs when an outcast might directly and considerably affect, or be affected by, the study design, conduct, or report. Likewise, a financial conflict of interest

occurs when substantial financial interest disturbs the design, conduct, or report of a study directly and significantly (Polit & Beck 2017:144). In this study, the researcher avoided and minimised conflict of interest from the beginning by adhering to the UNISA and Ethiopian Government requirements for recognition, disclosure, and management of conflict of interest, lessening self-interest and learning.

1.15 ORGANISATION OF CHAPTERS

This study is organised into seven chapters. The presentation of the chapters is organised to show the nature and scope of the study. The summary of the chapters is presented below in Table 1.2.

Table 1.2 Summary of chapters

Chapter	Content
Chapter 1	Overview of the study The main research variables are presented. The chapter is organised as follows: Introduction, Background, Description of the study problem, Theoretical framework, Definition of key concepts, Purpose, Research objectives and research questions, Research paradigm, Study design and approach, Study setting, study population, sampling, and sample size, Method and procedure of data collection, Method of data analysis, Ensuring rigour and Ethical considerations.
Chapter 2	Literature review This chapter presents the global, regional, continental, and national study findings on blindness, primary eye-care, service utilisation and barriers, knowledge and skills of service providers, and models of care. The chapter also identifies and presents gaps in the existing knowledge.
Chapter 3	Research design and methods This chapter presents the design and methods applied during the study. Accordingly, the chapter covers the pragmatic perspective of the study, sampling context, methods of data collection, management and analysis, quality assurance, and ethical procedures.
Chapter 4	Qualitative data presentation, analysis, and discussion This chapter presents the qualitative data management and analysis, emerging themes, categories, and sub-categories with detailed discussion.
Chapter 5	Quantitative data presentation, analysis, and discussion

Chapter	Content
	This chapter presents quantitative data management and analysis with detailed discussions in sections.
Chapter 6	Integration of phases, model development, and validation This chapter presents details of data integration, procedures of model development, explanation, and validation.
Chapter 7	Conclusions, recommendations, contribution, and limitations This chapter presents a summary of the main study findings, conclusion, recommendations, contribution of the study, limitations, and concluding remarks are incorporated in the chapter.

1.16 SUMMARY

This chapter presents a summary of the study. Background information, a description of the study problem, the purpose and the study objectives, and research questions were discussed. Additionally, a synopsis of the study design, methodology, and approach followed during the study, including sampling techniques, was presented. The methods of data collection, data management, and analysis were also overviewed. Finally, an outline of quality assurance activities and research ethics was presented. The next chapter presents the literature review of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 1 proposed how the study would unfold; therefore, it dealt with the introduction, research purpose, statement of the problem, study objectives, and research methodology, including ethical principles and measures applied to ensure the trustworthiness of the current study. In this chapter, the body of literature on primary eye-care service provision, use, barriers to service, knowledge and skills of service providers, and model of care are reviewed.

A literature review is described as a systematic way of collecting, integrating, and analysing findings and perspectives to provide a synthesis from many scholarly studies in order to understand the existing knowledge and answer the research questions (Garrard 2022:3; Jesson, Matheson & Lacey 2018:28). The literature review is organised to provide an overview to strengthen the foundation of knowledge, theory development, information advancement, and the development of conceptual and theoretical frameworks for a study (Booth, Sutton, Clowes & James 2022:39; Snyder 2019:335).

A systematic literature review is a commonly used method of literature review in health studies and follows the basic steps of defining the research question, preparing a design for the review, searching the literature through well-defined inclusion and exclusion criteria, checking and maintaining quality during the process, and preparing the synthesis (Burns & Grove 2017:208; Cooper, Booth, Varley-Campbell, Britten & Garside 2018:3). Research findings can easily be assessed to ensure their reproducibility and presentation with a systematic review of the literature (Davis, Mengersen, Bennett & Mazerolle 2014:511). In this chapter, the general concept of PEC was reviewed from the findings to meet the study objectives.

2.1.1 Literature review

A literature review is conducted to illustrate what is known so far, present similarities and differences between studies, show the gaps in existing knowledge, and demonstrate the level of awareness and the ability to interpret and present metaphors about the topic under study (Polit, & Beck, 2018:170; Paul & Crido 2020:1). Additionally, a literature review generates a new dimension for observing the known knowledge and gaps in previous studies for the largest bodies of information. A literature review will also be developed to better understand the accumulated knowledge in the field (Garrard 2022:3; Snyder 2019:335).

Literature that validated existing knowledge and filled the gaps in the study topics was reviewed. Concepts, methods, and experimental techniques related to the primary eye-care service, utilisation, barriers, knowledge and skill of service providers, and readiness of the PECU were reviewed to support the optimal provision of the primary eye-care service in the rural area of the South Omo of Ethiopia. The literature review will assist in generating new knowledge to be added to the existing body of knowledge.

2.1.2 Strategies used to search the literature

The literature review was compiled from different sources including, journals, books, articles, thesis/ dissertations, and government reports produced on the primary eye-care model, primary eye-care service, use, barriers, and knowledge and skill of primary eye-care service providers. Furthermore, relevant articles were searched using the following databases: Google Scholar, PubMed, Sabinet, Science Direct, Scielo, Biomed Central, Springer Nature, WHO website, Journals of Global Health Reports, and ophthalmic epidemiology using study keywords with slight alterations where search results returned detrimental results. Figure 2.1. presents keywords used.



Figure 2.1 Keywords used during the literature review

In this section, the literature related to the research topic, objectives, the conceptual framework on which the study is based, policies, programs, approaches, primary eye-care models, and lessons learnt to integrate PEC services into PHC and reduce avoidable blindness were briefly discussed. Key concepts were defined and discussed from various sources. Different journals and research books were utilised to cover the topic under discussion.

The literature review covers learnings from global, low- and middle-income countries, the sub-Saharan African region, and Ethiopia on eye-care, PEC, service utilisation, barriers to service, knowledge, and skill of primary eye-care workers to improve the eye-care services for the reduction of avoidable blindness in Ethiopia. The experience and lessons of national, regional, and international policies, different models, and approaches in developed and developing countries are well discussed to ensure optimal provision of primary eye-care services to the marginalised community. In this section, emphasis is

placed on how the developed countries reduced and eliminated avoidable blindness through models, policies, programs, and services. The details of the literature review are organised in chronological order to respond to the study objectives.

2.2 GLOBAL PERSPECTIVE OF EYE-CARE

The WHO (2022d:8) prepared thirteen core indicators to measure and define the eye-care service of member states. Core indicators measure eye-care service at the input, process, output, outcome, and impact levels. The prevalence of visual impairment and blindness is categorized as a key indicator for measuring and defining the impact of eye-care services in a country (WHO 2022d:8). Therefore, in this chapter, the global, regional, continental, and national status and perspective of eye-care was reviewed based on the prevalence of blindness and visual impairment.

In its global initiative to eliminate avoidable blindness, the WHO (2019a:4) defines blindness as a state of “visual acuity less than 3/60 or a corresponding visual field loss to less than 10° in the better eye with the best possible correction”. Similarly, low vision is defined as “visual acuity of less than 6/18 but equal to or better than 3/60, or a corresponding visual field loss to less than 20°, in the better eye with the best possible correction” (Malik et al 2018:179; WHO 2019a:4).

Visual Impairment (VI), a condition ranked third in causing disability worldwide, is a term used to represent both conditions (Malik et al 2018:179; Ferede, Alemu, Gudeta, Alemu & Melese 2020:2). Visual impairment is among the main health concerns worldwide and is allied with devalued quality of life and reduced subsistence expectancy in older populations (Cicinelli et al 2020:316).

Currently, 2.2 billion people in the world are estimated to have a VI, either blindness or low vision. Nearly half, one billion eye conditions were avoidable; treatable, or prevented (WHO 2022a:16; International Agency for Prevention of Blindness 2023:32). Every year a total of three trillion USD is expended by the community, families, and patients due to visual impairment worldwide, causing a huge economic impact that hinders individual as well as societal development (Forrest, Mercado, Engmann, Stacey, Hariharan, Khan & Cabrera 2023:1; Solomon, Shoge, Ervin, Contreras, Harewood, Aguwa & Olivier 2022:e116). In addition to the economic and developmental impact, visually impaired

people experience hardship and need the help of a family or community member for routine tasks. The hardship lasts longer when blindness occurs in childhood (WHO & UNICEF 2020:18).

According to Bourne (2021:134), due to factors such as ageing and population growth, the number of people who become visually impaired is rapidly increasing despite the recorded decline in blindness and visual impairment prevalence. The number among people 50 years and older becoming blind will increase in the coming years due to chronic eye diseases and the natural ageing process. The age category 50 years and older characterises 75-82% of the visually impaired (Forrest et al 2023:5). The result of a trend analysis of the prevalence of blindness, distance, and near vision impairment over 30 years (1990-2020) showed the number of people ageing will reach 2 billion and the number of people with blindness is predicted to reach 61 million by 2050. Age-related ocular morbidities, including refractive error (uncorrected), Glaucoma, cataracts, and Age-related Macular Degeneration (AMD), will be the causes of visual impairment (Bourne 2021:134).

Sub-Saharan Africa and South Asia carry 90% of the global blind and visually impaired population (Narayanan & Ramani 2018:752; Nikpoor, Hansen, Oliva, Tabin & Ruit 2018:27). Like most health indicators, the prevalence of blindness and low vision varies between developed and developing countries. Of 1,000 North Americans, 1.94 are blind. In Southeast Asia, the prevalence increases to 8.75 out of 1,000. In western sub-Saharan Africa, 11.1 people out of 1,000 are blind (Bourne 2021:134). The evolution in the disease process and change in socio-economic and environmental conditions has changed the causes of VI from communicable diseases such as Trachoma and onchocerciasis and blindness due to deficiencies to noncommunicable eye conditions such as Glaucoma, Diabetic Retinopathy, and AMD (Forrest et al 2023:5; Khanna et al 2020:333).

Blindness and visual loss have a serious impact on cognitive and psychomotor development when they occur during childhood (Malik et al 2018:177; WHO 2000:12). In most low- and middle-income countries, children with visual impairment are more likely to die early. If they survive, they will suffer greatly in attaining education and employment and making a potential contribution (Malik et al 2018:177; Surrati, Almuwarree, Mohammad, Almatrafi, Murshid, Khayat & Al-Habboubi 2022:1). Like adults, the prevalence of blindness and low vision in children is higher in low- and middle-income

countries when compared to developed nations being 12-15 per 10,000 in low-income countries and 3-4 per 10,000 in developed countries (Malik et al 2018:176). Coverage of immunisation and Vitamin A supplementation, access, and utilisation of eye-care services, and the sociocultural condition of the community determine the causes of blindness in different regions of the world (WHO 2019a:124).

The WHO recommends that key health promotion activities such as face washing and breastfeeding, key preventive measures such as measles immunisation and Vitamin A Supplementation (VAS), appropriate diagnoses, and referral of eye conditions treatable at a higher level such as cataracts and Glaucoma be carried out to address VI and blindness in children (WHO 2022d:35). Despite the presence of evidence on the effectiveness of strategies proposed by the WHO in reducing the prevalence of VI and blindness in children, there exists limited progress in implementing PEC in children (Malik et al 2018:4).

2.2.1 Eye-care in low- and middle-income countries

Eye conditions that could be prevented or treated, lead to blindness, and VI are a major public health problem in LMICs where eye-care services are provided at the PHC level (Lilian, Railton, Schaftenaar, Mabitsi, Grobbelaar, Khosa, Maluleke, Struthers, McIntyre & Peters 2018:2). Globally, South Asia, East Asia, and Southeast Asia have the largest number of visually impaired people in descending order (Bourne 2021:137). India carries the highest prevalence of global blindness. In 2023, 15 million Indians were reported to be blind (Singh 2023:1).

So far, different factors have been identified to account for the very high prevalence of VI in these countries, with poverty and low or no access to PEC services being the underlying causes (Misra et al 2015:82). Poverty and blindness always reside together. Poverty causes blindness, and blindness causes poverty. People living in an area where poverty is rampant have limited or no access to education and facilities that provide eye-care. In addition, different socioeconomic and cultural barriers hinder the use of unfairly distributed eye-care units (Med, Macleod, Bastawrous, Wanjala, Gichangi & Burton 2019:10; Misra et al 2015:82).

Unfairly distributed facilities, poor quality of service provided, lack of uniformity in implementing PEC services, shortage and turnover of trained personnel, shortage of equipment and supplies, poor follow-up, and failure of integration of eye-care services into PHC are among the major challenges developing countries face in reducing avoidable blindness (Khanna et al 2020:338; Misra et al 2015:83; Rehman & Sharif 2021:164).

Resolution 66.4 of the World Health Assembly adopted in 2013 as an integral part of the Universal Eye Health Global Action Plan 2014-2019 which emphasises access to a full-fledged eye-care service to create a world where no one is needlessly visually impaired, should be implemented to address the high burden of blindness and low vision in this region (WHO 2013b:128). The Global Action Plan envisioned a reduction in visual impairment by one-fourth at the end of 2019 (Bourne 2021:139; WHO 2013b:130). Key interventions explicitly targeting blindness are vital to address the current condition, which includes the basic components of prevention, promotion, treatment, rehabilitation, and eye health education with a special focus on the rural and marginalised community (Gnyawali, Bhattarai & Upadhyay 2012:98).

2.2.2 Eye-care in the sub-Saharan African region

Despite the significant improvement in the drop of VI in the region, the prevalence of blindness in Africa is the highest of all continents (Nikpoor et al 2018:31). Avoidable blindness due to cataracts and uncorrected refractive errors causes visual impairment in 26 million people in the region. An additional 100 million elderly are expected to have near vision impairment (Aghaji et al 2021:1). Of the world's regions, the highest prevalence of age-standardized blindness is recorded in sub-Saharan Africa, 4.3% in eastern Africa, and 5.1% in western sub-Saharan Africa. Almost 6 million of the population are blind (Aghaji et al 2021:1; Med et al 2019:3).

The distribution of visual impairment and the blindness and enactment of the action plan for universal eye health aimed at reducing avoidable blindness varies significantly between countries in the region (Lilian et al 2018:2; Med et al 2019:4). More than three-fourths of the visual impairment in the region is preventable or treatable (Graham 2017:2) Vitamin A deficiency and measles infection which can be prevented by community-level

interventions, are responsible for causing more than 50% of the blindness in children in the region (Graham 2017:87; Malik et al 2018:179).

One-fourth of Nigerians, 50 million, have ocular morbidity, of which 4.25 million are visually impaired or blind due to avoidable causes (Aghaji, Gilbert, Ihebuzor & Faal 2018:2). In Nigeria, among the main causes of blindness, the lack of facilities providing basic eye-care services is mentioned as the main reason for being or remaining blind. The result of a study carried out in Kassala state of Sudan by the Sudanese government found that 14% of the study population had blindness, which is among the highest in the country (Qureshi, Mansur, Al-Rajhi, Lansingh, Eckert, Hassan, Ravilla, Muhit, Khanna & Ismat 2012:356).

2.2.3 Eye-care in Ethiopia

Visual impairment and blindness is a problem for more than 15 million Ethiopians, and is among the major public health problems in the country. Having a 1.6% prevalence of blindness and 3.4% prevalence of low vision, Ethiopia is classified as among those countries with a high blindness and low vision prevalence (Ethiopian Ministry of Health 2016:35; Morka et al 2020:3). Cataracts, Trachoma, and uncorrected refractive errors were the leading causes of blindness and low vision and are responsible for 70% of the causes. Over 76 million Ethiopians live in Trachoma-endemic districts, which categorises the country as having the highest Trachoma burden globally (Ethiopian Ministry of Health 2016:45; Teshome et al 2021:3).

Like many sub-Saharan African countries, in Ethiopia, 91.2% of blindness and 87.4% of visual impairment is avoidable (Morka et al 2020:2). A result of a study conducted in Gondar, northern Ethiopia, to assess visual impairment among school children, found that visual impairment was a significant public health problem among schoolchildren, with uncorrected refractive errors being the main cause (Ferede et al 2020:5).

Aiming to develop a workable system for eye health care that guarantees the best viable vision for all people resulting in improving their quality of life, the Vision 2020 initiative was launched by the Ethiopian government in September 2002 (Ethiopian Ministry of Health 2016:34; Morka et al 2020:2). This national initiative covers human resource

development for eye-care, infrastructure and technology development, and control of causes of avoidable blindness (Teshome et al 2021:7).

Success in reducing blindness and visual impairment would break the poverty cycle and ease its impact at the household, community, country, and regional levels (Ethiopian Ministry of Health 2016:5). To improve global vision health, focus on diseases that affect vision, organise comprehensive policy packages, and make adequate investments in training and diagnosis programmes (Forrest et al 2023:6). Quality of life and socioeconomic disabilities caused by visual impairment will be improved in a coordinated and organised manner, resulting in the achievement of the Universal Right to See (Gnyawali 2012:101; Lilian et al 2018:1).

In 1999, Vision 2020: The Right to Sight, was prepared by the International Agency for Prevention of Blindness (IAPB) and the WHO; this is considered a footprint in avoidable blindness elimination around the world (WHO 2019a:15). Even though many sub-Saharan African countries, including Ethiopia, endorsed this global initiative, not much progress has been made. The World Health Assembly launched a new Global Action Plan to address universal eye health in 2013, the Global Action Plan 2014-2019 aimed at achieving a 25% reduction in avoidable blindness in 2019 from the baseline of 2010 (Boume 2021:147; WHO 2013b:15).

2.3 A GLOBAL PERSPECTIVE OF PRIMARY EYE-CARE

The 1978 Alma Ata meeting was marked as the first moment for the inception of Primary Eye-care (PEC) (Kalua, Gichangi, Barassa, Eliah, Lewallen & Courtright 2014:5; Rehman et al 2021:162). The WHO defines PHC as a community-based intervention to improve public health and well-being through important primary public health activities, integrated policies and action plans, and competent communities. Similarly, fundamental eye-care services are available to the whole community, regardless of their socio-economic status aiming at diagnosing and treating common eye conditions prior to complications (Gilbert et al 2021:70).

In the above, the definitions, integrated primary care and public health services refer to the identification and management of common ocular morbidities and accurate diagnoses and referral of complex conditions. The presence of policies and actions that can help

ensure the elimination of avoidable blindness and increase access is referred to as multi-sectoral policies and actions in the definition. Activities carried out to build the capacity of the community to know and take care of their eye conditions, including the source of the remedy, and the side effects of traditional or local remedies are classified as empowering the people and the community (Gilbert et al 2021:72).

Primary eye-care is one of the eleven components of PHC and the key part of comprehensive eye-care services; through this the community enjoys full-blown quality service at the grassroots (Moyegbone, Nwose, Nwajei, Agege, Odoko & Igubor 2020:2). Preventive, promotive, curative, and rehabilitative activities that are accompanied by visual acuity measurement, case identification, eye health education, basic eye examination, diagnosis, and timely referral are components of PEC. All components of PEC must take place in PHC except key health promotion activities which can be provided at the community and PHC levels (Graham 2017:86; WHO 2022b:14). Primary eye-care must consider policies and actions that are multisectoral and capable of creating community empowerment in addition to comprehensive eye-care services provision (Gilbert et al 2021:70).

The WHO recommends integrating PEC with PHC activities such as nutrition, sanitation, immunisation, and hygiene, and having relevant structures for service delivery, a policy framework, and passable financial commitment for successful implementation (Graham 2017:85; WHO 2022d:16). The main objective of PEC is to subsidise to the decrease of avoidable blindness and low vision in developing countries, thus improving quality of life (Blanchet & Finger 2015:293; Kalua et al 2014:4).

The WHO's (2013b:128) Global Action Plan (2014-2019) highlights the delivery of eye-care services using PEC as the best tool to achieve universal eye health coverage (UEHC) (Khanna et al 2020:334). This claims that the public should have access to high-quality and affordable primary care services that comply with the standard of care for promotion, prevention, treatment, and rehabilitation services in the nearby. They strongly advise that eye health services must be equitable, accessible, comprehensive, high quality, and affordable for all. The sustainable development goals (SDGs) focus on universal eye health coverage goal number three (WHO & UNICEF 2020:51).

The scope and implementation of PEC is very prominent in different areas of the globe. Numerous reports show the presence of significant variation in understanding the use and implementation of PEC globally (Khanna et al 2020:333). Countries such as Thailand, Pakistan, Nepal, and India have shown good progress in the incorporation of primary eye-care into PHC, rural family health systems, and vision centres (Burn, Puri, Roshan, Singh & Burton 2020:174; Gnyawali et al 2012:96; Rehman & Sharif 2021:166). They also staffed their PECs with community workers (CWs) who had received adequate training in screening and identifying ocular morbidities. A PEC service that ensures equity, intersectoral collaboration, community participation, and sustainability with a long-term impact on the creation of a healthy community is categorised as a good PEC (Gilbert et al 2021:71).

Regarding the provider of PEC service, countries like Australia, the United States of America, and the United Kingdom use specialised personnel such as optometrists to provide PEC (Kelaher, Ferdinand & Taylor 2012:51). In India, paramedical ophthalmic professionals are assigned to provide PEC in public facilities. In most African regions, PHWs provide PEC services with no or minimal training (WHO 2018b:43). The incorporation of PEC as a key component of PHC will support expansion and delivery, ultimately reaching the target community (Khanna et al 2020:338). Providers of PEC services must be well trained in the identification, treatment, and referral of common ocular morbidities by arranging appropriate equipment, consumables, and supervision for the implementation of PEC (Aghaji et al 2018:3).

2.3.1 Primary eye-care in low- and middle-income countries

Secondary and tertiary eye-care facilities are the most common eye-care service providers in many countries in this category (Aghaji et al 2020:2). These facilities are in urban areas, far from communities in need of PEC services. The absence of facilities providing comprehensive eye-care in rural areas incurs additional costs for both the service user and the provider, intensifies the visual loss due to lack of treatment or use of harmful traditional practices, and leads to access inequality (Aghaji et al 2020:4; Graham 2017:86). It is the non-governmental organizations (NGOs) who offer a large share of eye-care services in many LMICs (Aghaji et al 2018:3).

Of the LMICs, Nepal established and introduced a well-structured and functioning eye-care system. The existing system had good support from the government and all stakeholders in resource mobilisation and allocation, training for different ophthalmic professionals, and advocacy in integrated PEC with the existing PHC (Burn et al 2020:172). In India, a country that contributes nearly one fifth of global visual impairment, PEC is well integrated into PHC. However, due to the weak structure and poor commitment of the government, the PEC is not functioning well (Khanna et al 2020:335).

2.3.2 Primary eye-care in Africa

The primary eye-care service aims to reach the poorest and most marginalised community with locally trained PECWs, which is considered a task change in the provision of the eye-care service from more specialised personnel to less specialised personnel, especially in Africa (Kalua et al 2014:5). UEHC underscores that everyone should access quality eye-care services near without the risk of deprivation (Khanna et al 2020:335). Currently, there is positive progress in getting support for PEC in Africa and the world in general (Aghaji 2018:4).

Most primary eye-care-related studies include the effectiveness of the interventions in India and Nepal. There is very little evidence on the use, need, and barriers of PEC services in Africa. Only a third of Africans have access to haphazardly distributed eye-care facilities across and within certain countries (Aghaji et al 2020:2; Bright, Kuper, Macleod, Musendo, Irunga & Yip 2018:1). A study conducted in Rwanda to assess the population needs for PEC found that the estimated need for PEC and utilisation in the population was 34% (Bright et al 2018:1). Similarly, the result of a study conducted in Nigeria to assess barriers to the use of eye-care services in rural communities of Edo state showed that the use rate of eye-care in the state was 25.2% (Ebeigbe & Oveneri 2014:102). A separate study conducted in Rwanda found that only a third of the study population had utilised PEC services (Burn et al 2020:165; Yip, Bright, Ford, Mathenge, & Faal, 2018:950).

In South Africa, primary eye-care units provide a large number of services to the needy with a notable referral-out link (Lilian et al 2018:3; Ntsoane, Oduntan & Mpolokeng 2012:4). Similarly, in Kenya, Gambia, Mali, and Zimbabwe the PEC service is provided as part of the PHC. Service providers involve teachers, community-based rehabilitation

workers, and teachers who will serve as a bridge by reducing speculations and harmful traditional practices and generating awareness (Aghaji et al 2020:5). To realise the benefit of PEC, there should be a clear and well-designed communication, referral, and feedback mechanism from the household to the tertiary level (Aghaji et al 2018:4).

Many countries in sub-Saharan Africa have reported different challenges in the effective implementation of PEC despite the good progress of the programme in ensuring sustainability and increasing basic access to eye-care services. The lack of common sympathy for the scope and the absence of clear guidelines on the skills required for PECW, misinformation, high turnover of skilled professionals, and non-existence of curriculum were among the key challenges (Aghaji, Burchett, Mathenge, Faal, Umeh, Ezepeua, Isuiyaki, Kyari, Wiafe, Foster & Gilbert 2021:2; Graham 2017:86). Other challenges include the absence of integrated supportive supervision and the shortage of supplies and equipment, the knowledge and skill gap to diagnose ocular morbidity that causes improper treatment, delay in decision-making and referral, and failure to report unmanageable conditions at the PEC level (Aghaji et al 2018:4; Kalua et al 2014:2).

The complete PEC package shall be implemented if progress is planned that includes the completion of basic supplies, equipment, and consumables for an eye examination, eye health education and promotion, documented referrals, supportive supervision, health information, and feedback systems. Furthermore, government advocacy and support are needed in addition to clear financing mechanisms and good governance (Aghaji et al 2018:3). For effective implementation of PEC, a well-operational PHC is mandatory (Aghaji et al 2018:4). Countries such as the Gambia achieved success in plummeting the prevalence of blindness from 0.7% to 0.42% over 10 years after the effective implementation of PEC. However, most sub-Saharan regions reported failures related to activity as NGOs drove (Aghaji et al 2021:6).

The African Regional Office of the WHO launched an evidence-based PEC intervention packages, the WHO AFRO PEC package to uniformise the scope of PEC intervention in sub-Saharan Africa. The package can improve eye health coverage and strengthen the system (Aghaji et al 2021a:2). For ease of use, the package can be broadly categorised into facility-based eye-care interventions and health promotion activities. Facility-based eye-care interventions include visual acuity measurement, foreign body removal, eye medication administration, eye patch application, counselling, and referral. The package

was shown to be effective in solidifying the knowledge and skills of PECW and expanding access to eye-care (Graham 2017:85; Kalua et al 2014:5).

The WHO AFRO PEC package advocates community empowerment to take responsibility for their eye health and support their region to achieve ultimate eye health coverage. The package calls for a globally revitalised focus on PEC, national reforms on PHC programmes and approaches, and supporting policy environment and health financing mechanisms that accommodate the very poor coverage (Aghaji et al 2018:4). The result of a study on the efficacy of the WHO AFRO PEC package showed that there exists an increase in access to eye-care after the successful implementation of the package as part of comprehensive coverage of eye-care services (Graham 2017:86).

If the PEC service can be well grounded in African regions, the change in access and use will contribute to the overall socioeconomic and developmental improvement in addition to the expected remarkable reduction in preventable causes of blindness and low vision. The change will contribute to the attainment of universal access to PEC services (Audu 2020:1; Moyegbone et al 2020:5).

2.3.3 Primary eye-care in Ethiopia

The Ethiopian Ministry of Health (2016:36) defines the primary eye-care unit as a unit to provides basic preventive and promotion eye health services, having a separate room for patient examination and minor surgeries. Service providers were integrated eye health workers or ophthalmic nurses (Ethiopian Ministry of Health 2016:36). The PECU is expected to practice the promotion, prevention, and treatment of eye health. The unit will also perform minor surgery, basically Trachomatous Trichiasis (TT) surgery, and screen and refer uncorrected refractive errors, cataracts, and other eye conditions in secondary and tertiary eye-care units (Ethiopian Ministry of Health 2016:38).

So far, no evidence has been found of the need for PEC in the community in Ethiopia. A study carried out in Hawassa found that 23.8% of adults 40 years and older had utilised PEC services in the past two years (Morka et al 2020:1). A similar study conducted in the Gurage Zone of Ethiopia found that only 7% of health facilities provided eye-care and only 20% of them are equipped according to the national standard for eye-care service (Teshome et al 2021:2).

The Ethiopian Ministry of Health (2016:16) in its Five-year Eye Health Strategic Plan (2016-2020) identified the following weaknesses in the national eye-care programme: lack of units, lack of budget for instruments and supplies for eye-care, scarcity of trained eye-care workers, poor advocacy, delay in scaling up surgery, antibiotics, facial cleanliness, and environmental hygiene (SAFE) for elimination of Trachoma in highly affected regions, inadequate supervision at all levels, poor quality and absence of eye health indicators in the National report database (Ethiopian Ministry of Health 2016:16).

Primary eye-care aims to deliver eye-care services to the community regardless of the socioeconomic status of the individuals. As part of PHC, PEC abided by the basic principles of intersectoral collaboration, equitable distribution of resources, community participation, and use of appropriate technology (Misra et al 2015:80). In summary, the provision of PEC services is not satisfactory. Regardless of the presence of supportive policies, strategies, and guidelines, their implementation is still in its infancy. The activity is not well integrated into general service provision and needs serious attention (Malik et al 2018:176).

2.4 UTILISATION OF THE PRIMARY EYE-CARE SERVICE AND BARRIERS

The WHO and UNICEF (2020:10) defines health service as a wide range of diagnostic, curative, and rehabilitative services to the community to improve their general health status. The WHO and UNICEF (2020) PHC operational framework reported that 50% of the global population does not have access to the basic health services they want. This imbalance exists between and within countries, which results in the existence of health inequality. WHO should improve access, use, and monitoring of health services as key interventions to achieve universal health coverage (Med et al 2019:5).

The use of eye-care service is defined as the utilisation of the eye-care service for the prevention, promotion, cure, and rehabilitation of state of the eye health. The definition also includes the ability to obtain adequate information related to eye health (Morka et al 2020:4; WHO & UNICEF 2020:10). The use of eye-care in the above definition of the WHO incorporates components of comprehensive eye-care services for the prevention, promotion, treatment, and rehabilitation of eye health (Teshome et al 2021:2). Five elements were identified as the key to measuring acceptance of eye-care services:

accessibility, availability, accommodation, affordability, and acceptability (Graham 2017:86). Primary eye-care service delivery and its use varies greatly between and within countries dependent on the available resources (Gilbert et al 2021:2).

Even if appropriate use of eye-care services is among the key strategies to reduce the high burden of blindness and low vision, especially in LMICs, the use of eye-care services varies widely throughout the world, ranging from 18% to 82.5% (Morka et al 2020:2). In developed countries, most of the population uses eye-care services. Of the developed states, the use of eye-care services was 73.5% in South Korea, 57% in Canada and the United States, and 67% in Australia (Park, Heo, Ye, Suh, Kim, Lee, Park & Baek 2017:58; Foreman, Xie, Keel, 2018:213). Different factors contribute to this high use of eye-care services in developed countries when compared to developing countries. The level of awareness, accessibility, availability, affordability, and acceptance in this region is high.

In a separate study conducted in Australia to assess community awareness of common ocular morbidities, it was reported that 77% were aware of one of three eye conditions: Glaucoma, AMD and cataracts (Gnyawali et al 2012:98; Morka et al 2020:2; Park et al 2017:58). Adequate human resources, finance, health information, proper technology, consumables, service delivery, and good governance were identified by the WHO as key building blocks for comprehensive eye-care services (Cicinelli et al 2020:319; Umaefulam & Premkumar 2020:7).

2.4.1 Using primary eye-care services and barriers in low- and middle-income countries

In many low-and middle-income countries, PEC services are insufficient, and even in areas where the service is available, the utilisation rate is so low due to numerous reasons (Morka et al 2020:3; Rehman & Sharif 2021:163). Within the category of LMICs, very few primary eye-care-related studies have been conducted in Pakistan, Nepal, India, and few African countries such as Nigeria, South Africa, Rwanda, Kenya, and Ethiopia.

A study carried out in Pakistan to measure PEC usage found that 45.3% of study participants had used PEC in the past two years (Rehman & Sahrif 2021:164). A study carried out in Lete Ilaka state in Nepal to assess community awareness found that 63% of respondents were aware of one or more eye morbidities. The same study found that

6% of women caregivers in Lete Ilaka state did not know about the presence of PEC services and, despite the presence, primary eye-care units were found to be poorly equipped (Gnyawali et al 2012:97).

The result of a study in Nepal found that the eye-care service of the country is financed by NGOs or the private sector. The services provided by these actors are not affordable and reachable. On the other hand, most people living in rural areas suffer a lot due to a lack of trained workforce to provide care (Gurung & Oli 2021:13). Similarly, 69.8% of the urban population in India was found to be aware of what cataracts are. In both studies, adequate awareness of primary eye-care services and use was found to have a significant association with age, sex, educational level, and a recent visit to an eye-care provider (Khanna et al 2020:335).

The lack of awareness of PEC services was mentioned by most as a barrier to the service of the PEC service in Pakistan (Rehman & Sharif 2021:162). In the Lete Ilaka state of Nepal, in addition to poor knowledge of ocular morbidity, the long distance to units providing services, incomplete service, absence of the service provider during visits, and poor skill and knowledge of the service provider were identified as barriers to services (Gnyawali et al 2012:96). Different factors were identified as poor eye health seeker behaviour in LMICs. Among many factors: long-term use of traditional remedies, lack of awareness, lack of attention to eye problems, economic constraints, and gender (Bhoosnurmath 2017:14).

2.4.2 Use and barriers to primary eye-care services in sub-Saharan Africa

There is inadequate evidence on PEC services and barriers to service in the sub-Saharan African region, a region that represents those countries located South of the Great Sahara Desert. According to the WHO AFRO PEC package, in many sub-Saharan African countries, the PEC service is designed to reduce inappropriate travel and the use of secondary and tertiary eye-care facilities located in urban areas (WHO 2012:9). Establishing and full functioning of PECUs will result in increased access to the community and reduce the prevalence of avoidable blindness. In addition to its contribution to the attainment of universal eye health coverage, it has a huge socioeconomic and developmental benefit to the community (Med et al 2019:15).

The result of a study conducted in Nigeria shows that the delivery of services for eye conditions such as conjunctivitis and presbyopia in secondary and tertiary eye-care facilities resulted in high costs for both the patient and the service provider, resulting in inequality in eye-care services in the country (Aghaji et al 2018:3; Senyonjo, Lindfield & Mahmoud 2014:1). In South Africa, the provision and use of eye-care services is below the National Department of Health standard. Different challenges have been reported for the unstandardised delivery of services; these include poor and weak organisational support, a shortage of resources, and lack of competent service providers (Lilian et al 2018:3).

A periodic eye examination is recommended for all individuals, especially those with known or pre-diagnosed ocular morbidity to prevent complications and blindness. Studies showed that appropriate follow-up and period use of eye-care will reduce blindness in general (Pulido, Flaxel, Adelman, Hyman, Folk & Olsen 2016:210). The result of studies carried out at different times and in different regions of Nigeria described that eye-care use in the community was 19%, 32%, and 38%, the latest being 38% in Abuja, Nigeria (Aghaji et al 2018:2; Ebeigbe & Oveneri 2014:99; Moyegbone et al 2020:4). Similarly, the past two years eye-care service use rate Ghana was 32.2% (Ilechie, Otchere, Darko-Takyi & Halladay 2013:8).

The result of a study conducted in West Kenya, to assess the use of secondary eye-care units (SECUs) in the region, showed the presence of a gradual increase from 609 per 100,000 population in 2013 to 792 per 100,000 in 2015 in use of SECUs (Med et al 2019:2). In a study conducted in Nigeria to assess barriers to PEC service, 58% of the study participants stated that they had consulted an untrained (traditional medicine practitioner) several times for their eye conditions (Ebeigbe & Oveneri 2014:102). Similarly, in another study conducted in Nigeria to evaluate the use of PEC services, 35% of the respondents reported having consulted local healers as a first option for eye disease due to the lack of PEC services in the nearby area (Aghaji et al 2020:6).

Studies conducted to assess the use of PEC services in different parts of sub-Saharan Africa countries identified the presence of poor utilisation which is fenced off by many challenges and barriers (Müller, Murenzi & Mathenge, 2010:529). The result of a study conducted in South Africa to measure the use of eye-care patterns found that 73.4% of the study participants had not used the PEC service. The study identified age, income,

ethnicity, and medical conditions such as diabetes, and access as barriers to service use. The study recommends the creation of awareness and strengthening of health promotion activities, such as the establishment of a mobile clinic system (Akuffo, Sewpaul, Dukhi, Asare, Kumah, Addo, Agyei-Manu & Reddy 2020:10). The conclusion of another study conducted in South Africa on PEC indicates the presence of poor eye-care service in the country (Lilian et al 2018:3).

In South Africa, less than 10% of eye-care units were found to have separate eye-care clinics staffed with 50% of the minimum human resources for eye-care according to national standards. The study identified knowledge and skill gaps between service providers, gaps in accessing adequate supplies and equipment for primary eye-care services, and a weak organisational structure to provide the service for the needy (Lilian et al 2018:4). The study also identified the absence or shortage of trained personnel dedicated to the primary eye-care service, the shortage of medications, unaffordable medications, weak support and supervision, incomplete services, and a weak referral link to secondary and tertiary eye-care units as key challenges in the implementation of PEC in South Africa (Lilian et al 2018:13).

In Nigeria, most of the specialised ophthalmic professionals, such as ophthalmologists, are concentrated in urban areas, far from rural areas where much of the community lives. The community must travel far to obtain access to eye-care or consult traditional (untrained personnel) for ocular morbidity (Aghaji et al 2018:3). Another study conducted in Nigeria to explore barriers to PEC services found that the cost of treatment, the distance to the eye-care unit, the lack or absence of transportation, lack of interest, the need for an escort, religious beliefs, and language barriers are reasons behind poor access to PEC services (Ebeigbe & Oveneri 2014:99). The result of a study carried out in Kenya underscores the barrier to the health system as a major cause of poor eye-care in the country. The study identified the unavailability of trained eye-care professionals, the insufficient skill of the service provider, and a service that excludes the poor as system-related barriers. Distance and sex were also found to affect eye-care services in Kenya (Med et al 2019:2).

Accessibility of service was not the only reason for the failure to use eye-care services. In a study from Nigeria, 68% of the population had never had their eyes examined in a hospital before (Ebeigbe & Overseri 2014:101). Low or poor eye-care services use is a

real concern in Africa, due to the high probability of blindness and low vision to follow if individuals with ocular morbidity are left untreated. Different barriers to PEC services use have been identified in sub-Saharan Africa: geographical, socioeconomic, and political domains (WHO 2013c:31). Other factors such as lack of infrastructure, corruption, unrest, limited finance to eye-care services, and absence or shortage of dedicated eye-care personnel (Cicinelli et al 2020:321).

To achieve UEHC, the commitment and willingness of politicians, supportive policies, and programmes are mandatory. Additionally, a well-structured eye-care system and multisectoral collaboration are mandatory (Das 2020:3). Nigeria is presented as an example for most countries in the region, as it has updated and practical PEC policies and strategies. The policy emphasises the importance of eye-care training to primary healthcare workers and the establishment of a workable referral system between primary and secondary eye-care units for optimal eye-care services provision. The ideal PEC policy should incorporate human resources for eye health, a description of the scope of service delivery, equipment and supplies, the prevention and promotion activities of eye health, and a referral system (Aghaji & Gilbert 2021:82).

2.4.3 Using and barriers to the primary eye-care service in Ethiopia

Like most sub-Saharan African countries, eye-care facilities in Ethiopia are scarce and poorly distributed (Ethiopian Ministry of Health 2016:9). Eye-care use and barriers to service are not well studied. The Ethiopian Ministry of Health (2016:36) reported the presence of 579 PECUs led by an Integrated Eye-care Worker (IECW), a mid-level health care worker who received four to six weeks of training in primary eye-care, including TT surgery, and served as a contact person in the PHC, in 2015. The result of a study conducted in Hawassa, Ethiopia, to evaluate the use of eye-care services among adults it was established that 23.8% of the community used eye-care services in the past two years, which is among the very low use of eye-care in the region. Most of the study participants said that eye-care units should only be visited during illness, and the study identified a high awareness gap among study participants (Morka et al 2020:2).

In a study conducted in the Gurage area, Ethiopia, poor integration of the eye-care service into the PHC was identified. Only 7% of the PHC facilities provided PEC services to the community. The same study also revealed that only 20% of PECUs are equipped

according to the national standard (Teshome et al 2021:4). In its 5-Year Strategic Plan, the Ethiopian Ministry of Health (2016:6) identified the shortage and accumulation of professionals in urban areas and NGOs as a challenge to expand basic eye-care services in the rural community. Of the ophthalmologists in the country, more than 60% reside in Addis Ababa, Ethiopia's capital, and almost half work in NGOs or in the private sector (Alemayehu & Meskele 2017:215).

In summary, creating awareness and access to the community will break the barriers to eye-care services and increase the trend of use in the country. In addition, primary eye-care services must be standardised and be the number one choice for the needy.

2.5 KNOWLEDGE AND SKILL OF PRIMARY EYE-CARE WORKERS

The WHO Regional Office for Africa categorises those mid-level health cadres such as clinical officers and nurses providing basic eye-care services that are employed in primary health facilities as primary eye-care workers (WHO 2018a:30). Primary eye-care workers are expected to identify and treat common ocular conditions, diagnose other conditions, describe possible interventions, support patients in decision making, and ensure active participation of the individual and family (Moyegbone et al 2020:3; Tariq, Kawish, Wajahat, Tariq & Butt 2022:17).

For ease of use, the guideline categorises the clinical components of PEC service delivery into three tasks that PECWs must perform. Identification and treatment of common ocular morbidities such as xerophthalmia and conjunctivitis, diagnosis, treatment, and referral of eye conditions such as lid laceration, corneal ulcer, Trachomatous Trichiasis (TT), and diagnosis and referral of conditions such as vision loss, cataracts, and pterygium (Hailu et al 2010:130). The presence of a trained eye-care worker who is capable of appropriately diagnosing, treating, and referring patients is the key to the effectiveness of primary eye-care in addition to the availability and functionality of the eye-care units. In many low and middle-income countries, eye-care workers are scarce or maldistributed (Gilbert et al 2021:71; WHO 2010a:31).

The WHO (2018b:13) divides eye-care personnel into three groups: full-time eye-care workers, IECWs, and community eye-care workers. Ophthalmic clinical officers, ophthalmic nurses, Ophthalmologists, and optical technicians were classified as full-time

eye-care workers. The second category includes other professionals working in eye-care. The community eye-care workers include community health workers (CHWs), traditional birth attendants (TBA) volunteers, and traditional healers (WHO 2018b:13).

Countries such as the United States of America (USA), the United Kingdom (UK), and Australia used to provide PEC through specialised full-time personnel such as ophthalmologists (Khanna et al 2020:335). A study carried out in three European countries to measure the outcome of the PEC service delivery by different professionals found that, in France, ophthalmologists were found to provide PEC. On the other hand, in the UK, optometrists were responsible for providing PEC. In Germany, both groups were found to provide PEC services (Hiukka 2023:3).

Among low-and middle-income countries, government-owned PECUs in India provide services through trained paramedical ophthalmic staff who work in contact with medical offices (WHO 2019a:34; Khanna et al 2020:335). In most sub-Saharan African countries, mid-level eye health workers provide primary eye-care services after receiving short-term training lasting not more than six weeks or as part of their basic training (Kalua et al 2014:5).

The provision of eye-care services by a trained and well-capacitated primary care worker in the rural community will contribute significantly to the reduction of avoidable blindness. Many eye conditions can be easily diagnosed and are treatable by a qualified eye-care worker working at the primary level, where most of the world's population lives. Appropriate use of visual acuity, a key sign in eye health, as a vital sign in the medical world, can assist the decision of a primary eye-care worker, saving both the patient and the service provider at a higher level (WHO 2018b:36).

A study carried out in Nepal on primary eye-care service provision concluded that community eye-care workers were inadequate to provide comprehensive eye-care services during the study period (Burn et al 2020:165). In a study carried out in Pakistan to evaluate the awareness of PHC workers about the PEC service, 89.6% of primary healthcare workers received training in PEC and 55.7% recognised common eye diseases (red eye, cataracts, and Glaucoma) and 88% are familiar with the treatment of cataracts (Rehman & Sharif 2021:161). The study recommended new and refresher training for the service provider to improve service delivery (Rehman & Sharif 2021:166).

In many African countries, PEC-related training is provided as part of the basic healthcare worker training curriculum, although its implementation varies between and within countries (Mafwiri, Jolley, Hunter, Gilbert & Schmidt 2016:41). With nearly 17% of the global population and one-quarter of the global burden of ocular morbidity, Africa has only 3% of the eye health workforce (International Agency for Prevention of Blindness 2014:18; Nikpoor et al 2018:31). The primary purpose of PEC training is to allow PHCWs to diagnose, treat, and refer common ocular morbidity according to the standard (Kalua et al 2014:6). The result of a study conducted in Kenya, Malawi, and Tanzania to evaluate the knowledge and level of training of PECWs found that their skills are low, with a substantial fraction being below the level of basic competency. The study also identified the presence of poor-quality training that resulted in equally poor service provision (Kalua et al 2014:4).

The study carried out in Malawi found that almost 30% of primary eye-care service providers did not have any basic training in eye-care (Kalua et al 2014:8). A pilot study conducted in Zanzibar and Tanzania suggested that PHCWs can correctly distribute reading eyeglasses. In another study in Malawi, traditional healers were found to play a role in improving cataract surgical uptake (Bright et al 2018:5). To successfully implement the WHO-AFRO primary eye-care packages, countries (health units) must address the skill and knowledge gap of primary eye-care workers (Aghaji et al 2021b:14). Activities aiming to develop infrastructure and human resources for eye health need attention if achieving elimination and control of avoidable blindness is a goal (Ebeigbe & Oveneri 2014:103; Mabey, Antwi-Boasiako, Moloa, Mmuari, Hennelly & Zondervan 2019:3).

2.5.1 Knowledge and skills of health workers in primary eye-care in Ethiopia

In a study conducted in Ethiopia, to assess the knowledge of health extension workers (HEWs) in PEC, it was revealed that 87% did not identify the definition of blindness. Although the signs and symptoms of Trachoma were correctly mentioned by 89% of the study participants, only 10% were able to describe the WHO-endorsed control strategy (Hailu et al 2010:127). The health extension worker, a front-line health worker who has attended a 2-year training on basic concepts of health prevention and promotion after graduating from high school, will greatly contribute to achieving the national goal of eliminating avoidable blindness if trained and motivated well (Ethiopian Ministry of Health

2016:39). A study conducted in Gurage, Ethiopia among the HEWs, showed that 96.4% detected eye health-related problems in the community while performing a house-to-house visits for routine monitoring of the national Health Extension package (Hailu et al 2010:131).

In Ethiopia, the primary eye-care service is currently run by iecws, a mid-level eye health cadre who have received four to six weeks of additional training in PEC, including trichiasis surgery. The Ethiopian Ministry of Health (2016:34) listed eye health promotion and education, screening of major ocular morbidities, including cataracts, Trachoma, Glaucoma, and refractive errors, treatment of minor eye conditions, provision of TT surgery, postoperative consultation, follow-up, referral, and supervision as the list of the job description of integrated eye-care workers (Ethiopian Ministry of Health 2016:32). In its 5-year strategic document, the Ethiopian Ministry of Health (MOH) planned to train and deploy 3,600 integrated eye-care workers and 800 ophthalmic nurses to best deliver the service in primary eye-care units (Ethiopian Ministry of Health 2016:34).

Reaching out to everyone, especially those living in hard-to-reach areas and those with disabilities, is not an easy job and is achievable only by trained eye-care professionals. In most countries, eye-care facilities are within 10 km of the community. Community engagement and integration of eye-care services with other health activities are mandatory to appropriately expand the service (Gilbert et al 2021:72). To ensure the sustainability of primary eye-care services, participation, and appropriate training of non-ophthalmologist professionals, such as other health workers and clinical officers, are mandatory (Cicinelli et al 2020:321).

2.6 PRIMARY EYE-CARE MODEL

The WHO (2020:10) defines a model of care in health as a conceptualisation of service delivery, including but not limited to the whole process of care, service providers, and management. The care model aims to achieve healthcare priorities and objectives together with improved health system performance. Integrating PEC with existing PHC being the main domain, different models have been used to implement primary eye-care worldwide. So far, studies about these models have been reported in very few countries, Latin America, India, Nepal, and Nigeria.

The World Vision Report published by the WHO in October 2019, described eye health information of more than 40 years and underscored the importance of ensuring equity, universality, and integration of basic eye-care services into the general health system. The report strongly recommended the delivery of eye-care services using the integrated person-centred eye-care approach (WHO 2019a:28).

The World Report on Vision adopted four strategies for the implementation of the integrated people-centred eye-care approach globally: engagement and empowerment of people and the community, reorientation of the model of care, harmonisation, and amalgamation of service with sectors, and creation of an enabling environment (Das, Keeffe, Sivaprasad & Rao 2020:1263). A good primary eye-care model should plan to address the poor and most marginalised communities. Providing sustainable, affordable, quality, and world-class services that satisfy the needs of the majority should be the foundation for a good PEC model (Al-Aswad Lama & Rakitina 2023:2; Qureshi et al 2012:351). Below are some selected PEC models from different parts of the world.

2.6.1 Use of different ophthalmic professionals for PEC service provision: A model in Europe

A study carried out in three European countries to assess the cost and result of using different professionals for the provision of PEC services found the absence of uniformity in the provision of PEC services on the continent. In France, ophthalmologists were found to provide PEC. On the other hand, in the UK, optometrists were responsible for providing PEC. In Germany, both groups were found to provide the service. The study concluded that, despite the use of ophthalmologists and or optometrists as the primary provider of services, the community in all groups enjoyed world-class service (Thomas, Weegen, Walendzik, Wasem & Jahn 2011:8).

2.6.2 Inclusive, selective, and priority eye condition models in Latin America

In Latin America, three approaches were used to provide PEC services. These were the inclusive primary eye-care approach, the selective primary eye-care approach, and the priority eye conditions approach (Gilbert et al 2021:71). The inclusive primary eye-care approach is community-driven, demanding active participation of the community, including fundraising. The approach incorporates the basic components of the PEC

services of case screening, appropriate diagnoses, treatment, and timely referral. In the second approach, only selected interventions considered to have a great impact are identified and carried out under PEC (Gilbert et al 2021:71).

Unlike the inclusive primary eye-care approach, this selective PEC approach is separate from the PHC domain and cultivates vertical management. The selection of activities from the basic components of PEC and its detachment from PHC puts the sustainability of the approach in danger. The last approach used in Latin America was the priority approach to eye conditions. In this approach, maternal and child health workers, schoolteachers, non-communicable disease associations, and workers were selected and trained on specific eye conditions acknowledged as a priority at the national level and provided with specific tasks (Qureshi et al 2012:354).

2.6.3 Latin American comprehensive eye-care model

The fourth PEC model from Latin America is a comprehensive eye-care programme that achieved success in providing innovative eye-care services and increased surgical adoption that resulted in reaching the poor. From the beginning, the model was aimed at serving people who failed to obtain service due to financial restraints. While addressing the underserved, the model also designed and implemented a sustainable system of service delivery (Qureshi 2012:354).

In countries of low- and middle-income, multiple studies have been carried out in India on the feasibility and practicability of primary eye-care models.

2.6.4 Primary eye-care models from India

2.6.4.1 Integrated primary eye-care model

The integration of PEC into existing PHC was the first model studied in India. Two approaches were evaluated in this integration. The standalone primary eye-care service approach and special settings such as services in urban slums and tribal populations (Misra et al 2015:80). In established countries, a PHC is built to serve an average of 30,000 people, where less specialised ophthalmic personnel were the service providers. The study found that the integration of PEC with the existing PHC service was a sustainable and resource-efficient intervention. This model was found to be rewarding,

effective, and easy to use for PEC services in India (Qureshi 2012:352). Integration of PEC with PHC was found to play an important role in reducing avoidable blindness and low vision in most developing countries. This approach was found to be effective and productive in promoting awareness and expansion of the PEC service in rural communities (Kadam 2023:15).

The second model evaluated was the primary mobile eye-care service model. Mobile van service or teleophthalmology was found to be an effective mode of service delivery, especially for residents in difficult-to-reach areas (Abrol & Kumar 2021:15). The mobile primary eye-care service model was also found to be effective in raising awareness and reaching more people. Eye conditions such as Diabetic Retinopathy are eased using the model teleophthalmology approach (Misra et al 2015:82).

2.6.4.2. Community participation as a PEC service improvement tool

Another case study was conducted in India to assess community involvement as a tool to improve the efficiency of PEC delivery in 2022. The result showed that community participation is mandatory in increasing patient flow and appropriate access and use of primary eye-care despite the use of different models (Sabherwal, Sood, Chauhan & Das Gupta 2022:1). Improvement in alliances with local stakeholders resulted in increased efficiency of outreach and static services. An analogous study conducted in India found that service quality and the participation of the community were high in areas where static service is maintained for a long time (Abrol & Kumar 2021:15).

The case study concludes that consistency of service and collaboration with stakeholders are too important to increase the use of PEC services regardless of the model used to provide service (Sabherwal et al 2022:3). Similarly, community engagement is identified as a key factor in improving the efficiency of PEC services. A recommendation of a scoping review to design an eye-care model for indigenous people in high-income countries also suggested that an eye-care service that engages the community in design will not face an acceptance challenge and is mandatory to increase service use (Burn, Hamm, Black, Burnett, Harwood, Burton, Evans & Ramke 2021:18).

As a component of community engagement, a need-based screening tool was shown to be effective in integrating PEC-PHC. This tool was found to be effective in increasing the

uptake of the PEC service and saving time and budget. Need-based screening is organised for identified cases with visual disability that will contribute to addressing the underserved (Amritanand, Paul, Jasper, Prasanna, Kumar & Abraham 2018:661).

2.6.4.3 Vision Centre model

The third primary eye-care model implemented and studied in India was the Vision Centre model. The country defined Vision Centre as a facility located near the community and equipped with basic supplies to provide first-line eye-care services with skilled and dedicated service providers (Khanna et al 2020:334). Typically, the Vision Centre will hire two or three well-trained primary eye-care professionals from the community to serve an average of 50,000 people (Thulasiraj 2022:1448). The study found variations in understanding of the model and its implementation that resulted in variations in service descriptions and jobs between centres. Most of the Vision Centres covered by the study provide identification of common ocular morbidities, treatment of simple eye conditions, including glasses refraction, and distribution and referral to the next eye-care facilities (Ravilla 2021:9).

The study carried out to evaluate the functionality of the Vision Centre model identified many benefits in service delivery and the community. The Vision Centre serves as a primary point of answer and cares for patients, including cataracts and other complicated cases identification and referral (Thulasiraj 2022:1448). The existence within the community and the provision of service by someone the community knows and trusts can contribute positively to the reduction of avoidable blindness. The service in the Vision Centre also reduces barriers and direct and indirect costs of treatment and transportation, resulting in better health-seeking behaviour in the community. The study also found that women tended to use the services provided at Vision Centre more than men due to access and the short service time that was taken as an exemplary move to ensure gender equity (Khanna et al 2020:339).

Other benefits of the Vision Centre model are engagement and the benefit of the whole community (Ravilla 2021:9). Researchers strongly recommend considering the site of the Vision Centre, the expected number of beneficiaries around the centre, the convenience of the area, the capacity and distance to the referral centre, the level of community

involvement and the availability of trained and skilled service providers in the area before considering the establishment of the Vision Centre.

In another study, the Vision Centre model was found to contribute greatly to PEC services and increased patient satisfaction. However, the distance, cost of treatment, and location of the centre causes discomfort in some service users (Kovai, Rao & Holden 2012:489; Thulasiraj 2022:1448).

2.6.4.4. The LV Prasad Eye Institute pyramidal model of eye-care service delivery

India reported the best experience of a pyramidal model of an eye health delivery system. The model was created by the LV Prasad Eye Institute (LVPEI) and is based on service integration at all five levels of service delivery in the country. The 'Vision Health Guardian' was at the bottom of the pyramid serving 5,000 people. The 'Village Vision Complex' serving approximately 500,000 people is at the top of the list. The model advocates for integration and referral linkage between facilities for the effective provision of comprehensive eye-care services (Qureshi 2012:352).

The model presented a hierarchical and connected structure for a better provision of PEC in India. The three lower levels of the model represent facilities that provide high-quality eye-care service to the lower community. The key building blocks of the model were the development of adequate human resources for eye-care, infrastructure, quality, and affordable service provision, focus on preventive and promotion aspects, organising studies, and monitoring and evaluation visits. The model incorporates policy guidelines for sustainable service delivery (Rao, Khanna, Athota, Rajshekar & Rani 2012:398).

2.6.4.5. Hospital-based community eye health programme (HBCEHP): The model

The hospital-based eye health programme model was designed to tackle the underlying causes of blindness at hospital level in addition to the provision of curative services. Before the application of the model, the hospital focussed on curing cases but did not address the causes. Thus, the hospital-based community eye health programme was designed to sustainably reduce avoidable blindness in addition to providing treatment for blindness (Bhoosnurmath 2017:14).

2.6.4.6 The Sankara-Nethralaya philosophy

The Sankara philosophy is a community model designed in India with the mission: 'Providing the highest standards to all sections of the community through a team of competent, committed, and compassionate professionals in a patient-friendly environment'. The philosophy bases quality eye-care services provision both for the paying and non-paying service users equally (Badrinath 2020:289).

2.6.5 Modular eye-care model – Bangladesh

The modular eye-care (MEC) model is one of the oldest eye-care models implemented in multiple districts of Bangladesh from 1994 to 1999. The model was known by its typical characteristics of service provision, which were comprehensive, need-based and focused, provision interrelated, efficient, effective, and addressing the concepts of sustainability from inception. The model works in a delineated province and provides the whole PEC package for the needy. The best quality of the model was to ensure the sustainability of financial and human resources through cost reclamation. The service was affordable to the entire community (Khan 2000:24).

After 2000, Bangladesh implemented a comprehensive eye-care model that was based on existing hospital eye-care services. The new model suggested the training of adequate human resources for eye health, the deployment of more primary health care personnel to rural intensive care units, the provision of community services and health education (Hussain, Hussain, Roy, Roy, Islam, Hussain & Ahmed 2022:324).

2.6.6 Primary eye-care model in Africa

There is no uniformity in the definition and implementation of PEC models in sub-Saharan Africa. Even if different models were used in the region, few evaluation reports of the effectiveness of the intervention were found (Aghaji 2021b:3). There is no consensus on which model is the best; different countries use different models (Gilbert et al 2021:71). The presence and use of different primary eye-care models in different settings will contribute to awareness, access, and demand creation with the goal of avoidable blindness reduction (Misra et al 2015:79).

2.6.7 Public-private partnership model in Nigeria

In Africa, Nigeria was the only country to share a proven model of eye-care. Since 1993, Nigeria has implemented a tripartite eye-care system that involves the community, the public sector, and the private sector supported by the Eye Foundation. The result of the integration yielded an equitable, affordable, and sustainable system in the country (Qureshi et al 2012:354). By implementing the model, Nigeria ensures the sustainability of eye-care services that are acceptable and affordable for all (Qureshi et al 2012:354).

2.6.8 Integration of primary eye-care with primary health care activities in Nigeria

Another study carried out in Nigeria to assess the integration of eye-care into the PEC level in the Nigerian health system confirmed that the incorporation of PEC into the PHC model contributes significantly to improving the delivery of the country. Integrating PEC with basic health services created access to education and convalescence services. The PEC services incorporated many activities implemented at the grassroots level. This nature of PEC makes it an essential part of blindness prevention. In its assessment, the study emphasised the mismatch in the behaviour of health workers in the delivery of PEC services despite the presence of positive progress in knowledge and awareness among them (Moyegbone et al 2020:6).

2.6.9 Integration of primary eye-care with primary health care activities in Tanzania

Tanzania shared the experience of integrating PEC with PHC. A study carried out in Morogoro, Tanzania, proved that the integration of PEC services with PHC and the implementation of all components of PEC is vital to improve service utilisation (Jolley, Mafwiri, Hunter & Schmidt 2017:9; Yasmin & Schmidt 2022:i38).

2.6.10 Primary eye-care model in Ethiopia

Although the Ethiopian Ministry of Health (2016:2) prepared a guideline for PEC services as part of its national strategic plan for eye-care, there is no clear direction on which eye-care model is best tested in the country. Like most of the sub-Saharan African countries, the Ethiopian MOH strongly advocates the integration of PEC with the PHC domain. In a

study conducted in the Gurage area, Ethiopia, poor integration of eye-care services into the PHC was identified. There were two PECUs led by IECWs to serve more than 1.7 million people (Teshome et al 2021:1). The ministry is currently striving to fill this gap and expand the service to the entire community to ensure that a community enjoys a comprehensive approach to preventive, promotion, therapeutic, and rehabilitative services near them (Ethiopian Ministry of Health 2016:2; FDRE, Ministry of Health 2020:38).

In summary, blindness and visual impairment, which are vital indicators of eye-care services in a country, are among the key public health problems in many developing countries, including Ethiopia. The burden of blindness is high in these countries. Although most of the sub-Saharan African countries have endorsed and started to implement integrated primary eye-care services, their implementation and practicability are not well studied.

Primary eye-care services make an unquestionable contribution to increasing access to care, leading to a reduction in avoidable blindness among the poor. The low awareness, skill, and knowledge gaps among service providers significantly affected the expansion and use of PEC services. Similarly, the misdistribution of facilities on top of socioeconomic barriers had ominously affected provision and use.

2.7 SUMMARY

This chapter unlocks the key PEC concepts and service provisions from the literature. The global, developed countries, the low- and middle-income countries, the sub-Saharan region, and Ethiopian experience in primary eye-care, service use and barriers, and the primary eye-care model were presented. The preparation of the literature created a favourable condition for the researcher to select the appropriate study design, methods, and procedures for the study, which is discussed in the next chapter.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

In the previous chapter, basic concepts of primary eye-care were addressed from multiple sources, thus providing the researcher with a good base of the current knowledge and gaps in the study topic. The theoretical foundation was the basis for the preparation of this chapter. The current chapter focusses on procedures and techniques applied before and during data collection and analysis to explore and describe the provision in the four districts of the South Omo Zone, Southern Ethiopia.

Therefore, this chapter describes the methods for conducting this study. It covers the design and approach; the phases of the study and the methodological techniques applied to achieve the stated objectives and answer the research questions. The procedures followed during sample selection, data collection, and analysis were discussed.

3.2 RESEARCH DESIGN AND APPROACH

Research design refers to the procedure used to combine researcher views and research methods to address the main research questions (Creswell & Plano-Clark 2018:86). Research design also refers to the inclusive construction or plan that presents the overall aspect of the study. It covers the procedures and techniques proposed for data collection, processing, and analysis (Bowling 2014:166; Polit & Beck 2017:41). A good research design and approach protects the researcher from frustrations by establishing the research work on a good foundation (Asenahabi 2019:87).

The research approach refers to techniques applied to collect, analyse, and scientifically interpret data (Farghaly 2018:5; Leavy 2022:12; Thomaszewski et al 2020:4). Choosing an appropriate research approach requires a coordinated plan to incorporate the existing views with that of the researcher and the method to be selected (Creswell & Plano-Clark 2018:86). This study applied an exploratory sequential mixed-method study design method. An exploratory design is the best study choice when little is known about the

topic to be studied (Pratap 2019:1). The design uses a mix of methods in which the qualitative phase is used as a base to develop the quantitative phase and analysis (Asenahabi 2019:85).

The purpose of the research area was also used as a basis for selecting an appropriate design. Therefore, the researcher opted to follow the approach. The second reason for choosing the method was to better explore and describe PEC services in the four districts of the Southern Omo Zone by integrating and triangulating the findings of both studies. An exploratory sequential mixed-method design is the best study design to triangulate the findings from different perspectives (Asenahabi 2019:85; Jason & Glenwick 2016:233). The use of a mixed-method sequential exploratory study design awarded numerous advantages. Among the most, the study design gave the researcher the freedom to explore the following: (Pardede 2019:233).

Complementarity: In this study, the findings of the quantitative study were a complement to the result of a qualitative study in the development of an integrated community-based PEC model.

Expansion: the researcher used four different data collection methods to address PEC concerns at a time.

Development: During Phase II of this study, a quantitative data collection tool is developed based on the findings of the qualitative phase study.

Triangulation: The provision of PEC service is explored and described using different data collection methods. In the final phase, the findings of both studies are integrated and supported the development of a PEC model to support the optimal provision of primary eye-care services.

An exploratory sequential mixed-method approach is composed of three phases. The first phase is qualitative data collection and analysis. The second phase involves the development of quantitative instruments, and the last phase involves quantitative data collection and analysis (Creswell & Plano-Clark 2018:94). Figure 3.1 below shows the phases of an exploratory sequential mixed-method design.

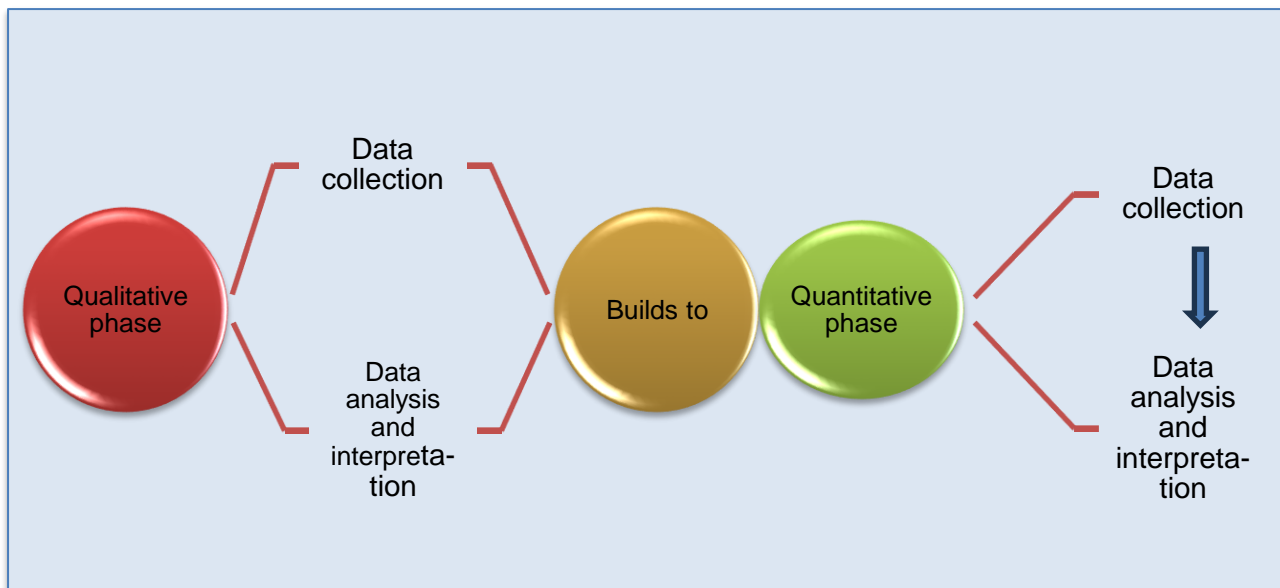


Figure 3.1 Phases of an exploratory sequential mixed method study design

(Adapted from Creswell & Plano-Clark 2018:94)

To this end, in this study, a three-phased exploratory sequential mixed-method approach was used. The experiences of adults, 40 years and older, who had used PEC services in the last six months and the experience of the PECWS were triangulated with the knowledge, skills, and readiness of the service providers and the PECU in the four districts of the study area. The phases of the study are shown below in Figure 3.2.

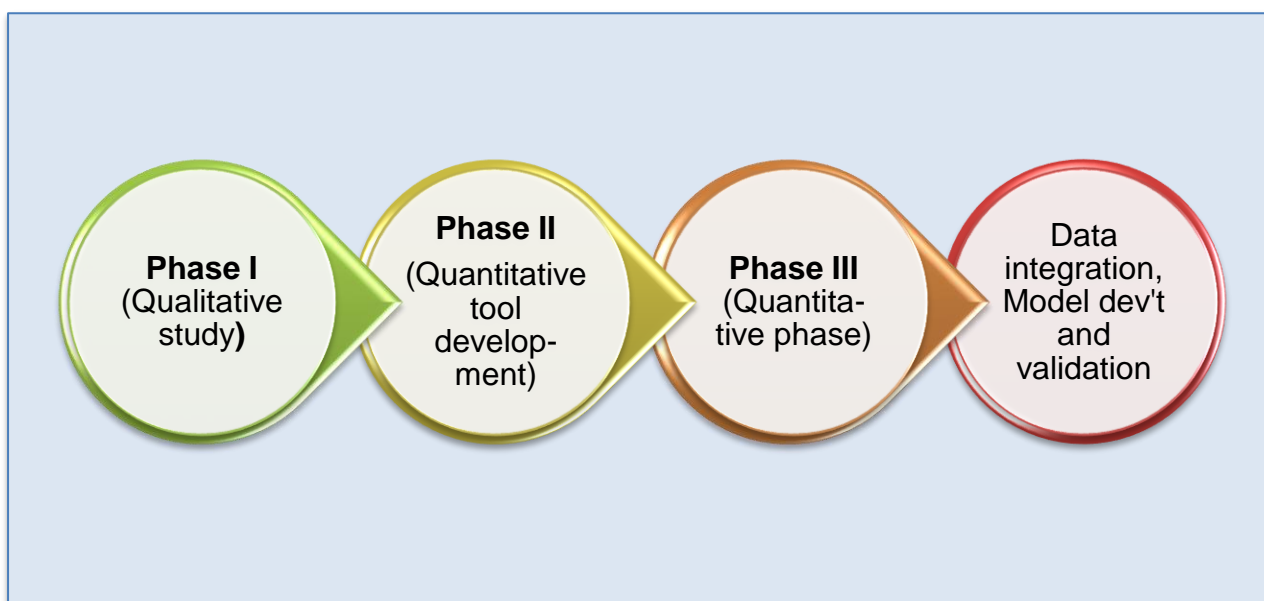


Figure 3.2 Phases of the study

3.2.1 Phases of the study

Phase I was qualitative data collection and analysis. During this phase, data was collected through FGDs and in-depth individual face-to-face interviews. The result of the qualitative study was presented from the point of view of the study participants (Setia 2016:264). The ATLAS.ti software version 23.2.2. was used to analyse the results.

Phase II was the development of a quantitative data collection tool. Therefore, the researcher adopted data collection tools based on the results of Phase I. Consequently, a standard self-administered questionnaire was adopted to assess the knowledge and skills of mid-level healthcare workers (see Annexure N) and a checklist (see Annexure O) to assess the readiness of primary eye-care units.

Phase III was quantitative data collection and analysis. During this phase, quantitative data was collected through tools adopted during Phase II of the study. A descriptive statistic was used to analyse the quantitative data using the Statistical Package for Social Sciences (SPSS) version 28 (Apuke 2017:6).

Data integration, model development, and validation occurred after Phase III. The findings were discussed in different categories and supported the development of the model. The findings of different types of literature were an addition to the study findings in the development and validation of the model according to Chinn and Kramer (2011).

Model development: After data convergence, the researcher developed an integrated community-based primary eye-care model to support optimal provision of PEC services in Ethiopia. The purpose of the proposed model is to explain the theoretical basis for the reference to delivery in the country. The researcher followed the following steps to develop the model:

- The researcher began with clarification of the concepts to assemble the concepts by their relevance towards a common theme.
- Identification of the main concepts, to construct the model.
- Definition of the concepts, the selected concepts of the study were defined according to the dictionary and literature to cover the subject matter from philosophical aspects.

- Classification of the main concepts, to mind-map the model through the concepts such as agents of change, recipient, context, procedure, dynamics, and terminus (Dickoff, James & Wiedenbach 1968:425).
- Operationalisation of the model, to enhance the enabling environment for the stakeholders or beneficiaries of eye-care.

Model validation, finally, the researcher invited seven PEC experts and they evaluated and validated the model in terms of its clarity, generality, simplicity, importance, and accessibility (Chinn & Kramer 2012:204).

3.3 PRAGMATIC PERSPECTIVE OF THE STUDY

The philosophical perspective or paradigm refers to perceptions and orientations shared by the research community. It is also presented as a perspective through which researchers see the world (Creamer 2017:94; Creswell & Plano-Clark 2018:66). A study paradigm implies the scientific principles or belief system of the researcher that guides the situation or study setting (Kivunja & Kuyini 2017:26). Positivism, constructivism, and pragmatism are commonly used paradigmatic orientations (Mohajan 2018:35).

3.3.1 Positivism

Positivism was a well-known perspective in the 19th and early 20th centuries by its viewpoint of objectivity and observed measurement. Positivism advocates the presence of a single reality or truth that should only be measured through rigorous scientific procedures. The key principles of positivism are objectivity, reductionism, and determinism (Creswell & Plano-Clark 2018:83). Positivism is well expressed in quantitative methods such as surveys, experiments, and statistical analysis. It demands drawing adequate samples, sampling procedure, analysis, and conclusion.

Positivism skips the experience of the study participant behind a particular action and lacks perception and behavioural factors while measuring the problem under study objectively only (Bowling 2014:20).

3.3.2 Constructivism

Constructivism or interpretivism was developed by scholars of social sciences to study phenomena overlooked by positivism. Constructivism focusses on understanding social circumstances with the belief that everything should also be seen in a social context based not only on objectivity (Creswell & Creswell 2018:45). This research philosophy magnifies the absence of a single truth, and everything shall be explored to best understand it (Nguyen 2019:5).

In constructivism, generalisation is not presented as mandatory for every problem under study. The key principles of constructivism are social and historical context, subjectivity, reflexivity, and inductive reasoning. The constructivism paradigm lacks objectivity and generalisability (Creamer 2018:96).

3.3.3 Pragmatic

Pragmatic is a research philosophy intended to cross the gap between positivism and constructivism. The pragmatic paradigm believes that research should pay attention to the study community and have a strong scientific foundation (Polit & Beck 2018:309). Furthermore, this philosophy strongly advocates that research should use malleable and problem-solving approaches (Shannon-Baker 2015:13). The key principles of the pragmatic paradigm include practicality, pluralism, and pragmatic truth. This paradigm is associated with mixed-method research designs (Creswell & Plano-Clark 2018:83).

A pragmatic perspective is not dependent on a single truth, perspective, or construct. Mostly, the approach advocates for the integration of qualitative and quantitative studies to better investigate the topic under study (Creswell 2014:39). Thus, the pragmatic paradigm creates access to the use of multiple data collection tools, giving freedom to the researcher to view the world from different perspectives, considers various assumptions, and lays the groundwork for carrying out multiple data collection and analysis (Creswell & Creswell 2018:48).

For this study, the pragmatic paradigm was applied. The pragmatic paradigm arises from the reality that any given situation does not necessarily subscribe to positivism or constructivism (as discussed in Sections 3.3.1, 3.3.2 and 3.3.3). The positivist paradigm

mainly refers to objective or quantitative studies, and the constructivist mainly refers to subjective or qualitative studies. Unlike the two, the pragmatic paradigm is credited with openness, mainly due to the freedom it grants to the researcher to not strictly follow a fixed research approach or data collection method (Creswell & Plano-Clark 2018:83).

The mix of positivist and constructivist perspectives in a single study allowed the researcher to show the advantages of both perspectives. The researcher chose this paradigm because of its advantage of creating flexibility and openness, which allowed the researcher to present the provision and utilisation from the points of view of service providers, users, and facilities. Most importantly, this paradigm helped the researcher triangulate the findings and develop a model.

3.4 RESEARCH METHODS

The research method presents how the study was conducted to respond to the main study questions and create new knowledge (Kawulich & Chilisa 2015:3; Patten & Newhart 2017:3). Research methods refer to the study context, techniques, and procedures applied to draw samples, collect data, and perform analysis.

3.4.1 Study context

A study context refers to the circumstantial information presented to ease the perception of the research problem and its implications. It is also a section to exhibit factors specific to the study area that may affect the study (Bowling 2014:191). In this section, the study setting and the population are discussed.

3.4.1.1 Study setting

As explained by Bowling (2014:192), the study setting is an important component of a research design because the result and interpretation of the findings profoundly depend on it. The study setting must incorporate contexts such as experimental, social, and physical environments where the study will be carried out (Majid 2018:3).

This study was carried out in four districts of the South Omo Zone, Ethiopia where 80% of the PECUs found in the zone were located. Ethiopia is in the Horn of Africa and is the

second most densely populated country after Nigeria, having a population of 127 million in 2023 (Central Statistics Agency 2019; World Population Prospects 2023). The South Omo Zone is among the 15 administrative Zones in the Southern Nationalities and People Regional state, which has 10 districts and a total population of 863,721. The Zone is located at the Southern tip of the country and shares international borders with Kenya and South Sudan (South Omo Zone Health Department 2023:4). The community in six of the ten districts is pastoralist, unlike most Ethiopians, who are agrarian. Figure 3.3 presents the physical map of the study area.

According to the 2023 annual report of the South Omo Zone Health Department (2023:5), there is one general hospital, two primary hospitals, and 47 primary health care units in the South Omo Zone. Regarding the facilities that provide eye-care services, there was one secondary eye-care unit located in the general hospital and 41 PECUs in primary health care units. These units provide basic eye-care service for an average of 625 patients per month. There were a total of 2,189 different health and medical service providers in the Zone, including 141 mid-level health workers providing primary eye-care services (South Omo Zone Health Department 2023:5).

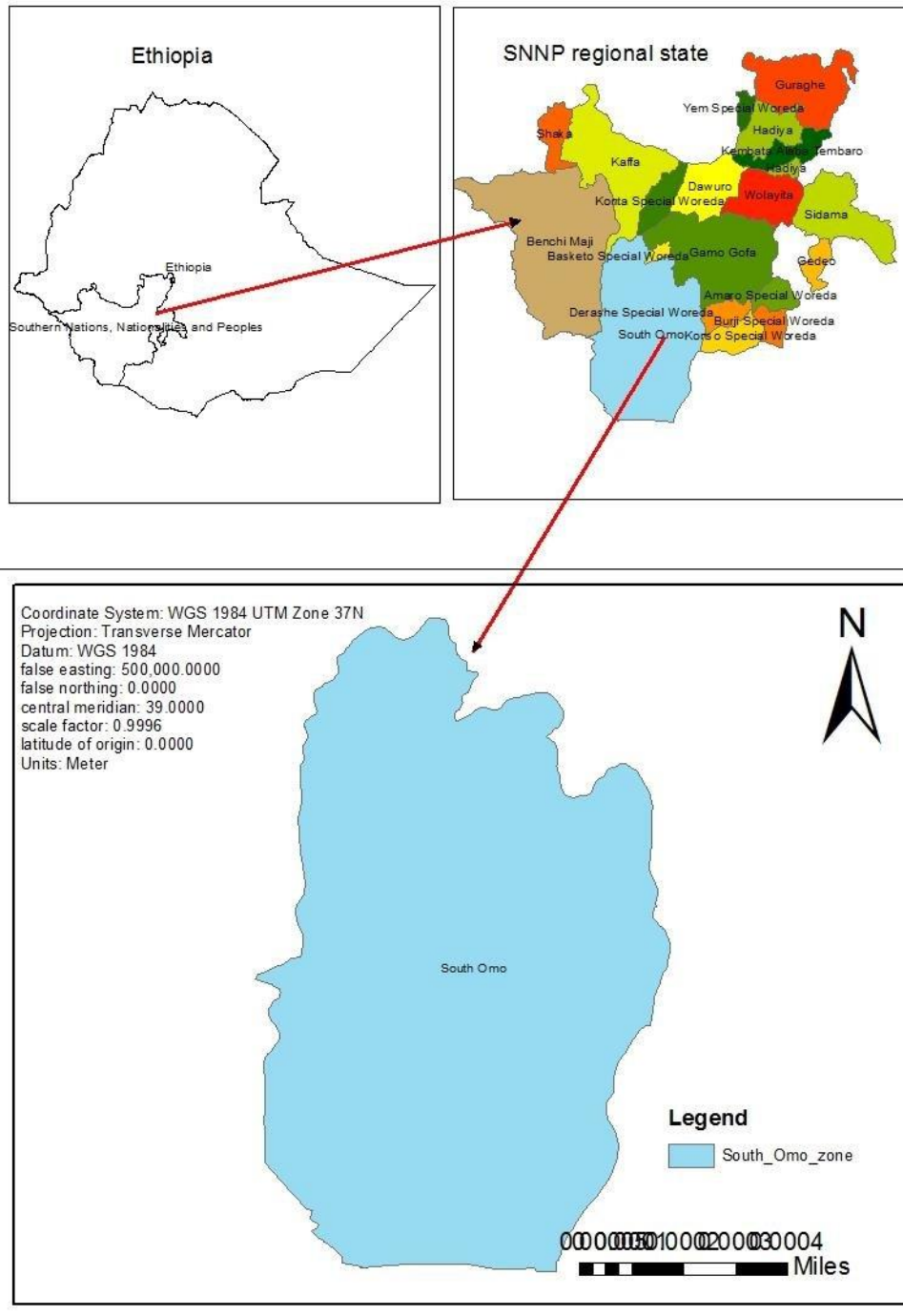


Figure 3.3 Physical map of the South Omo Zone, Ethiopia

(https://www.researchgate.net/figure/Location-map-of-South-Omo-Zone_fig2_335423033)

3.4.1.2 Study population

The study population is a group of people who share common characteristics and sources for a sample labelled by the researcher (Burns & Grove 2017:516). Therefore, all adults

and all healthcare workers in the four districts of the South Omo Zone were the study population for this study and the source of the sample to be drawn.

The target population is a group of the entire population from whom a sample can be taken (Polit & Beck 2018:243). Therefore, all adults aged 40 and older and all mid-level healthcare workers in the four districts of the South Omo Zone were the target population of this study and the source of the sample to be drawn from.

Accessible population is the segment of the target population that is reachable to the researcher (Polit & Beck 2018:243). Therefore, adults, 40 years or older, who had utilised primary eye-care services in the last six months and resided in the four districts of the South Omo Zone, trained and certified primary eye-care workers who actively provided eye-care services, and mid-level healthcare workers found providing eye-care services were the accessible population for this study.

3.4.2 Sampling

Sampling is defined as a systematic procedure by which the investigator chooses representative groups of people, events, or any other relevant part to collect pertinent information about the topic under study (Gray et al 2017:617). Sampling involves selecting a group of people with whom to conduct the study (Rahi 2017:3). As described in Creswell and Plano Clark (2018:181), sampling is the selection of important sources of information from the target community.

Following the use of an exploratory sequential mixed method design, qualitative and quantitative sampling techniques were applied in this study. Maximum variation, purposive, and simple random sampling techniques were used in different phases. The reasons and details of the sampling techniques applied during each phase of the study are discussed below.

3.4.2.1 Sampling technique for the qualitative phase

A non-probability purpose sampling technique is one of the best sampling techniques for qualitative studies (Elfil & Negida 2017:1). The main purpose of the sampling procedure is to select knowledgeable and experienced participants about the topic under

investigation, not to provide an equal chance of participation in the study (Flannery 2016:518; Silverman 2013:125). Considering collecting adequate information from the participants, the researcher used the non-probability purpose sampling technique to draw participants for both groups.

3.4.2.1.1 Purposive sampling

Purposive sampling is the first choice when seeking study participants to provide in-depth information about a topic under discussion (Ames et al 2019:3; Gray et al 2017:499). The researcher used purposive sampling during this study and deliberately selected the samples to cover a full range of the characteristics of interest. Furthermore, the sampling technique was used to select participants who were familiar with the subject under study (Polit & Beck 2018:227).

During Phase I (qualitative phase), two groups of participants participated in responding to the first two objectives of the study.

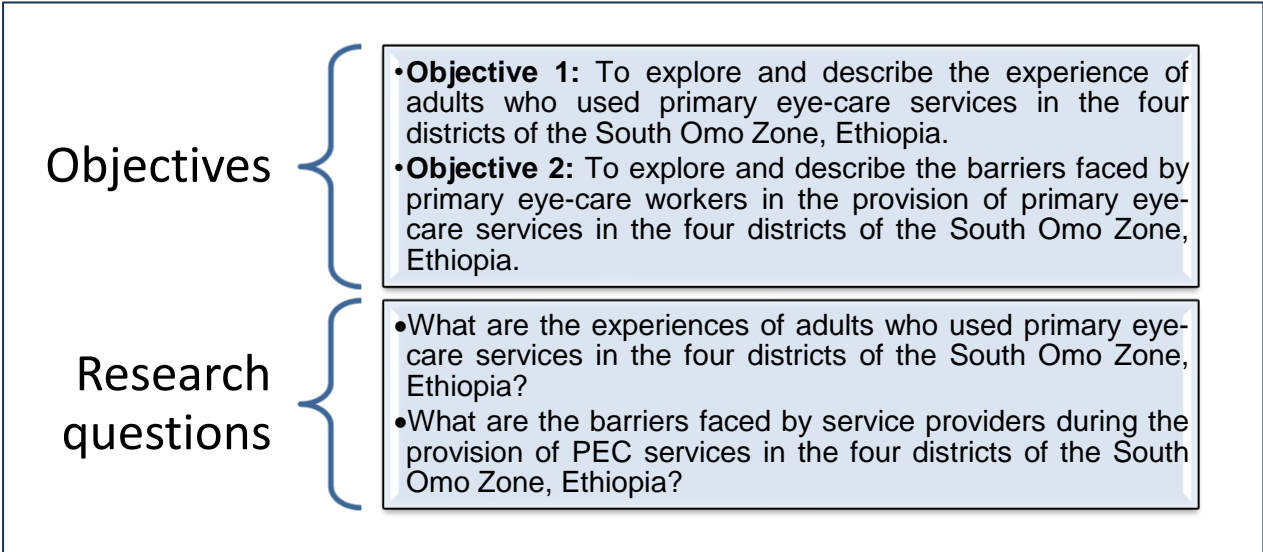


Figure 3.4 Objectives and research questions of Phase I

Group I: A focus group discussion was organised with adults 40 years and older who accessed PEC services in public PECUs in the last six months and were willing to participate in the study.

Group II: This was an in-depth individual face-to-face interview with primary eye-care workers who worked in a public primary eye-care unit in the past twelve months, were permanent employees of the unit, and provided service during the study period.

3.4.2.2 Sampling techniques for the quantitative phase

During the quantitative phase of the study, a simple random sampling technique was applied to draw participants for the study.

3.4.2.2.1 Simple random sampling (Phase III)

A simple random sampling technique was used to conduct the quantitative study (Terrell 2016:77). The simple random sampling technique gives everyone the same chance to be part of the study, increases the chance of sample representativeness, and decreases sampling errors (Setia 2016:263). At this stage, a permanent mid-level healthcare worker who has provided primary eye-care services in a public primary eye-care unit for at least one year participated in the assessment of the knowledge and skills of primary eye-care providers. A random number table is used to select study respondents. The list of the total 141 mid-level PECWs was the sampling frame.

To assess the readiness of primary eye-care units in equipment, infrastructure, and service delivery to provide primary eye-care services, a standard checklist adopted by the WHO was used, and all primary eye-care units found in the study area were covered. Figure 3.5 presents objectives 3 and 4 with their respective research hypothesis.

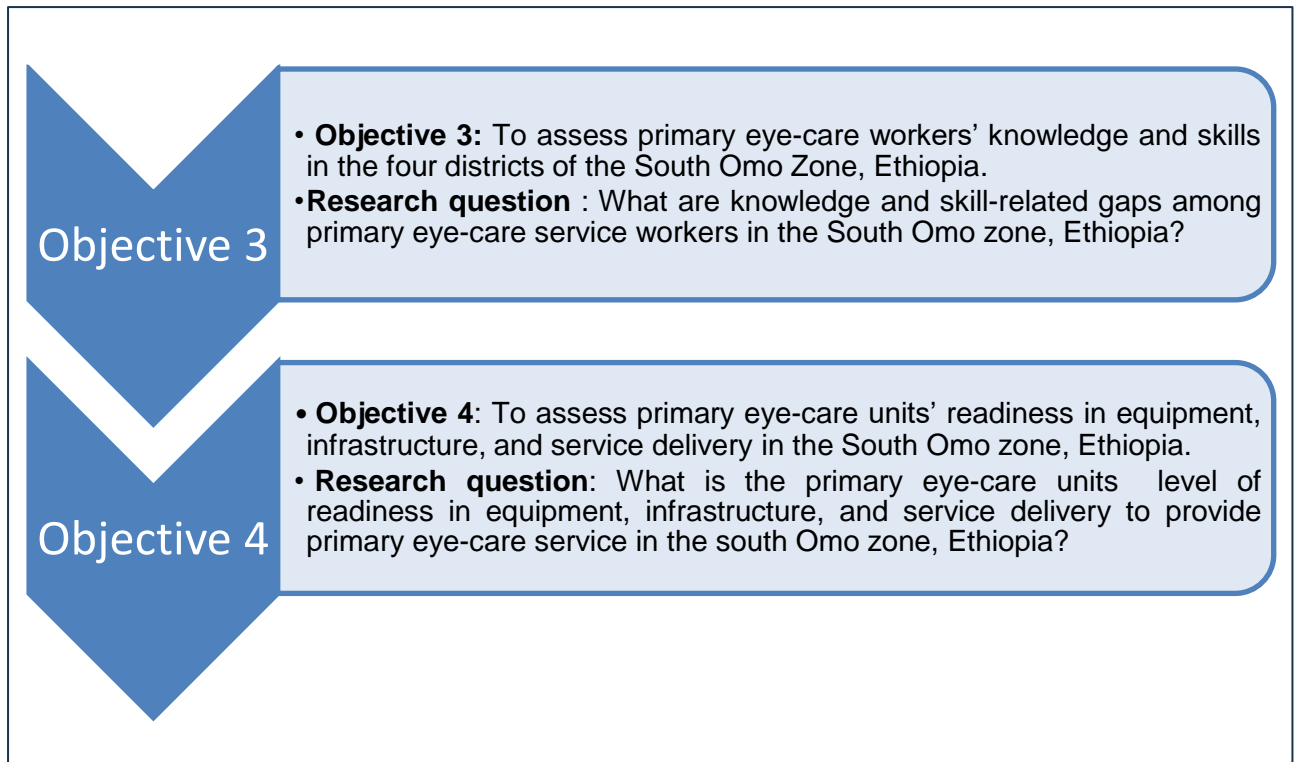


Figure 3.5 Objectives 3 and 4 with research hypothesis

3.4.3 Sampling criteria

Sampling criteria are a group of criterions prepared by the researcher to clearly define the scope of the study to show the relationship of the sample with the study and the target population (Burns & Grove 2018:518). Commonly used sampling criteria include environmental, physical, behavioural, and social factors appropriate to the research purpose. Similarly, the sampling criteria help the researcher justify the limitation during accessing the selected participants of the study.

3.4.3.1 Inclusion and exclusion criteria (qualitative phase)

During the qualitative study, participants were purposively selected for both groups using the inclusion and exclusion criteria presented below. Inclusion criteria imply characteristics that a person must possess to be a member of the study (Burns & Grove 2017:518).

Group I: Inclusion criteria for the focus group discussion were:

Inclusion criteria applied for the focus group discussions were: adults, 40 years and older, who have accessed primary eye-care services in a public primary eye-care unit in the last six months and those 40 years and older who were willing to be part of the study. On the other hand, adults with comorbidity and those unwilling to participate in the study were excluded from the FGD.

Group II: Inclusion criteria for the in-depth individual face-to-face interviews were:

Similarly, during the in-depth individual face-to-face interview those certified eye-care workers who had worked in a public primary eye-care unit for at least a year, were permanent employees of the unit and who had provided primary eye-care services during the study period were included. On the other hand, those mid-level healthcare workers who did not receive an official/additional certificate to provide eye-care service, but were providing eye-care service and part-time workers were excluded from the study.

3.4.3.2 Inclusion and exclusion criteria - quantitative phase

To conduct the quantitative study, a simple random sampling technique was applied using the following inclusion and exclusion criteria.

Group I: Inclusion and exclusion criteria for the quantitative study with primary eye-care workers were:

The inclusion criteria applied for the quantitative study with mid-level healthcare workers were: any mid-level healthcare professional providing primary eye-care in a public primary eye-care unit for at least a year, a permanent employee of the unit and who has provided primary eye-care services during the study. On the other hand: those mid-level healthcare workers who were not providing primary eye-care services and part-time workers were excluded from the study.

Group II: Inclusion and exclusion criteria for the quantitative study to assess the readiness of PECUs in equipment, infrastructure, and service delivery were:

The inclusion criteria used for the quantitative study to assess the readiness of PECU in equipment, infrastructure, and service delivery were: public primary eye-care units that had provided service for at least six months, had at least one trained and certified primary eye-care worker and provided services on a routine basis. Whereas, those service facilities with less than six months of service provision experience and units that did not provide PEC services routinely were excluded from the study.

3.4.4 Sample size

The sample size represents study participants to be used to answer the research hypothesis. Generally, the sample size must be sufficient to address the subject under study (Polit & Beck 2017:378). Most importantly, the sample size shall be determined based on the purpose of the study and the study design (Kothari & Garg 2019:53; Setia 2016:264). The sample size should also indicate the procedures used to calculate this number in addition to the number of samples proposed in the study (Creswell & Creswell 2018:212).

3.4.4.1 Sample size for the qualitative study

The level of data saturation is considered as the sample size in qualitative studies (Gentles, Charles, Ploeg & McKibbin 2015:1782; Hennink & Kaiser 2021:7). During Phase I (qualitative phase), data was collected with FGDs and in-depth individual face-to-face interviews until data saturation was reached to explore and describe the use and barriers of PEC services in the four districts of the Southern Omo Zone, Ethiopia (Kumar 2011:194; Polit & Beck 2017:702). Consequently, the qualitative data collection phase was completed with six FGDs and twelve in-depth individual face-to-face interviews when the researcher recognised the level of information saturation in consulting the advisors (Merriam & Tisdell 2016:23). Table 3.1 reflects the number of FGDs and in-depth individual face-to-face interviews organised during this study.

Table 3.1 Number of focused group discussions and in-depth individual face-to-face interviews organised

Districts	Number of FGD organised	Number of in-depth individual face-to-face interviews organised
District 1	2	2
District 2	1	2
District 3	2	5
District 4	1	3
Total	6	12

The number of FGDs & in-depth individual face-to-face interviews per district were purposively determined based on the number of participants with adequate information about the topic under study.

3.4.4.2 Sample size for the quantitative phase

Rao soft formula, an online sample size calculator was used to estimate the sample to assess the knowledge and skills of mid-level healthcare workers who provide PEC services in the four districts of the South Omo Zone in Ethiopia. Prior to the study, 141 registered healthcare workers provided PEC services in the four districts of the Southern Omo Zone, Ethiopia (South Omo Zone Health Department 2023:5). Considering a 95% confidence interval, a 5% margin of error, a 50% population proportion, and a population size of 141, the sample size was 104 (Kothari & Garg 2019:53).

To assess the readiness of PECUs in infrastructure, equipment, and service delivery functional primary eye-care units in the study area were incorporated. During the current study, 32 PECUs were found to provide PEC services (South Omo Zone Health Department 2023:5). Considering the minimum sample size for quantitative research and getting adequate information all 32 PECUs were incorporated in the assessment.

3.5 DATA COLLECTION PROCESS

Data collection is a procedure for collecting data systematically to resolve research questions (Brink et al 2018:65). Based on its exploratory sequential mixed methods research design approach and the proposed pragmatic paradigm that was applied during the study, the data collection process involved both qualitative and quantitative data

collection procedures. Data was collected in four districts of the South Omo Zone, Ethiopia. The entire data collection took 5 months from June 2023 to October 2023. Table 3.2 presents the study data collection process.

Table 3.2 Summary of data collection methods

Phases	Method of data collection	Participants
Qualitative phase	Focused group discussion	Adult service users
	In-depth individual face-to-face interviews	Primary eye-care workers
Quantitative phase	Self-administered questionnaire	Mid-level healthcare workers
	Checklist	Primary eye-care unit managers

3.5.1 QUALITATIVE DATA COLLECTION

During Phase I (the qualitative phase), data was collected through FGDs and in-depth individual face-to-face interviews (Denzin & Lincoln 2018:45). Consequently, the pre-tested semi-structured guides that provoked discussion were used to collect data through FGD (Annexure L) and in-depth individual face-to-face interviews (Annexure M). The focus of qualitative data collection was to explore the use and barriers of PEC services among adults, 40 years and older, and PECWs (Nyumba, Wilson, Derrick & Mukherjee 2017:2). Data collection was carried out in primary eye-care units and selected areas in the village, where the community spent time together. The study participants were adult service users and PECWs who were identified to provide detailed information about the topic. There was no cost incurred by the study participants for transportation to the data collection site.

The researcher was the main data collector and ensured that the application of all ethical protocols was maintained during the study. Furthermore, strict procedures were followed to protect the safety of the researcher and the study participants, including obtaining clearance from all gatekeepers prior to data collection, careful and wise selection of data collection participants, venue and time, and adherence to basic principles of ethics as presented in the last section of this chapter.

3.5.2 Development of quantitative data collection tools

Phase II of this study was the development of quantitative data collection tools. During this phase, the researcher adopted a checklist (Annexure O) and a self-administered questionnaire (Annexure N) based on the findings of Phase I.

3.5.3 Quantitative data collection

During Phase III (the quantitative phase), data was collected using data collection tools developed in the preceding phase. A pre-tested self-administered questionnaire was used to collect data from mid-level healthcare workers face-to-face. Similarly, a standardised checklist was applied to evaluate the readiness of PECUs (Goodman & Thompson 2018:181). Before the application, the statisticians validated the questionnaire and checklist for their content by assuring the tools define the purpose and scope of the study.

The focus of quantitative data collection was to describe the knowledge and skills of mid-level healthcare workers and to assess the readiness of primary eye-care units with respect to equipment, infrastructure, and service delivery to support the development of the primary eye-care model. Quantitative data collection was carried out in primary eye-care units and study participants were staff from the unit; therefore, participants did not incur any cost for being part of the study.

3.5.4 Preparatory phase

The preparatory or pre-investigative phase of a study refers to a phase prior to the actual investigation in which the researcher will test the study tools (Kumar 2011:218; Williams-McBean 2019:1055). In this section, the pre-testing of the qualitative tools, the focused group discussion guide, and the in-depth individual face-to-face interview guide are discussed first. Second, the pre-testing of the quantitative tools, the self-administered questionnaire, and the checklist are presented.

3.5.4.1 Pretesting of the qualitative tools

The researcher conducted an FGD and two in-depth individual face-to-face interviews in one of the districts to test the tools. The pre-tested result and the study participants were not incorporated into the final study result. The pretesting supported the researcher in measuring the content of the tool in answering the research questions. Following the pre-test of the qualitative tool, more probing questions were added to the guides (Annexures L & M).

3.5.4.2 Pretest of the quantitative tool

The questionnaire and checklist prepared to assess the knowledge and skills of primary eye-care service providers and the readiness of primary eye-care units were pretested to confirm their importance prior to the actual study. Consequently, five questionnaires and three checklists were used for the pretesting in one of the study areas to check the applicability of the tool in the study area. The average time taken to complete the self-administered questionnaire was 35 minutes and that of the checklist was 20 minutes. Adjustments were made to reduce the average time needed to complete the self-administered questionnaire to less than 30 minutes after the pretest. The results of the pretesting and the number of participants were not incorporated into the actual study result (Burns & Grove 2017:109). Both of the quantitative data collection tools were prepared in English and were subdivided into sections.

The sections of the self-administered questionnaire were as follows:

- Socio-demographic and basic data
- Knowledge assessment section
- Skill assessment section

The subdivisions of the checklist were as follows:

- Information about the primary eye-care unit
- Infrastructure assessment
- Instruments, consumables, and equipment assessment
- Service delivery assessment

3.6 ACTUAL INVESTIGATIVE STAGES

Data collection was carried out sequentially in phases (Creswell & Creswell 2018:306). Each phase of data collection was conducted separately in consecutive order to align with the sequential nature of the preferred research methodology (Gray et al 2017:589).

3.6.1 Phase I: Qualitative data collecting

During Phase I of the study, qualitative data was collected through FGDs with adults, 40 years and older, who had used primary eye-care services in the last 6 months and in-depth individual face-to-face interviews with certified and trained primary eye-care workers.

3.6.1.1 Focused group discussions

Focused group discussion is one of the qualitative data collection tools in which a selected group comprising four to twelve people discusses in detail a specific topic of dialogue being facilitated by a professional moderator (Gray et al 2017:530). During the current study, eight participants were homogeneously engaged in all of the six FGDs. All purposively selected study participants had used PEC services in the last six months and discussed their experience using the eye-care service in the nearby public primary eye-care unit.

Written consent was obtained from all study participants prior to the investigation. The average time spent with the study participant was one hour. The discussions were recorded with an H1 Handy recorder and a Smartphone recorder. The researcher had sufficient time to understand the experiences of the participants during the discussion. The data collection assistant captured the emotions and expressions of the participants to complement the ideas presented during the discussions. The discussions were organised in Amharic, the Ethiopian national language and an accredited language translator was engaged in the translation.

3.6.1.1.1 Recruitment of participants in the focus group discussions

The participants who were to provide adequate information and be familiar with eye-care services were selected by the researcher by applying purposive sampling (Polit & Beck 2018:218). Before the start of the discussion, the researcher provided the information sheet, that presented the purpose of the study, the voluntary nature of their participation, and the steps followed to purposively select them. The potential benefits of participating in the study, confidentiality issues, and the absence of consequences for being part of the study were presented in the information sheet provided. Signature consent was obtained from all participants following the agreement on the information provided and the general rules of the study (Annexure K). The average time spent with each group was one hour.

3.6.1.2 In-depth individual face-to-face interviews

An in-depth individual face-to-face interview is one of the qualitative data collection tools that allows the researcher to collect a large amount of information related to perception, experience, and behaviour from the participants (Gray et al 2017:530). An in-depth individual face-to-face interview is an independent research method that allows the researcher and the participants to discuss several aspects to better understand the topic under study (Polit & Beck 2018:297). The interactive nature of the in-depth individual face-to-face interview makes the data collection tool preferable. It is also one of the best tools to obtain deep information on study topics.

3.6.1.2.1 Recruitment of participants in the in-depth individual face-to-face interview

During this study, 12 in-depth individual face-to-face interviews were conducted with trained and certified primary eye-care workers, who were permanent employees of the unit and provided eye-care services during the study. The participants in the in-depth individual face-to-face interview were selected based on their experience in providing primary eye-care services in the study area (Gray et al 2017:530). The focus of the in-depth individual face-to-face interviews was to explore and describe barriers faced by PECWs in the provision of primary eye-care services in the four districts of the South Omo Zone, Ethiopia. All in-depth individual face-to-face interviews were conducted in primary eye-care units.

Before actual data collection commenced, participants received the information sheet that presented the purpose of the study, the voluntary nature of their participation, and the steps followed to purposively select them. The potential benefits of participating in the study, confidentiality issues, and the absence of consequences for being part of the study were presented in the information sheet provided (Manti & Licari 2018:146). Signature consent was obtained from all participants following the agreement on the information provided and the general rules of the study. The average time spent with each participant was forty-five minutes. Each discussion was recorded with an H1 Handy recorder and a Smartphone recorder. The interviews were organised in Amharic, the Ethiopian national language and an accredited language translator was engaged in the translation.

3.6.2 Phase II: Development of quantitative data collection tools

Phase II of the study was the development of quantitative data collection tools based on the findings of the Phase I study. After analysing and presenting the qualitative data collected during Phase I, quantitative data collection tools were adopted to respond to the third and fourth objectives of the study. Consequently, a self-administered questionnaire was used, which was adopted from the WHO training guide for primary eye-care workers and the Ethiopian Ministry of Health National Strategic Action Plan for Eye Health 2016-2020 to assess the knowledge and skills of mid-level healthcare workers (Ethiopian Ministry of Health 2016:43).

Similarly, to assess the readiness of primary eye-care units with respect to infrastructure, equipment, and service delivery, a checklist was adopted from the WHO tool to assess primary eye-care services (WHO 2018b:49)

3.6.3 Phase II: Quantitative data collection

The third phase of this study was quantitative data collection and analysis. Quantitative data collection refers to the collection of numeric variables to measure strength of variable and determine associations among them (Goodman & Thompson 2018:181). The quantitative data collection tools developed in the second phase of the study were used to collect data to respond to the third and the fourth objectives and corresponding research questions of the study.

3.6.3.1 Self-administered questionnaire

The self-administered questionnaire is one of the quantitative data collection tools, in which the study tool is completed by the respondents themselves (Polit & Beck 2018:139). In this study, a self-administered questionnaire was used to assess the knowledge and skills of mid-level healthcare workers who provide PEC services. The content and structure of the self-administered questionnaire used are presented in Table 3.3.

Table 3.3 Content and structure of the self-administered questionnaire

Section	Content covered	Items
Section A	Socio-demographic and basic data	11
Section B	Knowledge assessment	14
Section C	Skill assessment	10
Total		35

3.6.3.1.1 Administration of the self-administered questionnaire

After the study respondents were selected using simple random sampling techniques, the researcher coded and placed the questionnaire in specially designated boxes in the selected primary eye-care units. Study participants completed the self-administered questionnaire, placed it in a sealed envelope, and returned it. Each participant in the study received an information sheet with detailed information about the study. Before responding to the questions, all study participants signed the consent form attached to the self-administered questionnaire.

3.6.3.2 Checklist

A checklist is a set of expected items prepared before a study by a researcher for their presence and absence for easy guidance of the study. A checklist or rating scale is a preferred data collection tool for the identification of recorded data (Gray et al 2017:793). In this study, a checklist was used to assess the readiness of primary eye-care units in equipment, infrastructure, and service delivery in the study area. The content and structure of the checklist are presented in Table 3.4.

Table 3.4 Content and structure of the checklist applied in the study

Section	Content covered	Items
Section A	Information about the primary eye-care unit	4
Section B	Infrastructure assessment	4
Section C	Instruments, consumables, and equipment assessment	20
Section D	Service delivery assessment	7
Total		35

3.7 DATA MANAGEMENT AND ANALYSIS

Similarly, to data collection, data management and analysis were performed in each phase of the study. During the first phase, qualitative data was analysed, and study themes were developed that supported the development of quantitative data collection tools. The second phase of data analysis was quantitative data management and analysis (Creswell & Creswell 2018:307). Details of both phases are presented below.

3.7.1 Qualitative data analysis

Data analysis in the qualitative study involves the organising, thematising, and creation of categories and sub-categories of data that can assist in the interpretation of the study findings (Creswell & Poth 2018:248; Ravindran 2019:40). Unlike quantitative data analysis, in this phase, data collection and analysis occur concurrently (Polit & Beck 2017:748). The researcher and the research assistant carefully transcribed the data to ensure data quality. The results of the focus group discussion and the in-depth individual face-to-face interviews were analysed with the electronic-assisted qualitative data analysis method using the ATLAS. ti software version 23.2.2.

For Phase I analysis, 18 documents (6 FGD and 12 in-depth individual face-to-face interviews) were added to the software. After data entry, the researcher created codes, code groups, quotations, and memos to help develop study themes. Initially, 79 codes, eight code groups, and eight memos were created. In addition to the codes created by the researcher, the ATLAS. ti software created 286 AI codes. After a careful selection and review of the generated codes, the researcher finally designed three themes, seven categories, and 22 codes for the focused group discussion and four themes, 10 categories, and 30 codes for the in-depth individual face-to-face interview.

To finalise the number of codes, code groups, and themes, the researcher applied the co-occurrence, density, and ground analysis of the codes. Details of the steps and findings are discussed in Chapter 4 in Section 4.2.

3.7.2 Quantitative data analysis

During the third phase of the study, following the completion of numerical data collection, the completeness of the self-administered questionnaire and checklist was verified. One incomplete data collection tool was discarded. Finally, 103 self-administered questionnaires and 32 checklists were analysed.

During this phase, data entry was performed using Epi-info data management software version 6, and data analysis was performed using SPSS version 28 software with the support of a statistician. Descriptive statistics were used. In descriptive statistics, tables, graphs, means, and frequencies were used to present the data shown in Chapter 5. The association of variables was processed using a logistic regression model. Crude odds ratios were calculated to determine the strength of the association and adjusted odds ratios were used to control the effect of confounders. Bivariate analysis at a significance level of 0.25 was included in the multivariate analysis. Finally, the association of predictor variables with the outcome variable was presented using the adjusted odds ratio (AOR) with their 95% confidence interval.

3.8 QUALITY ASSURANCE OF RESEARCH WORK

The discussion presented below incorporates all the measures taken to ensure the safety and quality of research work. The discussion follows the phases of the study.

3.8.1 Enhancing trustworthiness

To improve the trustworthiness of this study, the researcher followed the following criteria to improve trustworthiness and minimisation of any weakness (Amin et al 2020:1479; Creswell & Hirose 2019:24; Denzin & Lincoln 2018:370).

3.8.2 Credibility

Credibility in qualitative research refers to the plausibility of the study results from the participant's point of view, not the researcher (Creswell & Hirose 2019:126). Polit and Beck (2018:415) describe credibility as trust in the findings and communication of results. To ensure credibility, the researcher used the following methods:

- The researcher used an H1 audio recorder, smartphone, and hardcopy document of the narratives provided about the experiences of using primary eye-care.
- The researcher used triangulation. Triangulation in this context refers to the use of different data collection methods to describe a single phenomenon (Creswell & Creswell 2018:200; Flick 2014:339). To this end, the researcher explored the barriers to PEC services of adults, 40 years and older, who had used PEC services and trained and certified PECWs. This helped the researcher collect sufficient data to saturation.
- The result of the study demonstrated the degree to which the researcher has accurately and fairly demonstrated the lived realities of Ethiopian adults regarding the provision of primary eye-care services in the rural South Omo Zone, Ethiopia.
- The researcher had a prolonged engagement with the participants in the study and collected in-depth data that helped the researcher understand the experiences of the participants (Yin 2016:86).
- The researcher also conducted a peer review and debriefing with the supervisor and independent experts in PEC to ensure that the research processes were logically conducted, and the results were well reported.

3.8.3 Dependability

Dependability refers to the loyalty and uniformity of the study findings and the level of documentation of the research process (Creswell & Hirose 2019:124). To maintain the reliability of the study, the researcher took the following measures:

- Detailed descriptions of the study findings were presented that compare the findings with similar studies carried out in different parts of the world.
- The researcher also documented all scientific procedures followed during the study.

- Study findings were peer reviewed by study supervisors and PEC experts before the results were communicated.

3.8.4 Confirmability

Confirmability is a process of repeatedly checking the findings during data collection and analysis to make sure the findings are consistent if carried out by others (Bowling 2014:289). It also refers on the investigator's level of commitment to the precision, implication, and significance of the data (Brink et al 2018:159). The researcher strictly evaluated the confirmability during data collection and analysis.

- The study applied four different data collection methods: focus group discussion, in-depth individual face-to-face interviews, self-administered questionnaires, and checklists to assess confirmability.
- The researcher adopted the concept of member checking to revert to participants with clarity and confirmation of the narrations shared by the participants. To this end, the researcher shared the initial summary report of the in-depth individual face-to-face interview with participants to make sure the report reflects their realities.

3.8.5 Transferability

Transferability is similar to external validity/generalisability in a quantitative study and refers to providing evidence that the findings can apply to other populations, situations, or contexts (Creswell & Hirose 2019:128). The study applied exploratory sequential mixed-method research to ensure the triangulation of data from multiple settings. To reflect the transferability:

- The researcher presented the topic under discussion in intensive categories. The study quotation was presented alongside the developed themes, categories, and sub-categories.
- The researcher purposively selected those participants with rich experience.
- The steps followed during the study and generating findings were clearly described.

3.8.6 Authenticity

Authenticity refers to the level to which the researcher collected the different viewpoints and principles of the study participants and created change between participants and study areas during data analysis (Gray et al 2017:527; Polit & Beck 2018:416). The applied methodology of the study guided the authenticity of the study. Accordingly, the researcher,

- Collected information directly from adult service users and primary eye-care providers.
- Presented the study findings with the direct quotes of the participants.
- Applied all ethical procedures described in Section 3.10. during data collection.

3.8.7 Reliability and validity (quantitative phase)

3.8.7.1 Reliability

Reliability is justified by the level of obtaining the same result using the same instrument more than once. Furthermore, it refers to the consistency of the measure obtained (Gray et al 2017:690). Most of the time, reliability is closely associated with subjectivity. If the researcher advocates subjectivity, the level of reliability will be compromised (Creswell & Hirose 2019:128). To ensure the reliability of the study,

- The researcher kept an audit trail for future and interested scholars who would wish to investigate further on the phenomenon.
- The study used statistical expertise to assess the association between study findings and conclusions.
- The study also used the use of Cronbach's Alpha to ensure the reliability of the study.

3.8.7.2 Validity

Validity is a mandatory requirement of research measured by the degree to which scientific methods have been followed throughout the process. Validity in a study can be measured and maintained by selecting an appropriate study time, choosing an

appropriate methodology and sample methods, and allowing the respondent to choose independently (Burns & Grove 2017:330). Accordingly:

- The study was conducted at an appropriate time, the participants of the knowledge and skill assessment were approached during their break time.
- Scientifically proven and sound sampling and analysis methods were used.
- Furthermore, the researcher used a statistician to scrutinise and validate the content and relevancy of the questions posed to the participants (Gray et al 2017:690).

3.9 RESEARCH ETHICS

Research ethics is a set of procedures and protocols prepared to support researchers in conducting world-class studies (Arifin 2018:30; Johnson & Christensen 2014:194). To adhere to international standard sets, the researcher strictly followed basic ethical principles (Council for International Organizations of Medical Science [CIOMS] 2016:32; UNISA 2016:11); obtaining permission to conduct the study, collecting consent from participants, and applying ethical principles of autonomy, justice, beneficence, and nonmaleficence before and during the study (Burns & Grove 2017:111). Details of the ethical procedures followed are presented below.

3.9.1 Permission to conduct the study

This study followed all applicable ethical issues and protocols. First, the researcher's request for permission to conduct the study was submitted to the College of Human Sciences Research Ethics Committee (CREC). Following the request, ethical clearance was granted from the School of Human Sciences Research Ethics Review Committee of the University of South Africa for a year with reference number 58528660_CREC_CHS_2023 (Annexure A).

Following approval of the ethical clearance from the University of South Africa, the researcher submitted permission to conduct the study to the Southern Ethiopia Public Health Institute and the South Omo Zone Health Department and received approval. Similar ethical clearances were received from the four district health offices prior to data collection (Annexures B-G).

3.9.2 Informed consent

Informed consent means the subjects' agreement to voluntarily participate in the prospective study to collect information about the study (Manti & Licari 2018:146). Informed consent involves an agreement to participate in the study after sharing information with participants (Polit & Beck 2017:157). In this study, the researcher collected signed informed consent from all participants in the focused group discussion, the in-depth individual face-to-face interview, and the self-administered questionnaire before the beginning of the actual study (Annexures I & J).

The researcher provided information to study participants on purpose, objective, contribution to the study, risk, and confidentiality. Participants were also informed that they had the right to withdraw from this study at any time they wished.

3.9.3 Principle of autonomy

The principle of autonomy requires the researcher to ensure that participants have the autonomous right to self-determination and understand that they have the right to decide whether to participate in the study or not (Gray et al 2017:327). During the study period, each participant signed an informed consent (Annexure I). Informed consent refers to the mutual agreement of study participants with a researcher, ensured by their signature after understanding the entire concept of the study (Polit & Beck 2017:157).

3.9.4 Principle of justice

The principle of justice refers to the right to fair and equal treatment during the study by ensuring that the selection of participants is based on study requirements rather than convenience (Polit & Beck 2017:155). In this study, the right to fair treatment was ensured by applying distributive justice to avoid imposing unfair treatment or discriminating unfairly against participants (Babbie 2013:43). Participants were selected and enjoyed fair treatment without any judgement of their beliefs, social standing, lifestyle, etc.

3.9.5 Privacy

Privacy may be intruded upon by introducing intrusions into the lives of participants (Polit & Beck 2017:141). The researcher must respect and care for the privacy of the study

participants during their participation (Babbie 2016:65; Rosenstein 2019:24). The researcher ensured that the privacy of the study participants was maintained throughout the data collection by keeping the data under the strictest measures to protect the participants.

3.9.6 Confidentiality

Confidentiality refers to the responsibility of ensuring that the collected data is not disclosed in any way to unauthorised persons, to protect the anonymity of the participants during data collection (Gray et al 2017:323; Johnson & Christensen 2014:212). During this study, the researcher maintained the safety of the collected data and protected them through encrypted passwords on the soft copy materials, and the hard copies were kept in a locked safe.

3.9.7 Anonymity

Anonymity refers to the names and identifiers of the data to protect confidentiality. Participants were not asked to identify or write their names on any material related to the data. The researcher did not link the participants to the collected data (Gray et al 2017:323). During this study, the researcher used codes to identify participants.

3.9.8 Beneficence

Beneficence states that research should be of some good contribution to people, as it imposes the moral duty of the researcher to not harm the participants. Beneficence advocates activities to maximise benefit and minimise harm (Polit & Beck 2017:134). During this study, the researcher fulfilled the agreed-upon international and national basic moral obligations and ensured that the study had a positive contribution to the people (FDRE, Ministry of Health 2014:21; UNISA 2016).

The researcher did not use his professional standing to exploit the participants. The researcher-participant relationship was kept professional. The researcher informed the participants that they had a right to participate freely in this study without being coerced in any way against their own will and discharged all their responsibilities.

3.9.9 Non-maleficence

Non-maleficence refers to the researcher's obligation to avoid or minimise harm; therefore, it requires research to not intentionally trigger harm to study participants (Polit & Beck 2017:152). Achieving the purpose of the study without causing harm is among the main ethical procedures that a researcher must follow (Motloba 2019:40). In this study, the researcher ensured that there was no physical harm. Participants were protected from risks by minimising possible physical and psychological harm and discomfort. To mitigate the discomfort that may have occurred due to the prolonged time of the data collection, the research involved only voluntary participants, and collection was performed at the most convenient time and place preferred by the participants. Furthermore, the researcher ensured the dignity and safety of the study participants according to the standard ethical procedures of the study.

3.9.10 Conflict of interest

Conflict of interest occurs when an outcast might directly and considerably affect, or be affected by, the study design, conduct, or report. Likewise, a financial conflict of interest occurs when substantial financial interest disturbs the design, conduct, or report of a study directly and significantly (Polit & Beck 2017:144). In this study, the researcher avoided and minimised conflict of interest from the beginning by adhering to the UNISA and Ethiopian Government requirements for recognition, disclosure, and management of conflict of interest, lessening self-interest and learning.

3.10 SUMMARY

This chapter presented the methodology applied to explore and describe primary eye-care service provision in the four districts of the Southern Omo Zone, Ethiopia. In the first section of the chapter, the research approach and design, the pragmatic perspective of the study, and the context including the study setting, the target, and the accessible population were discussed. Subsequently, the sampling techniques, criteria, and sample size used for both studies were discussed. The data collection process was briefly presented from the preparatory phase, pre-testing of the tools to the actual investigation and recruitment of study participants. The steps and procedures involved in the

management and analysis of qualitative and quantitative data was also discussed in a way that ensures the sequential nature of the study.

As part of the quality assurance of the research work, measures taken to enhance the trustworthiness of the study were discussed credibility, dependability, confirmability, transferability, and authenticity as well as validity and reliability in the quantitative phase. This chapter concludes with the basic principles of research ethics taken before and during the study, including the principles of autonomy, justice, privacy, confidentiality, anonymity, beneficence, maleficence, and conflict of interest. The next chapter will present the results and discussions of the qualitative phase of the study.

CHAPTER 4

PRESENTATION, ANALYSIS AND DISCUSSION OF QUALITATIVE DATA

4.1 INTRODUCTION

In the preceding chapter, the research design, methods, and phases of the study were discussed. The details of data collection, data analysis techniques, and procedures used during the interpretation of qualitative and quantitative data were reviewed. This chapter elaborates on the qualitative results, analysis, and discussion of the study to respond to the first two objectives of the study.

Explore and describe the experience of adults who used primary eye-care services in the four districts of the South Omo Zone, Ethiopia.

Explore and describe the barriers faced by primary eye-care workers in the provision of primary eye-care services in the four districts of the South Omo Zone, Ethiopia.

As an exploratory sequential mixed-method design study, the findings of the qualitative phase and the quantitative phase are illuminated consecutively in two chapters. This chapter elaborated the findings of the qualitative study and Chapter 5 described the findings of the quantitative study. The findings of both studies were integrated in Chapter 6 and helped to develop and validate the proposed primary eye-care model to support the optimal provision of primary eye-care services in the four districts of the South Omo Zone, Ethiopia.

4.2 PRESENTATION OF QUALITATIVE DATA ANALYSIS

The researcher collected qualitative data using FGDs and in-depth individual face-to-face interviews. A focus group discussion was organised with adults, 40 years and older, who had used PEC services in public primary eye-care units in the past six months to explore and describe PEC service utilisation experience. An in-depth individual face-to-face interview with trained and certified PECWs was organised to explore and describe the

barriers faced by PECWs in the provision of primary eye-care services in the four districts of the Southern Omo Zone, Ethiopia.

4.2.1 Management and analysis

The qualitative study findings discussed here were analysed from six FGDs and twelve in-depth individual face-to-face interviews. The 48 FGD participants were purposively selected as having used primary eye-care services in the last six months. A total of 12 in-depth individual face-to-face interviews were conducted with 12 trained and certified primary eye-care workers who worked in the public PECU for at least a year, were permanent staff of the unit, and provided primary eye-care services during the study period.

4.2.1.1 Qualitative data management

The results of the qualitative study are analysed and presented with the electronic-assisted qualitative data analysis method using ATLAS. ti software version 23.2.2. A total of 18 documents (6 FGD and 12 in-depth individual face-to-face interviews) were added to the software. Figure 4.1 shows the number of documents added to the software with the number of codes and quotations generated. The figure is exported from ATLAS. ti.

Project: T W Kentaviso Phase I

Report created by Temesgen Wolde Kentaviso on 8/29/2023.

Document Report – Grouped by: Document Groups

All (18) documents

FGD

Created by Temesgen Wolde Kentaviso on 7/15/2023.

6 Documents:

1 FGD Five

Text document, 31 quotations, **20 Codes**

2 FGD Four

Text document, 22 quotations, **13 Codes**

3 FGD One

Text document, 29 quotations, **12 Codes**

4 FGD Six

Text document, 27 quotations, **12 Codes**

5 FGD Three

Text document, 23 quotations, **16 Codes**

6 FGD Two

Text document, 21 quotations, **17 Codes**

In-depth Interview

Created by Temesgen Wolde Kentaviso on 7/15/2023.

12 Documents:

7 In-depth interviews eight

Text document, 12 quotations, **20 Codes:**

8 In-depth interviews eleven

Text document, 19 quotations, **63 Codes:**

9 In-depth interviews five

Text document, 22 quotations, **72 Codes:**

10 In-depth interviews four

Text document, 23 quotations, **51 Codes:**

11 In-depth interviews nine

Text document, 13 quotations, **31 Codes:**

12 In-depth interviews one

Text document, 30 quotations, **58 Codes:**

13 In-depth interviews seven

Text document, 23 quotations, **50 Codes:**

14 In-depth interviews six

Text document, 19 quotations, **29 Codes:**

15 In-depth interviews ten

Text document, 25 quotations, **53 Codes:**

16 In-depth interviews three

Text document, 28 quotations, **49 Codes:**

17 In-depth interviews two

Text document, 23 quotations **62 Codes:**

18 In-depth Interviews twelve

Text document, 18 quotations, **33 Codes**

Figure 4.1 ATLAS. ti document summary report

4.2.1.2 Qualitative data analysis

Following data entry, the researcher created codes, code groups, quotations, and memos to help develop study themes. Initially, 79 codes, eight code groups, and eight memos were created. In addition to the codes formed by the researcher, the ATLAS. ti software created 286 AI codes. After careful selection and review of the generated codes, the researcher finally designed three themes, seven categories, and 22 codes for the focus group discussion and four themes, 10 categories, and 30 codes for the in-depth individual face-to-face interview. To determine the final number of codes, code groups, and themes, the researcher applied the co-occurrence, density, and ground analysis of the codes. Figure 4.2 illustrates the code, density, and ground level in the first 14 codes of the study.

Title:		ATLAS.ti - Code Group Report	
Project:		T W Kentayiso Phase I	
User:		Temesgen Wolde Kentayiso	
Date:		8/29/2023 - 4:09:29 PM	
Code	Grounded	Density	
• Lack of transportation access	16	1	
• Lack of separate room for eye care service	4	2	
• Absence of someone to accompany	8	0	
• Awareness gap	20	8	
• Being old	2	0	
• Being poor	34	0	
• Community service utilization (good)	9	0	
• Community service utilization (low)	5	0	
• Community service utilization (seasonal)	2	1	
• Community services	34	0	
• Cost of treatment	8	1	
• Dependency on outreach and free services	1	0	
• Description of service @ PECU	28	0	
• Distance	10	0	

Figure 4.2 Excel export of the first 14 codes with their ground and density

Following the attachment of documents to the system, the software ripened the memos. Here are two sample memos (one FGD and one in-depth individual face-to-face interview) developed by ATLAS. ti. The researcher separated the details of the memos and

discussed them as part of the developed theme in Section 4.3 (themes of the focus group discussion) and Section 4.5 (themes of the in-depth individual face-to-face interview).

AI Summary: Document 6 'FGD two'

Created by Temesgen Wolde Kentayiso on 7/16/2023.

Participants in the FGD expressed dissatisfaction with the use of primary eye-care services in the nearby primary eye-care unit. They reported issues such as a lack of separate examination rooms, inadequate eye examination materials, and a lack of effective treatment. The participants also mentioned barriers such as low awareness of eye problems, lack of dedicated professionals, unethical behaviour of service providers, and lack of economic resources. Common challenges in providing primary eye-care services included transportation problems, language barriers, lack of money, and lack of materials. The key interventions suggested by the participants were the establishment of a separate and well-equipped primary eye-care unit and the government's attention to the needs of the rural community for eye-care.

AI Summary: Document Group 'in-depth individual face-to-face interview'

Created by Temesgen Wolde Kentayiso on 7/16/2023.

The participant also emphasises the need for more trained personnel, particularly ophthalmic nurses, to share the workload. He suggests implementing regular training programmes to increase the number of trained eye-care workers in the unit. In terms of infrastructure and equipment, the participant mentions the need for a separate building for the eye-care unit with adequate facilities for surgeries and storage of supplies. He also emphasizes the importance of having basic eye-care equipment, such as slit lamps, auto-refractors, and operating microscopes. The participant also suggests strengthening the referral system to ensure that patients with more complex eye conditions are referred to higher-level eye-care facilities. He notes that the referral system is weak and that many patients who require specialised care cannot access it. Overall, the key interventions suggested by the participant to improve primary eye-care service provision at his unit include training and increasing the number of eye-care workers, specifically ophthalmic nurses; integrating eye-care services with other health activities in the primary health

system; improving the infrastructure and equipment in the eye-care unit; and strengthening the referral system to ensure appropriate care for complex eye conditions. These interventions aim to address the challenges of workforce shortage, lack of awareness, transportation problems, and inadequate infrastructure and equipment, ultimately improving the accessibility and quality of primary eye-care services in the community.

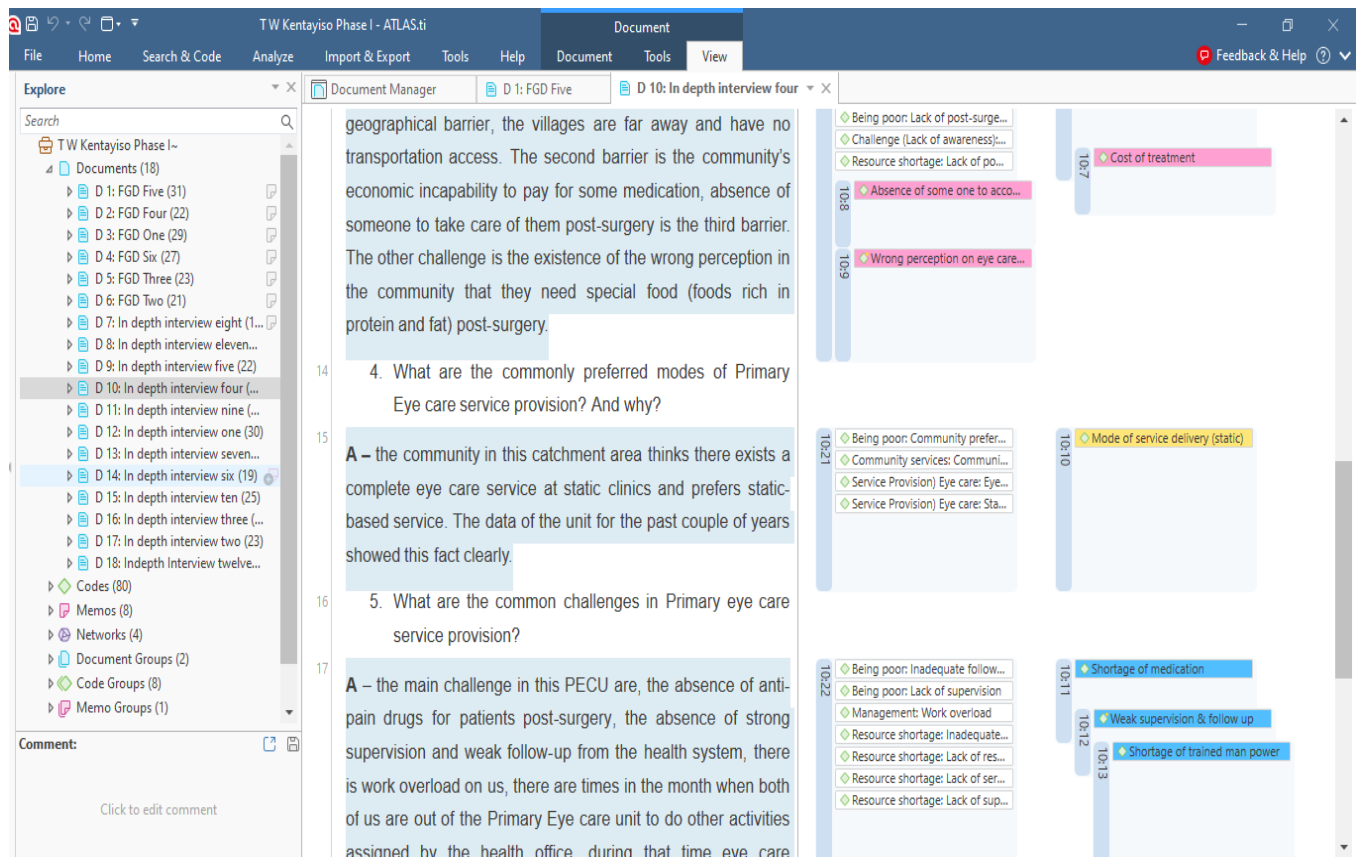


Figure 4.3 Qualitative data code segmentation
(Exported from ATLAS.ti)

4.2.2 Presentation of qualitative data

4.2.2.1 Demographic profile of participants in the focused group discussion

During the FGD, a total of 48 participants were purposively selected from the four districts of the study area that had used primary care services in the nearby public PECUs in the last six months. All participants were over 40 years old, the majority in the age group of 50 to 60 years. Thirty-one of the participants were men. More than half of the participants completed their primary education, grade 8, according to the Ethiopian Ministry of

Education classification. The vast majority were married. The demographic profile of the participants in FGD is described in Table 4.1 below.

Table 4.1 Demographic profile of participants in FGD (N=48)

S.N.	Variable	Group	Number	Total
1	Age	40-50	17	48
		50-60	19	
		>60	12	
2	Sex	Male	31	48
		Female	17	
3	Educational level	Illiterate	13	48
		Primary education	25	
		Secondary education	8	
		Collage and above	2	
4	Marital status	Single	5	48
		Married	38	
		Divorced	1	
		Widowed	4	

4.2.2.2 Demographic profile of the participants of the in-depth individual face-to-face interview

More than half of the in-depth individual face-to-face interview participants were in the age category of 20 to 30 years while only 1 was above 40 years of age. Most of the study participants were male. Only one of the twelve participants was female. Half of the interviewees were diploma graduates. Those married and those with 2-5 years' service made up the majority. The demographic profile of the participants in the in-depth individual face-to-face interviews is described in Table 4.2 below.

Table 4.2 Demographic profile of participants in the in-depth individual face-to-face interview (N=12)

S.N.	Variable	Group	Number	Total
1	Age	20-30	7	12
		30-40	4	
		Above 40	1	
2	Sex	Male	11	12
		Female	1	
3	Educational level	Diploma	6	12
		Degree	5	
		Master's and above	1	
4	Marital status	Single	4	12
		Married	7	
		Divorced	1	
		Widowed	Nil	
5	Service year	1-2 years	4	12
		2-5 years	5	
		Above 5 years	3	

4.3 STUDY THEME, CATEGORIES AND SUB-CATEGORIES

4.3.1 Theme, categories and sub-categories of the focused group discussion

The finding of the focused group discussion is presented in this section, organised into three themes, seven categories, and 22 sub-categories. The selected and discussed themes of the study are the experience of community service use, barriers to primary eye-care services, and suggestions to improve primary eye-care services. Table 4.3 summarises the main themes, categories, and sub-categories of the qualitative study analysis of the focus group discussion, which were discussed later in this section.

Table 4.3 Themes, categories, and sub-categories of the focused group discussion

Objective 1: Explore and describe the use of primary eye-care services in the four districts of the South Omo Zone, Ethiopia.		
Research question 1: How should the use of primary eye-care services in the four districts of the Southern Omo Zone, Ethiopia, be explored or described?		
Themes	Categories (code groups)	Sub-categories (codes)
Theme 1: Experience of community service utilisation	1.1 Service-related factors	1.1.1 Lack of world-class eye-care service
		1.1.2 Inadequate information
		1.1.3 Absence of escort
	1.2 Service provider-related factors	1.2.1 Language barrier
		1.2.2 Disrespectful service providers
		1.2.3 Seasonal service utilisation
		1.2.4 Lack of commitment
	1.3 Service access factors	1.3.1 Long waiting time
		1.3.2 Travelling distance
1.3.3 Financial implications		
Theme 2: Barriers to primary eye-care services	2.1 Quality gap	2.1.1 Inefficient eye-care services
		2.1.2 Unspecialised service providers
		2.1.3 Service inequity
	2.2 Awareness gap	2.2.1 Lack of information and messaging
		2.2.2 Fear of surgery
		2.2.3 Use of indigenous knowledge
Theme 3: Suggestions to improve primary eye-care services	3.1 Improved service	3.1.1 Service expansion
		3.1.2 Attention
		3.1.3 Deployment of service providers
	3.2 Improved utilisation	3.2.1 Accommodative primary eye-care units
		3.2.2 Awareness creation
		3.2.3 Expansion of outreach services

4.3.2 Theme 1: Experience of community service utilisation

In this section, the community experience of service use was discussed in three categories: service-related, service provider-related, and service access. During the current study, different factors have been reported that determine the community use of eye-care services (Med et al 2019:10). Figure 4.4. below, presented the community experience in codes (exported from ATLAS. ti).

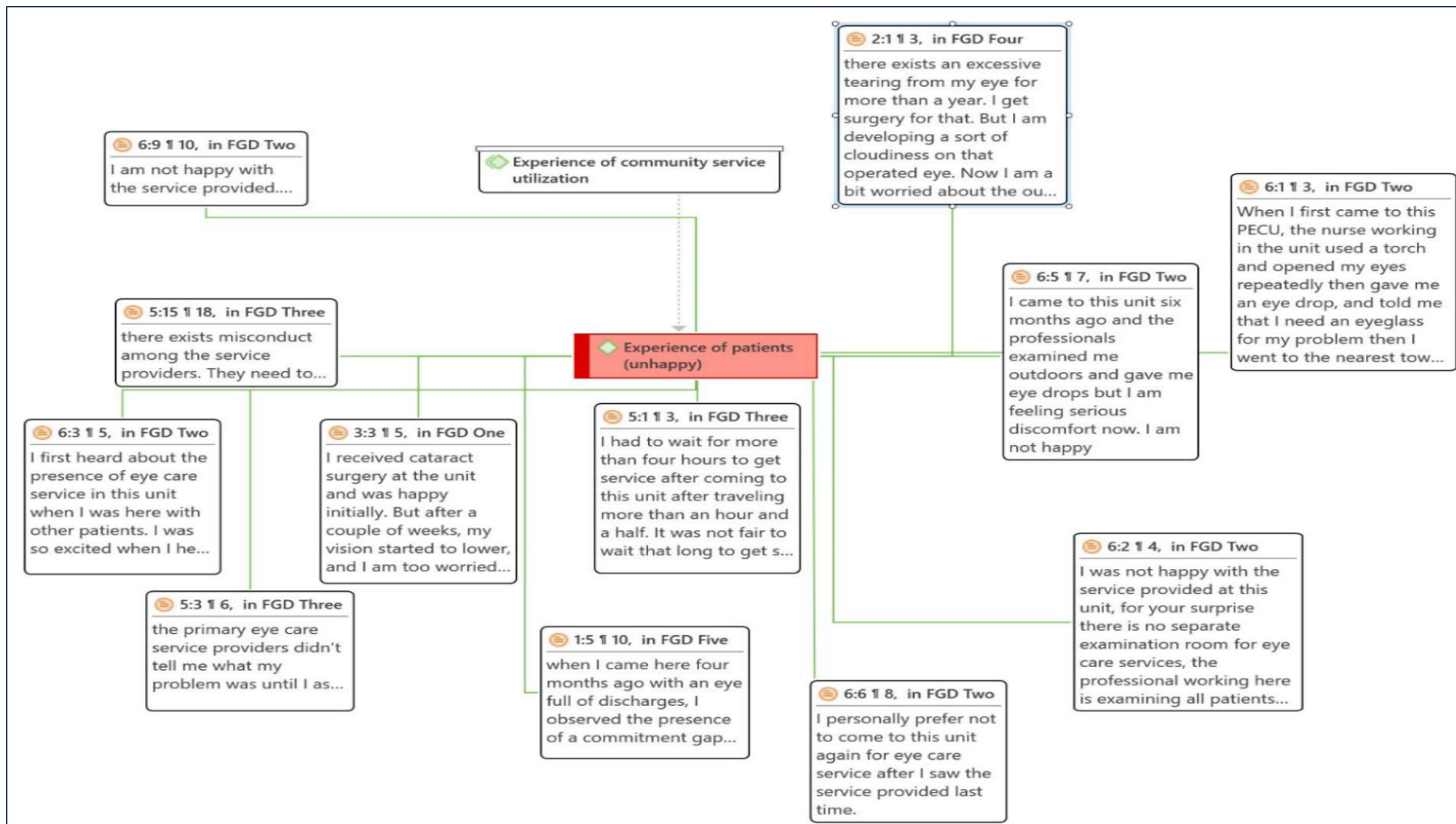


Figure 4.4 Community experiences in the use of PEC services

(Exported from ATLAS. ti)

To better discuss the experiences of service users, theme 1 is classified into three categories (code groups) and nine sub-categories (codes) and is described in Table 4.4 below.

Table 4.4 Theme 1: Categories (code groups) and sub-categories (codes)

Themes	Categories (code groups)	Sub-categories (codes)
Theme 1: Experience of community service utilisation	1.1 Service-related factors	1.1.1 Lack of world-class eye-care service
		1.1.2 Inadequate information
		1.1.3 Absence of escort
	1.2 Service provider-related factors	1.2.1 Language barrier
		1.2.2 Disrespectful service providers
		1.2.3 Seasonal service utilisation
		1.2.4 Lack of commitment
	1.3 Service access factors	1.3.1 Long waiting time
		1.3.2 Travelling distance
1.3.2 Financial implications		

4.3.2.1 Category 1.1: Service-related factors

During this study, different perspectives were identified by the study participants as factors that hindered their PEC services use. The factors were reclassified into sub-categories of lack of world-class eye-care services, inadequate information, and lack of escort as illustrated in Figure 4.5 below.

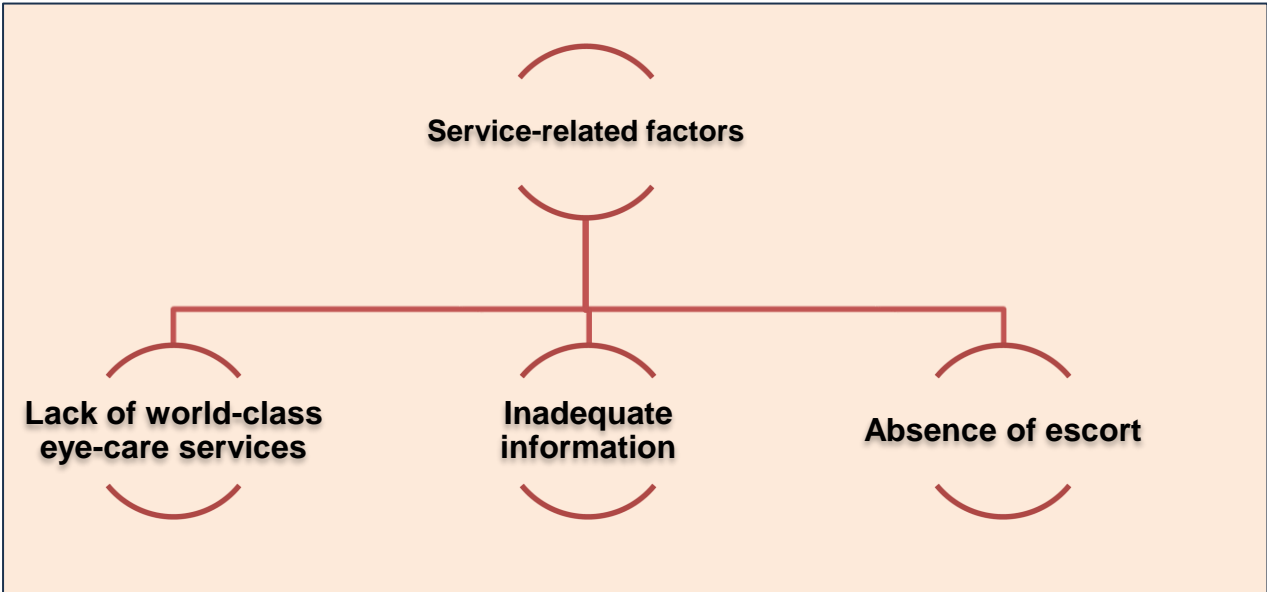


Figure 4.5 Sub-categories of service-related factors

4.3.2.1.1 Sub-category 1.1.1: Lack of world-class eye-care service

Study participants were asked to share their experiences with the use of PEC services and the factors that impede it. The lack of world-class eye-care services was mentioned as a major factor that hindered the utilisation of the PEC services of many participants. This finding is consistent with a result of a previous study done in the Gurage zone, Ethiopia (Teshome et al 2021:7).

The following three direct quotations from study participants articulate this narrative.

“I came to this unit six months ago and the professionals examined me outdoors and gave me an eye drop, but now I am feeling serious discomfort. I am not happy”
6:5 ¶ 7 in FGD Two

“I first heard about the presence of eye-care services in this unit when I was here with other patients. I was so excited when I heard the news and came on the second day for my blurry vision. I had double and triple vision when I looked at my plates while cooking. I am a widowed woman, but I am not happy with the service provided. Guess what I get? The only thing he provided me with was counselling, and that did not change my vision.” 6:3 ¶ 5 in FGD Six

“I am not satisfied with the services provided. My initial complaint was difficulty seeing clearly at night. The service provided gave me an eye drop but still no change.” 6:9 ¶ 10 in FGD Three

Some participants questioned the service quality at PECUs with the problem they were encountering post-treatment. A similar result was reported in a knowledge, attitude and practice study in South Africa (Xulu-Kasaba, Mashige & Naidook 2021:3).

One participant stated that:

“There was an excessive tearing from my eye for more than a year. I got surgery for that. The tear stopped. But I am developing a sort of cloudiness in that operated eye. Now I am a bit worried about the outcome.” 2:1 ¶ 3 in FGD Four

Another participant testified of similar concern:

“I received cataract surgery at the unit and was very happy at first. But after a couple of weeks, my vision started to decrease and I was too worried that I would be blind again. When I look at things, I have no clear vision. (Her face clearly tells the sorrow and worry).” 3:3 ¶ 5 in FGD One

The next sub-category is also associated with a lack of world-class eye-care services provision.

4.3.2.1.2 Sub-category 1.1.2: Inadequate information

During the FGDs, many participants mentioned that the information they received about their specific eye condition before, during, and after treatment from the service providers was inadequate. They highlighted that providing accurate and adequate information is mandatory to make well-understood decisions and understand the possible consequences of treatment. This result is consistent with a study conducted in rural Nigeria (Ebeigbe & Overseri 2014:101).

A participant in the focused group discussion stated that:

“The primary eye-care service providers did not tell me what my problem was until I repeatedly asked. They must tell us again and again until we get to understand them well. We are illiterates; we may not grasp things as they do.” 5:3 ¶ 6 in FGD Three

Some study participants referred to inadequate eye-care information in the community and mentioned that local residents did not recognise the availability of treatment for blindness in nearby primary eye-care units. This result aligns with the study conducted in Hawassa, southern Ethiopia (Morka et al 2020:2).

Three participants in the FGD stated:

“Most people who live around me think that if you are blind that condition is irreversible. This is due to lack of adequate information.” 3:12 ¶ 18 in FGD One

“We always relate eye problems with age and as part of a natural process. We all considered ourselves sick when we had a fever, chill, or abdominal cramp.” 6:12 ¶ 12 in FGD Two

“There exists a member of our community who does not know the existence of an eye-care service at this PECU.” 1:9 ¶ 14 in FGD Five

As part of the information inadequacy, the community prefer to obtain information about eye-care services from someone they know before decision making more so than they do from the primary eye-care workers.

“I came to this PECU after seeing the positive result of the surgery in my cousin. Similarly, others stayed home looking at failed surgery or treatment. Therefore, the service provider must be concise and provide adequate information. We trust the word of someone we know more than the service providers.” 5:13 ¶ 15 in FGD Three

4.3.2.1.3 Sub-category 1.1.3: Absence of escort

The third service-related sub-category identified during the current study was the absence of someone to accompany them. Participants mentioned the absence of someone to accompany them as a major challenge, especially among the elderly and disabled community, which significantly reduced their ability to use PEC services. This result is consistent with a study conducted in India (Cicinelli et al 2020:321).

The following three quotes elaborate:

“The main barrier to service usage in our kebele (village) is the absence of someone to accompany you. Unfortunately, many blind people live alone or with a busy family.” 1:6 ¶ 12 in FGD Five

“The main problem in this community is the lack of someone to accompany them and the awareness gap - telling me what surgery can do for me after this age.” 1:8 ¶ 13 in FGD Five

“Most eye-care service seekers are blind, and we all need someone to accompany us. If you live alone, there will be no one to escort you to an eye clinic. I think that is the main barrier to service utilisation.” 3:18 ¶ 21 in FGD One

4.3.2.2 Category 1.2: Service provider-related factors

This category described the factors related to the service provider reported by the FGD participants in the study area. To best illustrate the perspectives, this category is classified into four sub-categories: language barrier, disrespectful service provider, seasonal services, and lack of commitment. Figure 4.6. shows the sub-categories of factors related to the service provider described by beneficiaries.

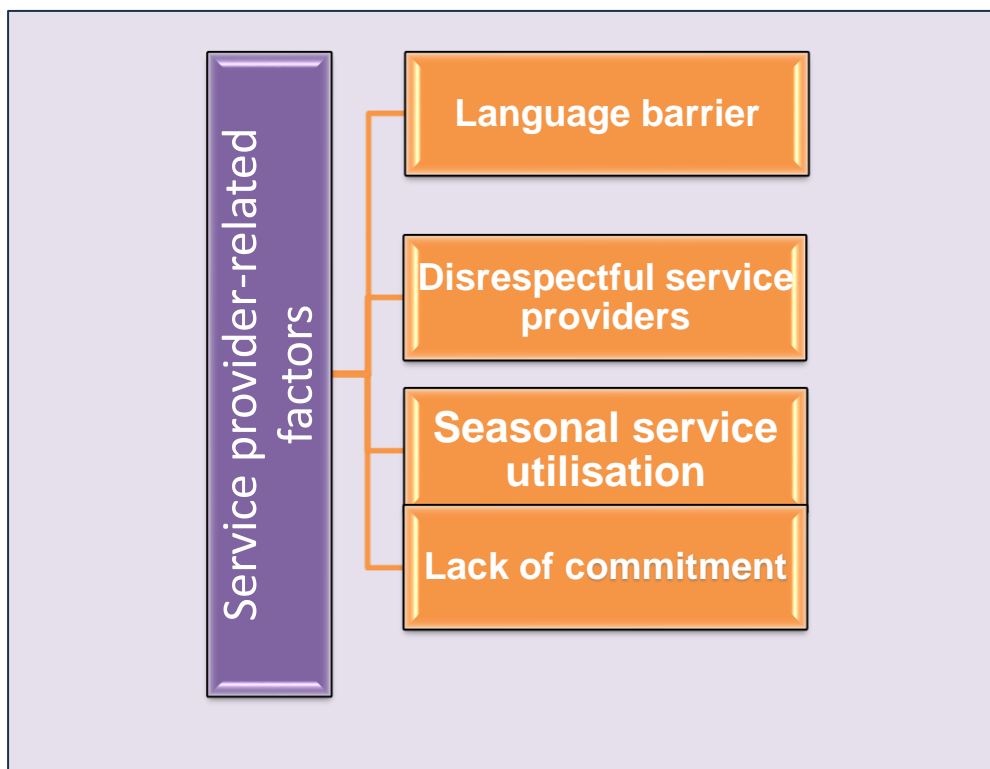


Figure 4.6 Sub-categories of service provider-related factors

4.3.2.2.1 Sub-category 1.2.1: Language barrier

Participants reported the presence of a language barrier in the nearby PECUs. The language barrier was identified among the main barriers to PEC services in similar studies conducted in India and Nigeria (Cicinelli et al 2020:321; Ebeigbe & Oveneri 2014:99).

A participant in the focus group discussion said:

“If you come to this unit after going through the transportation problem, there is a language barrier with the service providers. It is very difficult to communicate easily.” 6:19 ¶ 18 in FGD Two

The other participant in the FGD also mentioned the presence of a language barrier in the secondary eye-care unit, where he was sent with a referral. He said:

“I travelled to the nearby secondary eye-care unit for further treatment, having a referral from this unit. The secondary eye-care unit is well structured, unlike this, but the service providers were not supportive and ethical. There exists a language barrier.” 6:10 ¶ 10 in FGD Two

4.3.2.2.2 Sub-category 1.2.2: Disrespectful service providers

The FGD participants explained that some service providers are not respectful and ethical. Community members explained that respect and a welcoming environment are as important as quality treatment.

A participant in the focused group discussion stated that:

“There exists a misconduct among service providers. They must be polite and caring. Nurses ignore us, we do not go to the primary eye-care unit for recreation, we are in pain, so we need proper treatment.” 5:15 ¶ 18 in FGD Three

Participants also reported that the service providers spent most of their time doing nonwork-related tasks rather than providing basic eye health services. A similar study result was reported from India (Khanna et al 2020:338).

Below are two direct quotes from the study participants:

“The other main challenge in this unit is that some of the service providers were not ethical. They wasted most of their working hours playing video games and music.” 1:18 ¶ 19 in FGD Five

“There was no dedicated professional to provide eye-care service. You must wait a while until they are done with their business, playing games or talking. Most professionals are not ethical.” 6:13 ¶ 13 in FGD Two

Most of the study participants believed that service providers need to be ethical and caring for improved PEC service utilisation.

Sample quotes:

“Primary eye-care service providers must provide eye-care services properly and ethically.” 1:26 ¶ 25 in FGD Five

“Service providers must be ethical and caring and establish a good follow-up system.” 5:18 ¶ 21 in FGD Three

4.3.2.2.3 Sub-category 1.2.3: Seasonal service utilisation

Although eye-care services should be available and used all the time, due to geography and community preferences, use in the four districts of the Southern Omo Zone in Ethiopia was reported to be seasonal. This season-based service use was testified by many participants in the study. This result is consistent with studies results in rural India and Pakistan (Khanna et al 2020:338; Rehman & Sharif 2021:164).

“There is rain at least six months of the year that makes my village geographically inaccessible for transportation services. During this time, no one will go to the primary eye-care unit for treatment.” 1:13 ¶ 15 in FGD Five

The other reason that participants in the current study stated for the inclination for seasonal services use is the waiting for the season of outreach and free services.

“Most partially or blind people are poor. They prefer the free service and wait at home until the season of the free outreach programme comes. They are not coming here fearing the cost of treatment and prefer to stay home for the season of free service.” 1:7 ¶ 12 in FGD Five

The lack of commitment by the service provider is the next subcategory of the service provider-related factors.

4.3.2.2.4 Sub-category 1.2.4: Lack of commitment

The lack of commitment of some service providers was reported to be an instigation of service utilisation in the study area. Participants in the FGDs highlighted commitment as a mandatory expertise an eye-care service provider should possess. A study in India reported similar findings (Misra et al 2015:83).

A participant in the FGDs said:

“When I came to this site four months ago with an eye full of discharges, I noticed the presence of a commitment gap among service providers. They let me wait for a long time for no reason while playing a mobile game.” 1:5 ¶ 10 in FGD Five

Another participant in the FGDs said that:

“I was not happy with the service provided in this unit, to your surprise there is no separate examination room for eye-care services, the professional working here examines all patients coming for eye-care in an open area (outdoor) and I do not think the unit has even basic eye examination materials. In general, they are not committed to providing service.” 6:2 ¶ 4 in FGD Two

A participant in the study related the lack of service provider's commitment to the ban on benefits packages for service providers, saying:

“Service providers were so nice a year ago, but today due to the reduction in their night and overtime payments, service providers are reluctant to provide service and don't care if you stayed an hour or more. You must visit every room looking for eye-care professionals.” 6:15 ¶ 14 in FGD Two

4.3.2.3 Category 1.3: Service access factors

Universal Eye Health Coverage strongly advises that eye health services must be equitable, accessible, comprehensive, high quality, and affordable for all. The SDGs pay attention to the UEHC goal number three (WHO & UNICEF 2020:51). Service access-related factors was the third category marked from the experience of service users. To

better describe the access issues in the study area, three sub-categories were formulated. Long waiting times, distance to travel, and financial implications. Figure 4.7. shows the sub-categories of service access.

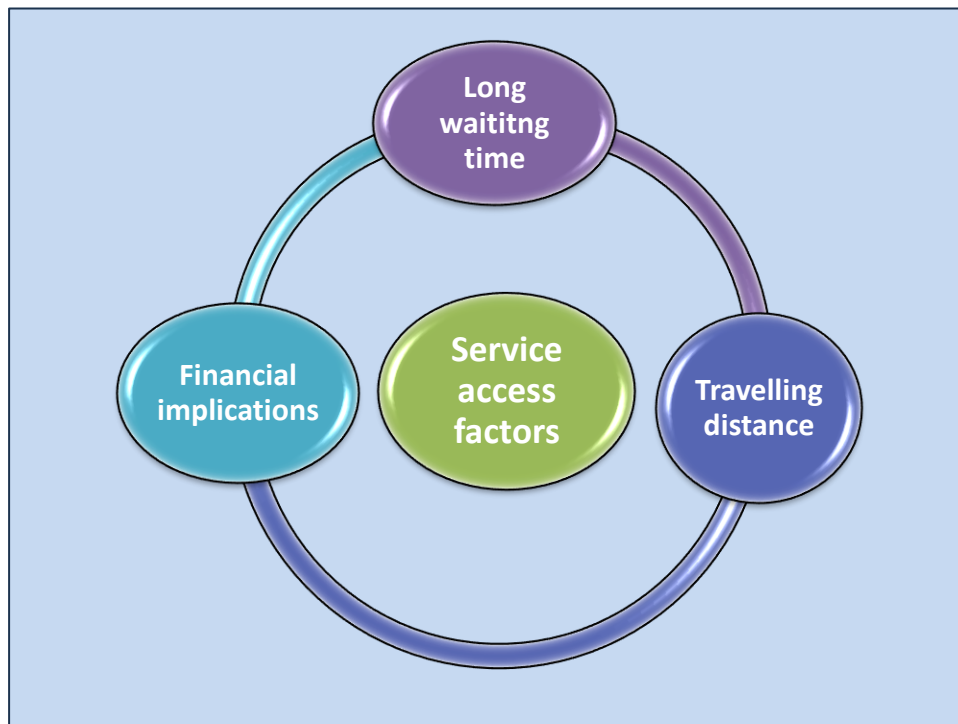


Figure 4.7 Sub-categories of service access

4.3.2.3.1 Sub-category 1.3.1: Long waiting time

The long waiting time to obtain the services was described by many participants as an unhappy experience. Study participants mentioned that waiting more than the average time to get the services, caused discomfort and a lack of interest in coming back for more services. This result is consistent with a study conducted in rural India (Cicinelli et al 2020:321).

The below quotes clarify the statement:

“I had to wait more than four hours to get services after coming to this unit and travelling more than an hour and a half. It was not fair to wait that long to get service.” 5:1 ¶ 3 in FGD Three

“The time patients need to wait before receiving service is a serious challenge in this primary eye-care unit, and sometimes they appoint blind patients with many

complaints for other times, which is unfair and unacceptable.” 1:14 ¶ 17 in FGD Five

The participants related the long waiting time to service provider shortage and the incapacity of the PECUs. This result is consistent with a result of an assessment of patient waiting and service time in Nigeria (Olokoba, Durowade, Adepoju & Olokoba 2020:231). A participant in the third focus group discussion said:

“The absence of professionals fully dedicated to providing PEC services is the main barrier in this PECU. You must wait a long time until one trained eye-care professional is free to provide services.” 5:12 ¶ 14 in FGD Three

Another participant in the study also said:

“Only a few staff provide eye-care services. I don’t know why. The number matters. As the number of service providers is getting lower the average time, we need to wait for service increases.” 5:14 ¶ 17 in FGD Three

“Most of the rural community members, including me, hate to wait a long time or appointed for another time waiting for someone to come.” 4:24 ¶ 25 in FGD Six

4.3.2.3.2 Sub-category 1.3.2: Travelling distance

The UEHC underscores that every person should access quality eye-care services without the risk of deprivation (Khanna et al 2020:335). While listing the challenges of PEC services, many participants in the study reported the distance to travel to PECUs as a reason for the low use of primary eye-care services in the four districts of the Southern Omo Zone, Ethiopia. This result is consistent with previous studies in different parts of the world (Cicinelli et al 2020:321; Olokoba et al 2020:231).

The participants said distance was their main concern. The two quotations of the participants listed below demonstrated the details.

“The main challenge in this primary eye-care service delivery is distance. This primary eye-care unit is located eight kilometres from my village. Patients confirmed to have operable eye conditions must travel at least eight kilometres to

this primary eye-care unit or twenty-one kilometres to Jinka General Hospital and spend the night there to receive surgical treatment. Imagine the problem.” 3:21 ¶ 23 in FGD One

“In my village, the distance service provision site is the main barrier. For example, I travelled more than two hours to get here. Imagine how an old blind guy comes here alone!” 5:8 ¶ 11 in FGD Three

In addition to distance, some participants in the FGDs mentioned the cost of transportation as a huge challenge to access and use PEC services.

Some of the participants said:

“The transportation problem is another challenge in my village; we need to travel so long on the back of a horse, or we shall pay more money to use a motorbike.” 1:16 ¶ 18 in FGD Five

“Transportation is expensive; for example, I paid 80 Ethiopian birr for a one-round trip to this PECU for a risky trip by motorbike.” 2:13 ¶ 14 in FGD Four

The problem related to the distance to travel causes a challenge in the use of the service. The study participant mentioned the presence of beneficiaries with treatable eye conditions who did not receive service due to distance. The quote stated below by a community member elaborated on the idea:

“Transportation service needs special attention. To your surprise, I came to this primary health care unit last night with my neighbours carrying a delivery mother with a local portable coach on our back travelling for more than two hours. Imagine the problem for a blind person.” 1:30 ¶ 28 in FGD Five

Financial implications were the last subcategory of service access identified by participants in the focused group discussion.

4.3.2.3.3 Sub-category 1.3.3: Financial implications

Financial implications are a subcategory of access that many study participants report as a challenge to not use primary eye services. The participants in the study explained that eye problems were largely related to poverty. Financial implications were similarly reported as a challenge in a study in Nigeria (Aghaji et al 2018:3).

Sample quotes:

“The other barrier is cost. As you know, we are all poor and concerned that if we pay 100 Ethiopian birr for transportation to the eye-care service, where do we get money to feed our children?” 2:16 ¶ 16 in FGD Four

“The main problem is the economic problem, there are so many people who visit the nearby secondary eye-care unit for eye problems and get permanent remedies. On the other hand, there are so many blind people in their homes waiting for a free service. I think the economic problem is the main barrier to service use.” 6:16 ¶ 15 in FGD Two

Some participants also mentioned the lack of accurate information about treatment costs in the community. One focus group discussant said:

“There is wrong information in the community that says they need to have so much money to get eye-care services. So, blind people prefer not to come here fearing the cost of treatment.” 1:10 ¶ 14 in FGD Five

This description of service access is in line with findings from similar studies in different parts of the world. The absence of facilities providing comprehensive eye-care in rural areas incurs additional costs for both the service users and providers which intensifies the visual loss due to lack of treatment or use of harmful traditional practices, and leads to access inequality. This finding is consistent with studies carried out in different parts of Africa (Aghaji et al 2020:4; Graham 2017:86).

4.3.3 Theme 2: Barriers to primary eye-care services

In this section, barriers to primary eye-care services are discussed from the service user's point of view with categories and sub-categories. The theme was further illustrated in two categories and six sub-categories Figure 4.5 illustrates the categories and sub-categories of Theme 2.

Table 4.5 Theme 2: Categories and sub-categories

Theme	Categories	Sub-categories
Theme 2: Barriers to primary eye-care services Tabel	2.1 Quality gap	2.1.1 Inefficient eye-care services
		2.1.2 Unspecialised service providers
		2.1.3 Service inequity
	2.2 Awareness gap	2.2.1 Lack of information and messaging
		2.2.2 Fear of surgery
		2.2.3 Use of indigenous knowledge

4.3.3.1 Category 2.1: Quality gap

In this category, barriers to PEC services were presented in three sub-categories: inefficient eye-care services, unspecialised service providers, and service inequity.

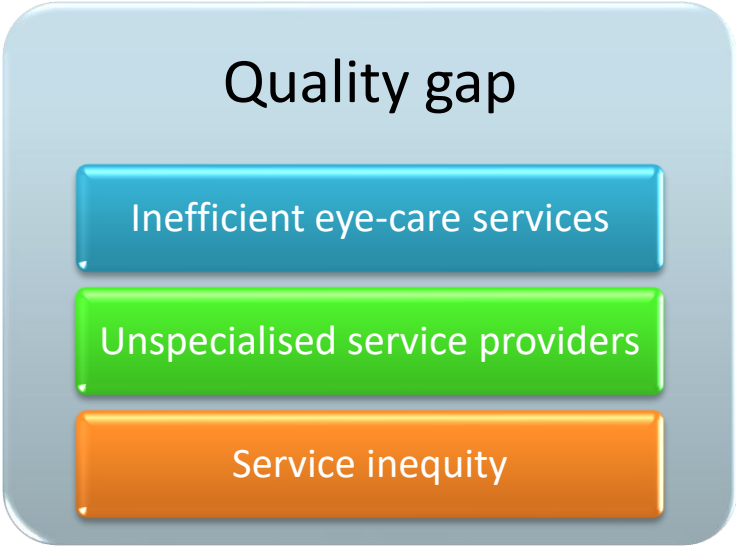


Figure 4.8 Sub-categories of quality gap

4.3.3.1.1 *Sub-category 2.1.1: Inefficient eye-care services*

The WHO identified five elements as key to measuring the acceptance of eye-care services: accessibility, availability, accommodation, affordability, and acceptability (Graham 2017:86). Many participants described eye-care services efficiency as an important indicator and strongly pointed out the need to provide efficient eye-care services near for better use.

A participant in the FGDs reported the inefficiency of the eye-care service:

“I prefer not to come back to this unit for eye-care service after seeing the service provided last time. It was not coordinated and efficient. We want full and reliable eye-care services. I think that is our right.” 6:6 ¶ 8 in FGD Two

Another participant also alluded:

“I came to this unit six months ago and the professionals examined me outdoors and gave me an eye drop, but now I am feeling serious discomfort. Is that a treatment? I am not happy. We want a full service to use.” 6:5 ¶ 7 in FGD Two

The presence of non-specialised service providers was the next subcategory identified under the current study.

4.3.3.1.2 *Sub-category 2.1.2: Unspecialised service provider*

Most of the study participants described the quality and capacity of the service providers as a primary indicator of the decision to use eye-care services. The presence of unspecialised service providers was reported to affect the PEC service utilisation in the four districts of the South Omo Zone. This result is consistent with a study conducted in Kenya, Malawi and Tanzania (Kalua et al 2014:5).

A study participant said:

“I came to this PECU after seeing the positive result of the surgery on my cousin. Similarly, others stayed home looking at failed surgery or treatment. Therefore, the service provider should be sharp.” 5:13 ¶ 15 in FGD Three

The preference for specialised service providers was reported to affect the provision and use of PEC services in the study area. This result is consistent with a study result in Nigeria (Aghaji et al 2018:4). A participant in the focus group discussions mentioned this community preference.

“There are rumours in my community that the primary eye-care unit service providers deployed at this clinic are not trained and are here to practice on our eyes.” 4:10 ¶ 14 in FGD Six

Some study participants indicated that there was an erroneous understanding of eyedrop medical treatment in the community. A participant in FGD said that the community only considers the specialist personnel of primary eye-care workers to perform surgery or to provide glasses. The participant alluded:

“In this community, people did not consider eye drops as a treatment for eye conditions. Because you can easily buy eye drops from a pharmacy. They do not consider a service provider as trained if he prescribes eye drops or only provides counselling.” 4:18 ¶ 22 in FGD Six

Service inequity is the next subcategory identified as a quality gap during the current study.

4.3.3.1.3 Sub-category 2.1.3: Service inequity

Equity in eye-care services is presented as one of the key building blocks of eye-care service determination by the WHO (Graham 2017:86). Participants in the FGD mentioned that they are not allowed to freely enjoy this right.

A participant in the focus group discussions denounced the service quality in the nearby PECU by comparing the service he received with the standard of the national average eye-care service. This is what he said:

“We are left-over citizens of this country. This is a country where there are specialty eye-care treatments including corneal transplantation service. I remember the former president of this country, Girma Wolde Giorgis, who donated his cornea when he died. However, eye-care services lack adequate attention when you go to the community, the lower structure. Look what we are getting here. Counselling and eye drops only. This clearly shows the quality of service.” 6:18 ¶ 16 in FGD Two

Participants also mentioned that lack of basic prescriptions for visual care was a sign of inequalities in services, which caused them a great deal of cost and reduced their interest in seeking more services. This result is consistent with a study result in South Africa (Lilian et al 2018:13). The participants raised this point as an issue of service equity.

A participant said:

“The main barrier to primary eye-care services is the absence of medication for the eye-care service. They had very few eye drops and used to provide us with prescriptions to get the medication from private pharmacies, which were too expensive. Most of the members of this village, including me, are registered members of community health insurance programmes, so we pay only once a year and receive treatment with the card for the whole year. This is our right, but they do not have enough medication or appropriate treatment.” 5:6 ¶ 9 in FGD Three

4.3.3.2 Category 2.2: Awareness gap

Participants in the FGDs were asked to describe barriers to primary eye-care services. Many of them reported that the awareness gap is a serious barrier to PEC services in the four districts of the South Omo Zone, Ethiopia. This result is consistent with a result of a study conducted in Hawassa, Southern Ethiopia (Morka et al 2020:2). To further describe the gap, the narrative in this section is classified into three sub-categories. Lack of information and message, fear of surgery, and use of indigenous knowledge. Figure 4.9 describes the sub-categories of the awareness gap.



Figure 4.9 Sub-categories of awareness gap

4.3.3.2.1 Sub-category 2.2.1: Lack of information and messaging

Study participants prioritised the lack of information and messaging of the barrier to the use of PEC services in the four districts of the Southern Omo Zone, Ethiopia. They revealed that the community considered blindness a fragment of the natural ageing process or as a result of poor behaviour rather than a disease. This lack of information and messaging aligns with a result of a previous study in Ethiopia (Morka et al 2020:2).

One of them said:

“Almost everyone in my village thinks blindness is part of the natural ageing process and thinks that there is no treatment for it” 3:13 3 18 in FGD One

“Some people also consider blindness to be a result of bad doing.” 5:9 ¶ 12 in FGD Three

The study also identified that some members of the community reject primary eye-care services without fully understanding the problem.

“There is a knowledge gap in the community. Most refuse services wrongly even before understanding their problem properly.” 5:7 ¶ 10 in FGD Three

In addition to elaborating on the lack of information and messages, the study participants mentioned the presence of gossip in the community about the need for a lot of money for eye-care services, which are provided free of charge in most of the PECUs found in the study area.

Saying:

“There is wrong information in the community that says that they need to have a lot of money to get eye-care services.” 1:10 ¶ 14 in FGD Five

“There is also a false rumour that private clinics provide the best care than government clinics. Unfortunately, the private clinics around here are not capable of providing eye-care services at all.” 2:11 ¶ 13 in FGD Four

Fear of surgery is the second subcategory of the awareness gap that is presented as a result of lack of adequate information and messages about eye-care services.

4.3.3.2.2 Sub-category 2.2.2: Fear of surgery

During the FGD, the study participants mentioned the presence of fear of surgery in the community. This result is consistent with a result of a study done in rural Nigeria (Ebeigbe & Ovenseri 2014:100).

A participant in the focus group discussions alluded:

“There is a fear of surgery in the community. Most people in this village think that surgery is the only treatment for any eye complaint, and when one talks about the eye-care service, they think surgery is the only remedy and prefer not to come to eye-care facilities.” 2:15 ¶ 16 in FGD Four

Another participant added:

“There is a fear of surgery in the community. Most people with eye complaints consider surgery will cause permanent loss of vision rather than correction of vision. 1:11 ¶ 15 in FGD Five

The participant reported that there are blind people in the community who are not willing to take the services due to fear of surgery and its outcome.

A participant in the FGD said:

“I have a lot of friends and neighbours with operable turned eyelashes. However, they were not treated due to fear of surgical outcome. All of them are jealous of my progress but are not willing to come here only because of the fear of surgery.” 4:12 ¶ 15 in FGD Six

The use of indigenous knowledge was presented as a third subcategory of the awareness gap in the current study.

4.3.3.2.3 Sub-category 2.2.3: Use of indigenous knowledge

The use of indigenous knowledge for eye condition treatment was reported by many study participants as a barrier to PEC services. Participants mentioned that many residents of the study area prefer to use indigenous knowledge and remedies for their ocular complaints. This result is consistent with a study held in different regions of Nigeria (Aghaji et al 2020:6).

Two participants in the FGDs articulated:

“There have been traditional remedies for eye problems in this community for a long time. Like epilation (plugging of the inverted eyelashes) and removal of pterygium from the cornea. The community considers that as a single treatment for their problem.” 4:9 ¶ 14 in FGD Six

“There exists a traditional way to heal eye problems in this village. They were here before the introduction of modern medicine, and most of the villagers considered them the main source of remedy for their eye problems. I think that is the main barrier.” 2:10 ¶ 13 in FGD Four

4.3.4 Theme 3: Suggestions to improve primary eye-care services

The third theme that emerged during this study was suggestions to improve PEC services. The participants in the focus group discussion suggested areas of improvement to better provision and use of PEC services in the four districts of the Southern Omo Zone, Ethiopia.

Figure 4.10 below presents the coded suggestions of the study participants (exported from ATLAS. ti.)

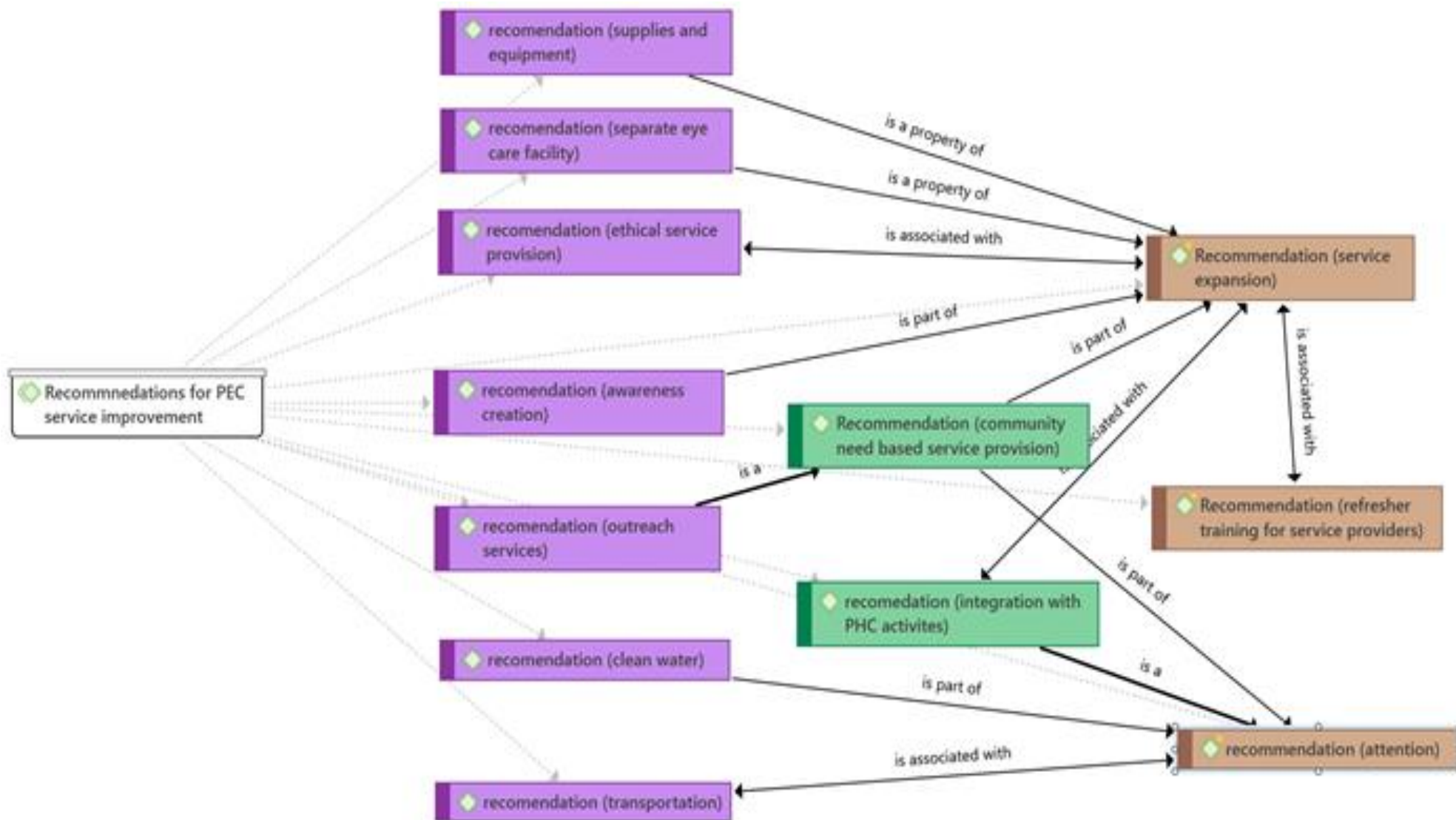


Figure 4.10 Suggestions for improving primary eye-care services

(Exported from ATLAS. ti)

During the current study, participants identified the following suggestions to improve primary eye-care services: improved service and improved use as shown in Table 4.6. The following are the categories and sub-categories of suggestions for improving PEC services in the study area.

Table 4.6 Theme 3: Categories and sub-categories

Theme	Categories	Sub-categories
Theme 3: Suggestions for improving primary eye-care services	3.1 Improved service	3.1.1 Service expansion
		3.1.2 Attention
		3.1.3 Deployment of service providers
	3.2 Improved utilisation	3.2.1 Accommodative primary eye-care units
		3.2.2 Awareness creation
		3.2.3 Expansion of outreach services

4.3.4.1 Category 3.1: Improved service

During the focus group discussions with adult service users, many participants reported that the primary eye-care services need improvement. The researcher labelled service expansion, attention to eye-care, and deployment of service providers in the category of improved service. Figure 4.11 presents the description of improved services.

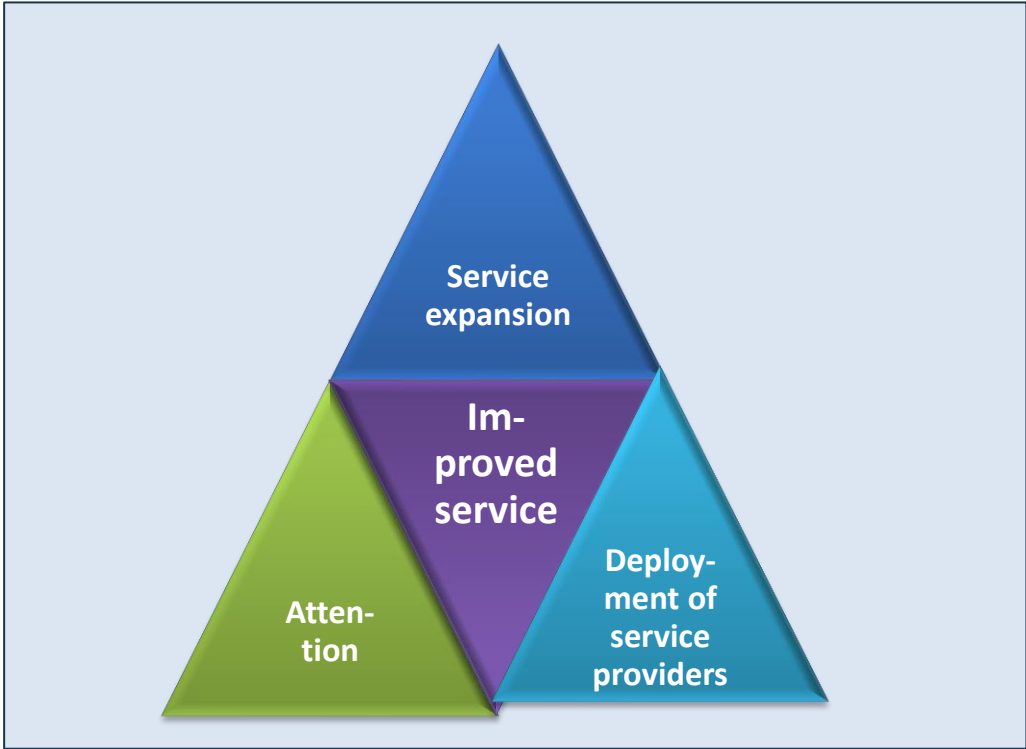


Figure 4.11 Sub-categories of improved services

4.3.4.1.1 Sub-category 3.1.1: Service expansion

Participants in the discussion of focus groups believed that primary eye-care services were not sufficient, and that the expansion of the service was mandatory to improve their use. During the discussion, the participants in the study presented suggestions to increase the use of the service through service expansion.

Most of the study participants recommended expanding and integrating the service into the rural community for better use. This recommendation aligns with the WHO recommendation to improve PEC service provision and utilisation in the Sub-Saharan Africa region (Graham 2017:85; WHO 2022d:16). A participant in the FGD said:

“If the government made the service available nearby, no one would think twice to get the service. There will not be distance, cost, or fear of lack of someone to accompany them when thinking of using primary eye-care services, especially among the elderly, the blind, and those with serious eye conditions. I am sure everyone will come and enjoy the service and our village will be free of eye problems.” 3:24 ¶ 26 in FGD One

Similarly, participants highly recommended the integration of the activity with other routine activities of the primary health care unit which aligns with recommendations made to improve the crises in human resources for eye-care in sub-Saharan Africa (Graham 2017:85).

Some of the participants had alluded that:

“The activity shall be integrated with other healthcare activities. It is a standalone programme. That is why most people do not use the service appropriately. There are so many blind people in my community who need help.” 1:23 ¶ 24 in FGD Five

“The primary eye-care unit shall integrate eye health care services with other outreach activities. Nurses come to our village every month and provide services to children and pregnant mothers. It would be nice if eye-care activities were integrated with these activities.” 5:22 ¶ 23 in FGD Three

Adequate attention is the next largely proposed recommendation for service improvement in the study area.

4.3.4.1.2 Sub-category 3.1.2: Attention

Many participants in the study noted that eye-care services did not receive adequate attention in the study area. They reported that the lack of attention is evidenced by a lack of roads and a scarcity of clean water. The result aligns with a study in Nigeria (Aghaji et al 2018:3).

A participant in the focus group discussion said:

“Access to my village is at the stage of almost impossible. Only those who can pay or have personal cattle leave the village for treatment. This shows the level of attention the government gave us to be free of blindness.” 1:28 ¶ 26 in FGD Five

To reverse the condition, the study participants openly mentioned the need for attention. Saying:

“We all are poor and economically powerless. So, the government needs to pay attention to us.” 4:26 26 in FGD Six

“The provision of safe and clean water to the rural community needs serious attention. So, we can be free of avoidable blindness in a good time.” 1:25 25 in FGD Five

Deployment of service providers is the next subcategory discussed in this section as a suggestion to improve primary eye-care service in the study area.

4.3.4.1.3 Sub-category 3.1.3: Deployment of service providers

Many study participants pointed out the shortage of service providers in the nearby primary eye-care unit as a barrier to service usage and suggested the deployment of more service providers for better usage (Ethiopian Ministry of Health 2016:6).

A participant in the FGD said:

“The absence and scarcity of trained personnel is the main barrier in this PECU. You must wait a long time until a trained eye-care professional is free to provide service. I strongly suggest that the government deploy more eye-care workers.”

5:12 ¶ 14 in FGD Three

Another participant said:

“Service providers are scarce in this primary eye-care unit. The government needs to deploy more nurses as delivery assistant nurses. The assignment of only one nurse to serve all residents around here is unfair.” 6:15 ¶ 14 in FGD Two

Improved use is the next category of suggestions.

4.3.4.2 Category 3.2: Improved utilisation

The last category of suggestions from the participants was improved use. To improve the use of PEC services, participants in the discussion suggested accommodative primary eye-care units, awareness creation, and expansion of outreach services. Figure 4.12 presents the sub-categories of improved use.

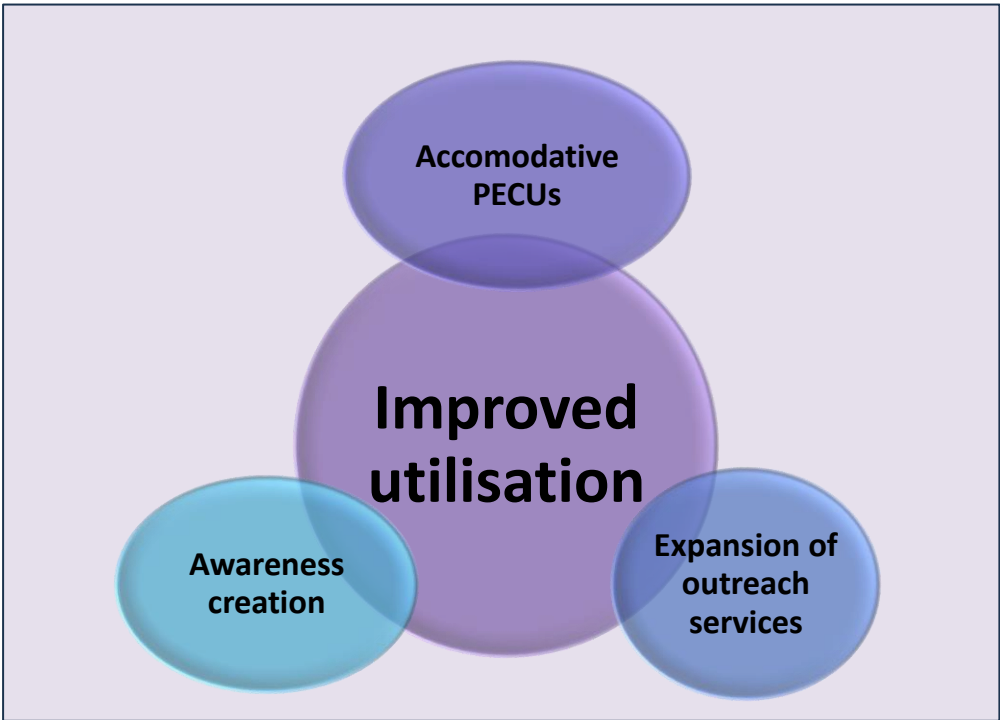


Figure 4.12 Sub-categories of improved utilisation

4.3.4.2.1 Sub-category 3.2.1: Accommodative primary eye-care services

Primary eye-care units should be a suitable place for patients with visual disabilities. However, participants in the FGD said that units providing eye-care services are not ideal places to serve patients with eye problems. This finding is consistent with a study conducted in South Africa (Lilian et al 2018:4).

A participant in the study alluded:

“As you can see, the eye-care unit is located far from the main entrance of the primary health centre. The way to the unit is not comfortable. How come a blind patient walks this road?” 5:21 ¶ 22 in FGD Three

The other participant reported that the primary eye-care unit should be designated as the delivery and immunisation rooms.

“The service provision unit should be differentiated as a unit is expected to provide service for fully and partially blind patients.” 5:20 ¶ 22 in FGD Three

The study participants recommend that standardisation of the PECUs is a must to expand the service and increase its use of the service. Awareness creation is the next subcategory largely highlighted by study participants as a recommendation.

4.3.4.2.2 Sub-category 3.2.2: Awareness creation

During the current study, similar to the result of a study conducted in rural Nigeria, participants mentioned the awareness gap in the community as an impediment to the use of PEC in the study area (Ebeigbe & Oveneri 2014:100).

A participant stated:

“The main barrier in this community is the awareness gap. Due to this, most people remain home blind.” 2:12 ¶ 14 in FGD Four

Another participant in the study also mentioned the advantage of awareness with the benefits she received, saying:

“Awareness gap is the main barrier. If the community knows better, transportation and economic issues will not be a concern. To your surprise, I walked 26 km to get eye-care before the establishment of this primary eye-care unit when my graduate child told me that my eye condition would improve if I received treatment.” 2:14 ¶ 15 in FGD Four

To fill the gap, participants suggested consolidation of awareness-creation activities.

Sample quotes:

“The community should be well informed about the prevention and treatment of eye problems to improve use.” 1:21 ¶ 22 in FGD Five

“Community mobilisation and awareness-creation activities should be strengthened to reach those in need of an eye-care service.” 2:21 ¶ 21 in FGD Four

4.3.4.2.3 Sub-category 3.2.3: Expansion of outreach services

Expanding outreach services is the final sub-category suggestion from participants in the discussion group on improving utilisation in the four districts of the South Omo Zone, Ethiopia. This finding is consistent with a recommendation of case studies in India done to measure the effectiveness of community engagement as a tool for improving the efficiency of PEC service delivery (Sabherwal et al 2022:1).

The following direct quotes from study participants told the narratives:

“To improve patient flow and expand the eye-care service to a larger group, I strongly suggest arranging outreach services and spreading out of primary eye-care units to the rural community.” 3:23 ¶ 26 in FGD One

“I strongly recommend that expanding eye-care services to villages and organising more outreach programmes. If the service is closed, no one will remain home.” 3:28 ¶ 28 in FGD One

Some participants in the study recommended the expansion of the outreach programme, as it would solve the economic barrier of the community (Cicinelli et al 2020:321).

The following two quotations from the study participants describe more:

“I strongly recommend that the primary eye-care unit organises outreach programmes and provides free service to those who are economically incapable of paying.” 2:20 ¶ 20 in FGD Four

“The primary eye-care unit shall arrange outreach services near you. If the community gets the service nearby, everyone will be free of blindness soon.” 1:22 ¶ 23 in FGD Five

The following Sankey diagram is exported from ATLAS.ti shows the distribution of the codes in the analysed document. The diagram shows that researchers have created code and code categories from all the six FGDs.

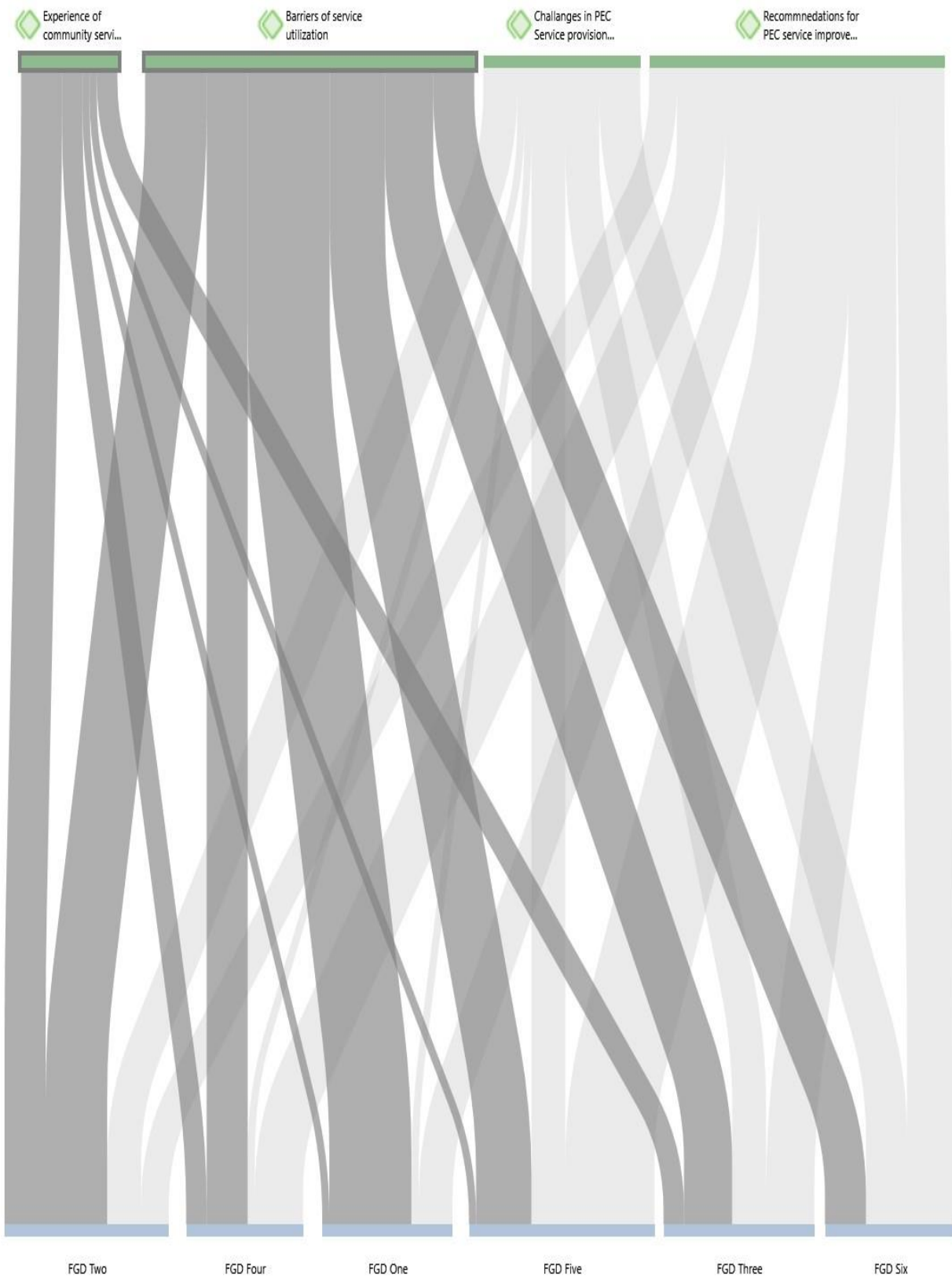


Figure 4.13 Sankey diagram showing the distribution of codes in the FGD

4.4 IMPRESSION OF FOCUSED GROUP DISCUSSION FINDINGS

This summary section is presented with the emerging themes of the study. As discussed in Section 4.3, three themes emerged.

- Experiences of community service using PEC services
- Barriers to primary eye-care services
- Suggestions to improve primary eye-care services.

4.4.1 Experiences of community service using PEC services

The experiences of using PEC services in the study area were found to be low. Many study participants reported bad experiences when accessing services in the last six months. The experiences of community service use were classified into three categories: related to service, the service provider, and service access. Service-related experiences reported were lack of world-class service, inadequacy of information, and absence of escort.

Language barriers, the presence of disrespectful service providers, seasonal use of services, and lack of commitment were presented as service providers' factors for the poor use of PEC services in the four districts of the South Omo Zone, Ethiopia. From the service access point of view, three factors were identified: long waiting times, distance to travel, and financial implications.

4.4.2 Barriers to primary eye-care services

Participants in the FGD identified the presence of quality and awareness gaps as barriers to PEC services in the study area. The quality gaps identified during the current study were inefficient eye-care services, unspecialised service providers, and service inequity. The awareness gap includes the lack of information and messaging, fear of surgery, and the use of indigenous knowledge.

4.4.3 Suggestions to improve primary eye-care services

To improve the poor PEC services utilisation, the study participants identified two areas of improvement: service and utilisation. To achieve better services, service expansion, adequate attention, and deployment of service providers were suggested. Finally, to improve service usage the study participants suggested the establishment of accommodating PECUs, awareness creation, and expansion of outreach services.

4.5 THEMES, CATEGORIES, AND SUB-CATEGORIES OF THE IN-DEPTH INDIVIDUAL FACE-TO-FACE INTERVIEW

The in-depth individual face-to-face interview findings are presented in this section, sorted into themes, categories, and sub-categories. In this section, a total of four themes, 10 categories, and 30 sub-categories were created and discussed. This section addressed the second study objective: explore and describe the barriers faced by primary eye-care workers in the provision of primary eye-care services in the four districts of the South Omo Zone, Ethiopia.

The emerging themes of the study were the experience of the service provider, the preferred mode of use of the service, barriers to primary eye-care services, and suggestions to improve primary eye-care services. Table 4.7 summarises the main themes, categories, and sub-categories of the qualitative study analysis of the in-depth individual face-to-face interview, which were further discussed in this section.

Table 4.7 Themes, categories, and sub-categories of in-depth individual face-to-face interview result

Objective 2: Explore and describe the barriers to primary eye-care services in the four districts of the South Omo Zone, Ethiopia.		
Research question 2: How should barriers to the use of PEC services be explored and described in the four districts of the South Omo Zone, Ethiopia?		
Themes	Categories code groups)	Sub-categories (codes)
Theme 1: Experiences of service providers	1.1 Service providers' perspectives	1.1.1 Seasonal service provision
		1.1.2 Integrated outreach service preference
		1.1.3 Work overload
	1.2 Service access-related factors	1.2.1 Time preference
		1.2.2 Geographic inaccessibility
		1.2.3 Direct and indirect costs of treatment
Theme 2: Preferred mode of service utilisation	2.1 Static clinic-related factors	2.1.1 Lack of comprehensive eye-care service
		2.1.2 Foreign service providers
		2.1.3 Free service preference
	2.2 Outreach service-related factors	2.2.1 Variables of age and disability
		2.2.2 Inconvenient service provision site
		2.2.3 Wrong beliefs
Theme 3: Barriers to primary eye-care services	3.1 Awareness gap	3.1.1 Information gap
		3.1.2 The lack of eye health-seeking behaviours
		3.1.3 Use of indigenous knowledge
	3.2 Service gap	3.2.1 Poor eye health infrastructure
		3.2.2 Shortage of equipment and supplies
		3.2.3 Shortage of trained workforce
	3.3 Leadership and management gap	3.3.1 Loose relationship
		3.3.2 Lack of management support
		3.3.3 Inadequacy of clean water
Theme 4: Suggestions to improve primary eye-care services	4.1 Improved administration	4.1.1 Service integration
		4.1.2 Service expansion
		4.1.3 Attention
	4.2 Improved service	4.2.1 Training for service providers
		4.2.2 Standardised primary eye-care units
		4.2.3 Provision of supplies and equipment
	4.3 Improved utilisation	4.3.1 Need-based service provision
		4.3.2 Awareness creation
		4.3.3 Advocacy

4.5.1 Theme 1: Experiences of service providers

Service providers’ experiences were discussed in two categories: service provider’s perspective and service access. To elaborate on the experiences of service providers, six sub-categories were created. Table 4.8 reflects the categories and sub-categories of service providers.

Table 4.8 Theme 1: Categories and sub-categories

Theme	Categories	Sub-categories
Theme 1: Experience of service providers	1.1 Service providers’ perspectives	1.1.1 Seasonal service provision
		1.1.2 Integrated outreach service preference
		1.1.3 Work overload
	1.2 Service access-related factors	1.2.1 Time preference
		1.2.2 Geographic inaccessibility
		1.2.3 Direct and indirect costs of treatment

4.5.1.1 Category 1.1: Service providers’ perspectives

During the in-depth individual face-to-face interview with certified and trained primary eye-care workers who had worked in public primary eye-care units for at least a year, were permanent employees of the unit, and provided PEC services during the study period, many perspectives were reflected for the low use of services. To elaborate on the points raised, this category is sub-categorised into three and discussed below. Figure 4.14 shows the sub-categories of service providers' prospects.



Figure 4.14 Sub-categories from the service provider perspective

4.5.1.1.1 Sub-category 1.1.1: Seasonal service provision

Even if eye-care services should be provided and used all the time, for numerous reasons, the provision and usage in the study area have been reported to be seasonal. This seasonal service provision was testified by many participants of the in-depth individual face-to-face interview. This result is consistent with study results in India and Pakistan (Khanna et al 2020:338; Rehman & Sharif 2021:164).

A participant in the in-depth individual face-to-face interview said:

“As a pastoralist district, the use of community services was mostly seasonal. The community enjoys the service more during outreach programmes. You cannot find many patients who come to this PECU voluntarily for eye problems. If we measure the use of the service at the static clinic, it was very low.” 8:18 ¶ 11 In In-depth individual face-to-face interview Eleven

Another participant stated:

“The use of the primary eye-care unit service was seasonal. There is a high flow during the dry season and a low flow during the rainy season.” 14:16 ¶ 11 In-depth individual face-to-face interview Six

Similar to a result of a study in rural India, waiting for the perfect season by the community affected service use and the treatment outcome in most primary eye-care units (Misra et al 2015:83).

One of the study participants stated that:

“To your surprise, there are so many people around this primary eye-care unit who developed corneal opacity or blindness being at home waiting for integrated outreach services.” 11:15 ¶ 13 In-depth individual face-to-face interview Nine

In addition to the seasonal inclination to use, in some primary eye-care units, service provision was reported to be seasonal due to a shortage of trained personnel. A study aimed at replicating the success of Nepal in eliminating preventable blindness in Africa reported a similar finding (Nikpoor et al 2018:31).

As stated by one of the study participants:

“There are times when I am out of the unit for different conditions, like during training and personal leave; at that time the service will freeze. There will be no eye-care service at this primary health centre and patients with eye complaints must wait until my return.” 14:16 ¶ 11 In-depth individual face-to-face interview Six

4.5.1.1.2 Sub-category 1.1.2: Integrated outreach service preference

The community's preference for an integrated outreach service was reported to affect the use of eye-care services in most primary eye-care units in the South Omo Zone, Ethiopia. Participants reported this preference as a cause of low use of PEC services. Such a trend was also reported in a scoping review of the best practice eye-care model in India (Qureshi et al 2012:354).

An integrated eye-care worker from one of the primary eye-care units verbalised:

“Due to the low awareness in the community about eye-care, the service utilisation rate was low. The community enjoys outreach services, and most people wait at their homes waiting for us to go there. If you see our service report, most of the service users benefitted during outreach activities.” 12:28 ¶ 12 In-depth individual face-to-face interview One

Other participants revealed the awareness gap, poor road access, cost, distance, and simplicity of the service provision as a reason for the inclination of service users to the integrated outreach services.

Sample quotes:

“The community prefers the outreach service more. However, most of the health posts in this primary eye-care unit are not cemented or clean enough to perform Trachomatous Trichiasis (TT) surgery. Despite the presence of this challenge, they prefer outreach-based services. Second, due to the poor road access in the village, they do not want to come to us for surgery considering the difficulty of returning with a patch on their eye.” 14:18 ¶ 15 In-depth individual face-to-face interview Six

“They also prefer outreach, as there is no long queue and a procedure to take place before examination and treatment.” 12:15 ¶ 17 In-depth individual face-to-face interview One

The service providers also elaborated on the challenge posed by the preference for the integrated outreach service in the provision and utilisation by explaining the absence of patients coming to the primary eye-care unit and the challenge that the unit had to organise integrated outreach services to respond to the community need.

“The community in this area had been using outreach and free service in their respective village for a long time. This created a great challenge of dependency. Almost no patient comes to this unit unless we go to the villages.” 8:19 ¶ 13 In-depth individual face-to-face interview Eleven

“The community enjoys service more during outreach programmes. You cannot find many patients who come to this PECU voluntarily for eye problems.” 8:3 ¶ 11

In-depth individual face-to-face interview Eleven

4.5.1.1.3 Sub-category 1.1.3: Work overload

During the current study, many primary eye-care workers reported work overload as a reason for the low provision and use of PEC services, which causes discontent among service users in many ways. This result is consistent with a finding of an awareness study done in Pakistan (Rehman & Sharif 2021:164). Patients must wait a long time when primary eye-care workers are busy with other tasks. Previous studies carried out in different parts of the world presented similar results (Khanna et al 2020:339; Olokoba et al 2020:231).

The following three direct quotes from the in-depth individual face-to-face interview expound the narrative.

“I am work overloaded, in addition to my appointment as an integrated eye-care worker, I work in the Outpatient and other departments. Only two of us, health officers and one medical doctor care for 100–150 patients who come to the outpatient department every day. In addition to working in the outpatient department, I am a focal person for integrated disease surveillance, cervical cancer screening, and the malnutrition department. I am also working in shift, which makes eye-care patients wait until my return in my shift.” 17:28 ¶ 20 in In-depth individual face-to-face interview Two

“I am on the go. In addition to my role in this eye unit as an integrated eye-care worker, I work as an emergency focal for cases coming to the primary health care unit.” 12:30 ¶ 15 In-depth individual face-to-face interview One

“The scarcity of trained personnel to provide eye-care service is the main challenge. I am the only person who provides service in this PECU and, in addition to eye-care, I am the focal person for immunisation and stock management of the health centre.” 18:13 ¶ 17 In-depth individual face-to-face interview Twelve

The study participants also pointed out that basic quality assurance activities were not implemented due to the overload of work.

“Absence of strong post-surgery follow-up for patients who receive trichiasis surgery due to work overload, which we must do after two weeks and within three to six months after surgery.” 12:20 ¶ 19 In-depth individual face-to-face interview One

4.5.1.2 Category 1.2: Service access-related factors

During the in-depth individual face-to-face interview, community time preference, geographic inaccessibility, and direct and indirect costs of treatment were raised as service access-related factors. Each subcategory is discussed below.

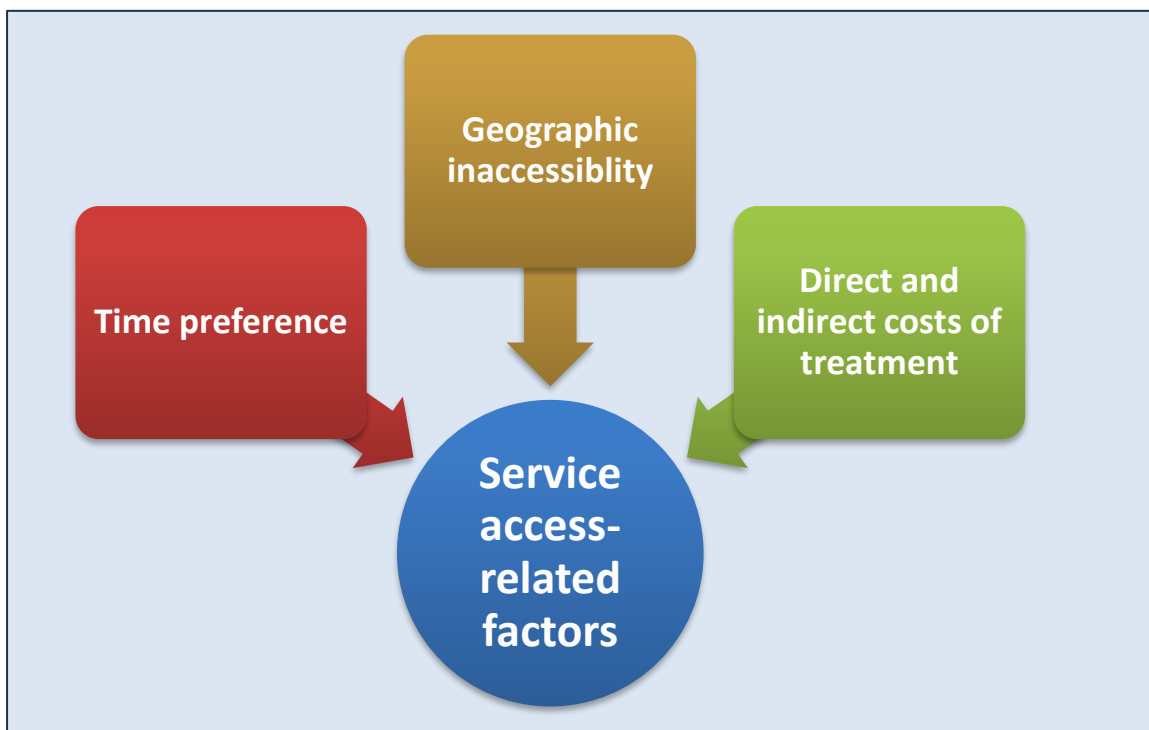


Figure 4.15 Sub-categories of service access-related factors

4.5.1.2.1 Sub-category 1.2.1: Time preference

The first subcategory of service access-related factors identified during the current study from the service provider’s perspective was preference for time. This subcategory refers to the time the community grouped for the use of primary eye-care services. Some of the study participants stated that the rainy and cold seasons were their worst times to seek services.

A service provider mentioned the idea of community time preference due to river overflow:

“There were seasons when there was an overflow of rivers. During that time, the community will not come to the unit due to the difficulty of crossing.” 14:17 ¶ 13 In-depth individual face-to-face interview Six.

The other preference of the service users was related to the free service provision time. Study participants reported the existence of community members who waited in pain until the time for free service arose.

A participant in the in-depth individual face-to-face interview said:

“The community in this area has been using outreach and free service in their respective village for a long period. This created a great challenge of dependency in the community. Almost no patient comes to this unit unless you go to the villages.” 8:5 ¶ 13 In-depth individual face-to-face interview Eleven

In the course of the study, participants also mentioned the existence of incorrect beliefs in the community about the need for special dishes after surgery to ensure fast recovery and that patients should wait until that time.

The following quote elaborates on:

“The other challenge was the existence of a perception in the community that they need special food (food rich in protein and fat) after surgery. Taking this, some patients wait for a long time until they collect enough money to prepare the special food or align their surgical schedule with known holidays.” 10:20 ¶ 13 In-depth individual face-to-face interview Four.

4.5.1.2.2 Sub-category 1.2.2: Geographic inaccessibility

Many participants in the in-depth individual face-to-face interview reported that the geographic inaccessibility of the PECUs and the villages was a factor affecting the PEC service delivery in the study area. This finding is consistent with a study result conducted in Edo state, Nigeria (Ebeigbe & Ovenseri 2014:99).

A service provider said:

“Most of the residents of this primary eye-care unit live in very far away areas. Therefore, they are not in a good position to come to this primary eye-care unit walking an average of two hours for an eye complaint. Therefore, distance and geographic obstructions are the main barriers.” 11:15 ¶ 13 in In-depth individual face-to-face interview Nine

Another participant added:

“The absence of a road is the main barrier to service use at my site. The topography of the villages around the health centre is not comfortable for travelling.” 7:3 ¶ 13 In-depth individual face-to-face interviews Eight

The geographical inaccessibility of villages brought challenges to both the use and provision of services. Consistent with a study result in India, the interviewee mentioned the presence of beneficiaries with treatable eye disease but that they had not received services due to a lack of access (Cicinelli et al 2020:321).

Sample quote:

“Old people and those with unilateral or bilateral blindness did not come to the unit due to the bad geography, and I must go to the community.” 7:5 ¶ 13 In In-depth individual face-to-face interviews Eight

Treatment-related costs were the third subcategory of service access identified by participants in the in-depth individual face-to-face interview.

4.5.1.2.3 Sub-category 1.2.3: Direct and indirect costs of treatment

During the current study, many of the participants reported that direct and indirect costs associated with treatment affected service usage.

A participant in the in-depth individual face-to-face interview said:

“The second barrier is the economic inability to pay for some medication. Due to this, most of the patients either did not use the prescribed medication or prefer not to come back.” 10:7 ¶ 13 In-depth individual face-to-face interview Four

The other participant supported the effect of the cost of treatment on the use of services by mentioning the fear of going to a referral centre:

“There exist economic challenges in the community, which is evidenced by the fear of going to a referral centre.” 16:17 ¶ 17 In-depth individual face-to-face interview Three

Participants in the in-depth individual face-to-face interview also mentioned that the failure to cover the costs of eye-care treatment in the PECU restricted them from providing comprehensive and need-based services. This result is consistent with a result of a study in India (Misra et al 2015:334).

An eye health care worker said:

“The lack of budget and transportation were also among the barriers to service provision in this PECU, especially during outreach programmes. This shortage prevents us from reaching the public.” 12:18 ¶ 19 In-depth individual face-to-face interview One

4.5.2 Theme 2: Preferred mode of service utilisation

In this section, the preferred mode of PEC services use was discussed for its effect on the use of PEC services in the four districts of the Southern Omo Zone, Ethiopia. The favoured mode of use is classified into two categories: static clinic and outreach services. The categories were further subcategorised in the discussion below to better describe their consequences. Table 4.9. shows the categories and sub-categories of the preferred mode of service utilisation.

Table 4.9 Theme 2: Categories and sub-categories

Theme	Categories	Sub-categories
Theme 2: Preferred mode of service utilisation	2.1 Static clinic-related factors	2.1.1 Lack of comprehensive eye-care service
		2.1.2 Foreign service providers
		2.1.3 Free service preference
	2.2 Outreach service-related factors	2.2.1 Variables of age and disability
		2.2.2 Inconvenient service provision site
		2.2.3 Wrong beliefs

4.5.2.1 Category 2.1: Static clinic-related factors

In this category of the preferred mode of service use, three sub-categories were identified and discussed: comprehensive eye-care service, foreign service providers, and free service preference. Consistent with many other studies, the quality of service and the engagement of the community participation were high in areas where static services were maintained for a long time (Sabherwal et al 2022:2). The following narration was prepared with the results of the in-depth individual face-to-face interview with primary eye-care workers. Figure 4.16 presents the sub-categories of static clinic-related factors.

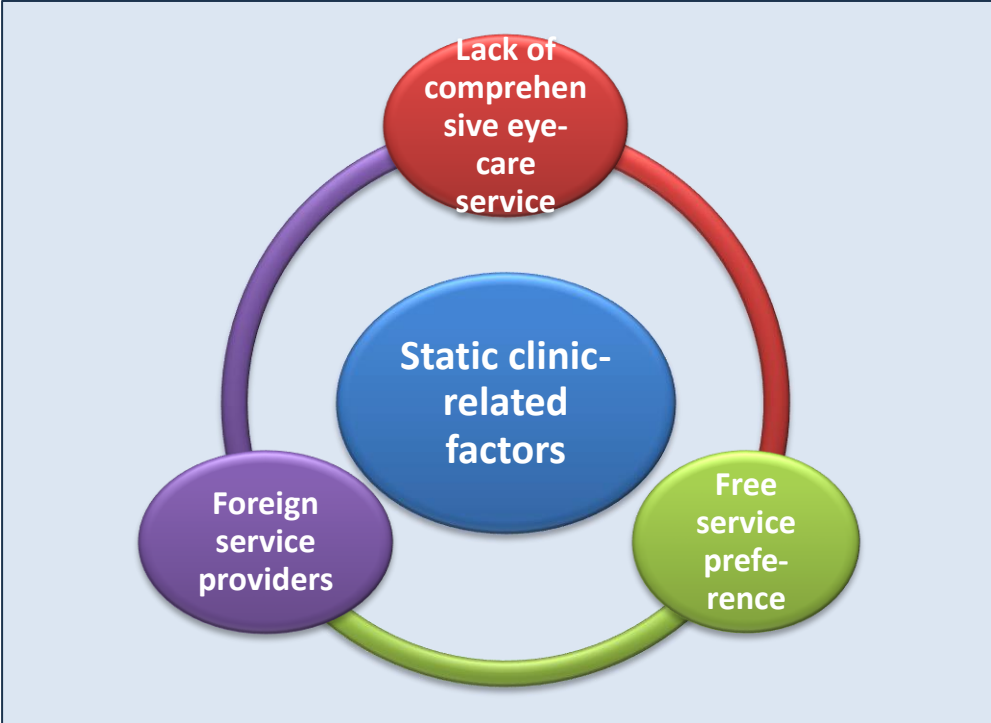


Figure 4.16 Sub-categories of static clinic-related factors

4.5.2.1.1 *Sub-category 2.1.1: Lack of comprehensive eye-care service*

The lack of comprehensive eye-care services is mentioned by many participants in the study as a reason for the low primary eye-care services usage. This result is consistent with a study in India (Misra et al 2015:81). The participants in the in-depth individual face-to-face interviews mentioned the lack of comprehensive eye-care service in the primary eye-care unit, and that the community preferred to visit a secondary eye-care unit located in a distant area. The following direct speech from an integrated eye-care worker demonstrate that:

“There are three villages in this primary eye-care unit. The nearest station is within a 30-minute walking distance and the farthest is located at a walk distance of not more than an hour. However, most of them prefer to visit the secondary eye-care unit, located at 42 KM, for any ocular complaint than we, due to the lack of comprehensive and quality eye-care service in this unit.” 16:14 ¶ 15 In-depth individual face-to-face interview Three

One of the study participants also mentioned the community's preference for comprehensive eye-care service saying:

“The community wants this PECU to provide a complete eye-care service that includes cataract surgery, Glaucoma treatment, and eyeglass distribution. They do not differentiate the levels of the eye-care service facility. They just want all the services here. When we provide them with a referral for cases beyond our scope, they are not happy and willing to travel. They consider our services inefficient.” 14:17 ¶ 13 In-depth individual face-to-face interview Six

4.5.2.1.2 *Sub-category 2.1.2: Foreign service providers*

The participants in the in-depth individual face-to-face interview mentioned that the community trusted foreign service providers more than trained and locally available. Consistent with a study result in Nigeria, this preference for foreign service providers affected primary the eye-care service provision and use in the study area (Aghaji et al 2018:4).

An integrated eye-care worker, who was part of the in-depth individual face-to-face interview, said:

“The patient flow to this PECU is very low. Patients come to this unit only when they develop serious complications or blindness. We see a maximum of 10 to 20 patients per month. Only those with eye injuries and emergencies come to us repeatedly. There exists a wrong perception in my community that the service is better provided by external personnel (foreigners) than by some of their own (trained and deployed in the primary eye-care unit).” 16:26 ¶ 11 In-depth individual face-to-face interview Three

4.5.2.1.3 Sub-category 2.1.3: Free service preference

During the in-depth individual face-to-face interview with primary eye-care workers, many participants presented the community preference for free service as a factor contributing to the low use of primary eye-care services. This preference was reported as a barrier in a previous study conducted in India (Cicinelli et al 2020:321).

“The community prefers free service because of its poor socioeconomic status. Poverty and blindness are a vicious circle. Because of that, it is difficult to get patients with eye complaints in static clinics.” 12:14 ¶ 17 In-depth individual face-to-face interview One

Another participant in the study also mentioned the long dependency of the community on free services, stating:

“We can list many challenges for the low use of service in this primary eye-care unit. The long-year dependency of the community on outreach and free service is the main, in addition to transportation and the lack of awareness.” 8:20 ¶ 17 In-depth individual face-to-face interview Eleven

Outreach is the second category of the preferred mode of use discussed here due to its contribution to the low use of PEC services.

4.5.2.2 Category 2.2: Outreach service-related factors

The second category of preferential use methods influencing the provision and use of PEC services in the research area were outreach services. Age and disability variables, inconvenient service provision sites, and wrong beliefs were the sub-categories created under the outreach service to illustrate the effect of community preference on primary eye-care service use modes.

Compared to the static clinic-based service provision, the community considered the outreach services well-organised due to distance, cost, time, and procedures.

Sample quotations:

“The community preferred outreach services more than static services mainly because of distance and cost. They also prefer outreach because there is no long queue and the procedure is not performed prior to examination and treatment. They consider outreach treatments an efficient service.” 12:31 ¶ 17 In In-depth individual face-to-face interview One

“The community preferred outreach service more. Especially those with minor eye complaints and those who need surgery prefer outreach programmes.” 17:26 ¶ 17 In-depth individual face-to-face interview Two

During the current study, the outreach-based primary eye-care service provision was considered efficient and effective. The figure presented below is a word cloud, exported from ATLAS. ti shows that the word outreach was stated many more times in the code group (category) of the preferred mode of service provision.

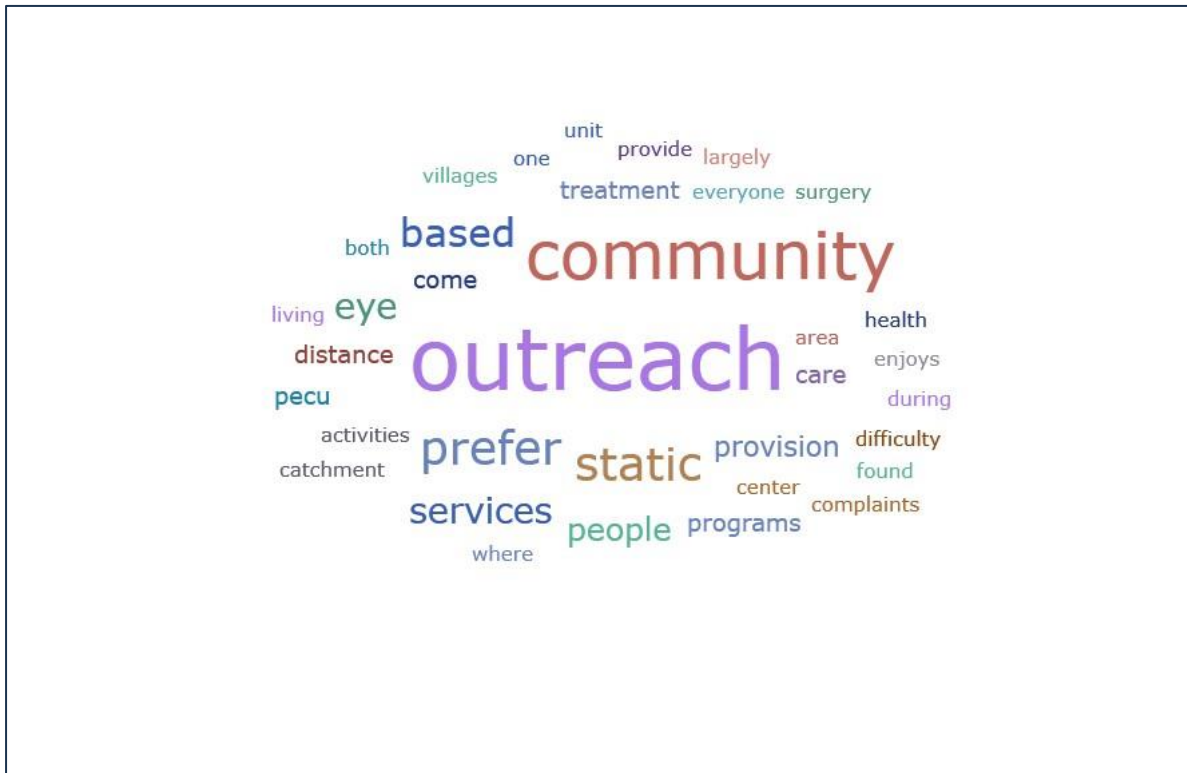


Figure 4.17 A word cloud exported from ATLAS. ti – code group – preferred mode of service provision

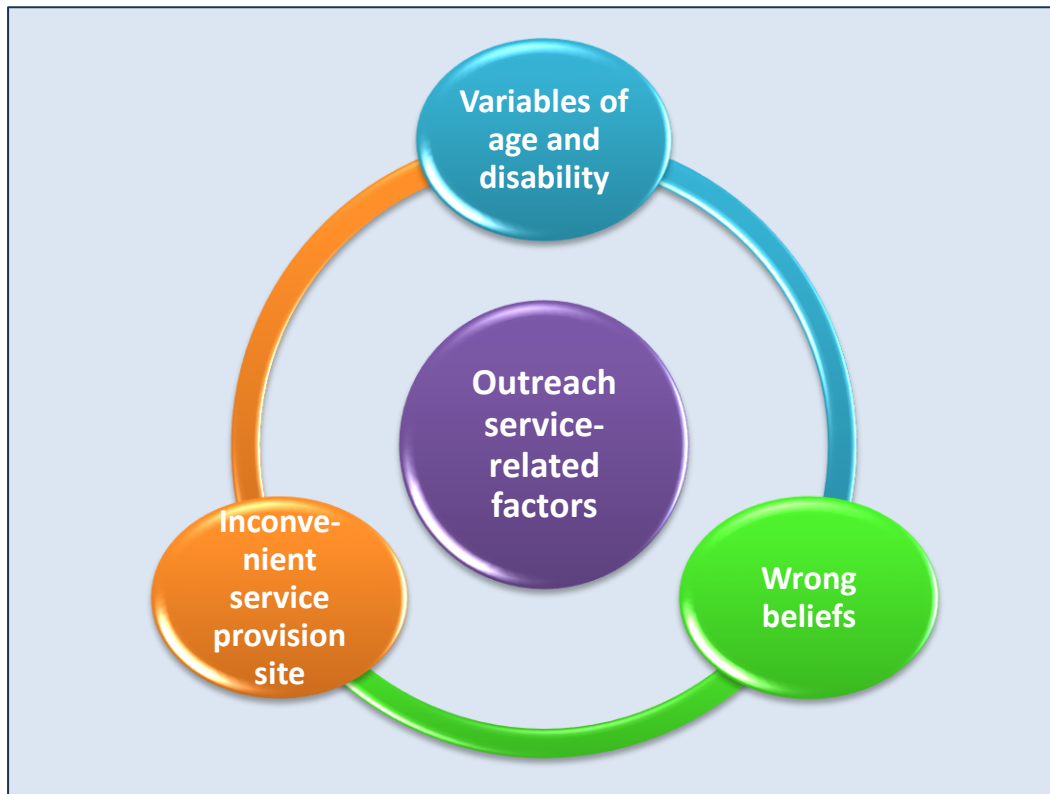


Figure 4.18 Sub-categories of outreach service-related factors

4.5.2.2.1 Sub-category 2.2.1: Variables of age and disability

Many of the study participants reported that age and disability variables significantly limited the use of PEC services in the community (Gilbert et al 2021:72). The study further indicated that these variables significantly affected the use and preference for PEC services.

The following three quotations from the in-depth participants tell more.

“Most of our customers were aged and in difficult mobility, they prefer the outreach-based service provision. There is a time when we fail to get one patient per month unless we reach.” 15:24 ¶ 15 In In-depth individual face-to-face interview Ten

“Minority groups, such as the very old and people with a disability, prefer outreach-based services, which significantly affected the PEC services delivery modes.” 9:11 ¶ 15 In an In-depth individual face-to-face interview Five

“Most of our target groups are old and reject receiving eye-care service due to the absence of someone to take care of them after surgery, which is a serious barrier to service provision in this primary eye-care unit.” 10:8 ¶ 13 in In-depth individual face-to-face interview Four

4.5.2.2.2 Sub-category 2.2.2: Inconvenient service provision site

The second subcategory of outreach services as a factor in the low use of primary eye-care services in the study area was the presence of inconvenient service provision sites. Participants in the in-depth individual face-to-face interview reported that, as discussed in Section 4.3.2.2.1, despite the presence of a wrong understanding of blindness and its treatment options in older and disabled communities, there was no suitable environment for these groups to access primary eye-care services. This result is consistent with a previous study conducted in Gurage, Ethiopia (Teshome et al 2021:4).

Participants stated:

“Old people and those with unilateral or bilateral blindness did not come to the unit due to the poor geography and lack of a conducive environment for them in the primary eye-care unit.” 7:13 ¶ 13 In-depth individual face-to-face interview Eight

“Most of the health posts around this health centre are not well structured and suitable for conducting basic screening and treatment for the very old and people with a disability.” 9:25 ¶ 15 in In-depth individual face-to-face interview Five

Another participant in the study noted the lack of food and a place for patients to spend the night after treatment, as a testimony to the inconvenience.

Saying:

“The absence of food and a place to spend the night after surgery in this unit was reported to be a challenge by many patients from a distant area, in addition to the low awareness among people living in pocket areas so far from the health centre.” 17:4 ¶ 14 In-depth individual face-to-face interviews Two

The wrong beliefs of the community were the next subcategory of outreach services reported during the current study.

4.5.2.2.3 Sub-category 2.2.3: Wrong beliefs

Consistent with a study result conducted in western Kenya, the study participants mentioned the presence of different wrong beliefs in the community among the reasons for the low use of PEC services in the four districts of the Southern Omo Zone, Ethiopia (Med et al 2019:2).

The following direct quotations from the study participants elaborate more:

“In this community, people did not consider eye drops as a treatment for their eye condition. Most failed to apply prescribed antibiotics and will develop complications later.” 16:11 ¶ 13 In an In-depth individual face-to-face interview Three

“There exists a wrong perception in my community that the service is better provided by external personnel (foreigners) than some of their own (trained and deployed in the Primary Eye-care Unit).” 6:6 ¶ 11 In-depth individual face-to-face interview Three

Other study participants also mentioned the presence of wrong beliefs in the community about traditional remedies for the low use of PEC services in the community.

“There is a wrong belief in the community that traditional healers can treat eye conditions better.” 8:8 ¶ 13 In-depth individual face-to-face interview Eleven

“The main barrier in this PECU is the decreased flow to the PECU, patients not coming to us until their vision is lost, and the use of traditional medication for an eye problem that complicates things more.” 18:7 ¶ 13 in an In-depth individual face-to-face interview Twelve

The third sub-category of wrong beliefs reported by the study participants was related to special food. One of the study participants said:

“The other challenge is the existence of the wrong perception in the community that they need special food (foods rich in protein and fat) after surgery for a fast recovery.” 10:9 ¶ 13 In-depth individual face-to-face interview Four

4.5.3 Theme 3: Barriers to primary eye-care services

In this section, barriers to PEC services were discussed with categories and sub-categories. The theme was further illustrated in three categories: awareness gap, service gap, and leadership and management gap. Table 4.10 reflects the categories and sub-categories of barriers to primary eye-care services in the four districts of the South Omo Zone, Ethiopia.

Table 4.10 Theme 3: Categories and sub-categories

Theme	Categories	Sub-categories
Theme 3: Barriers to primary eye-care services	3.1 Awareness gap	3.1.1 Information gap
		3.1.2 The lack of eye health-seeking behaviours
		3.1.3 Use of indigenous knowledge
	3.2 Service gap	3.2.1 Poor eye health infrastructure
		3.2.2 Shortage of equipment and supplies
		3.2.3 Shortage of trained workforce
	3.3 Leadership and management gap	3.3.1 Loose relationship
		3.3.2 Lack of management support
		3.3.3 Inadequacy of clean water

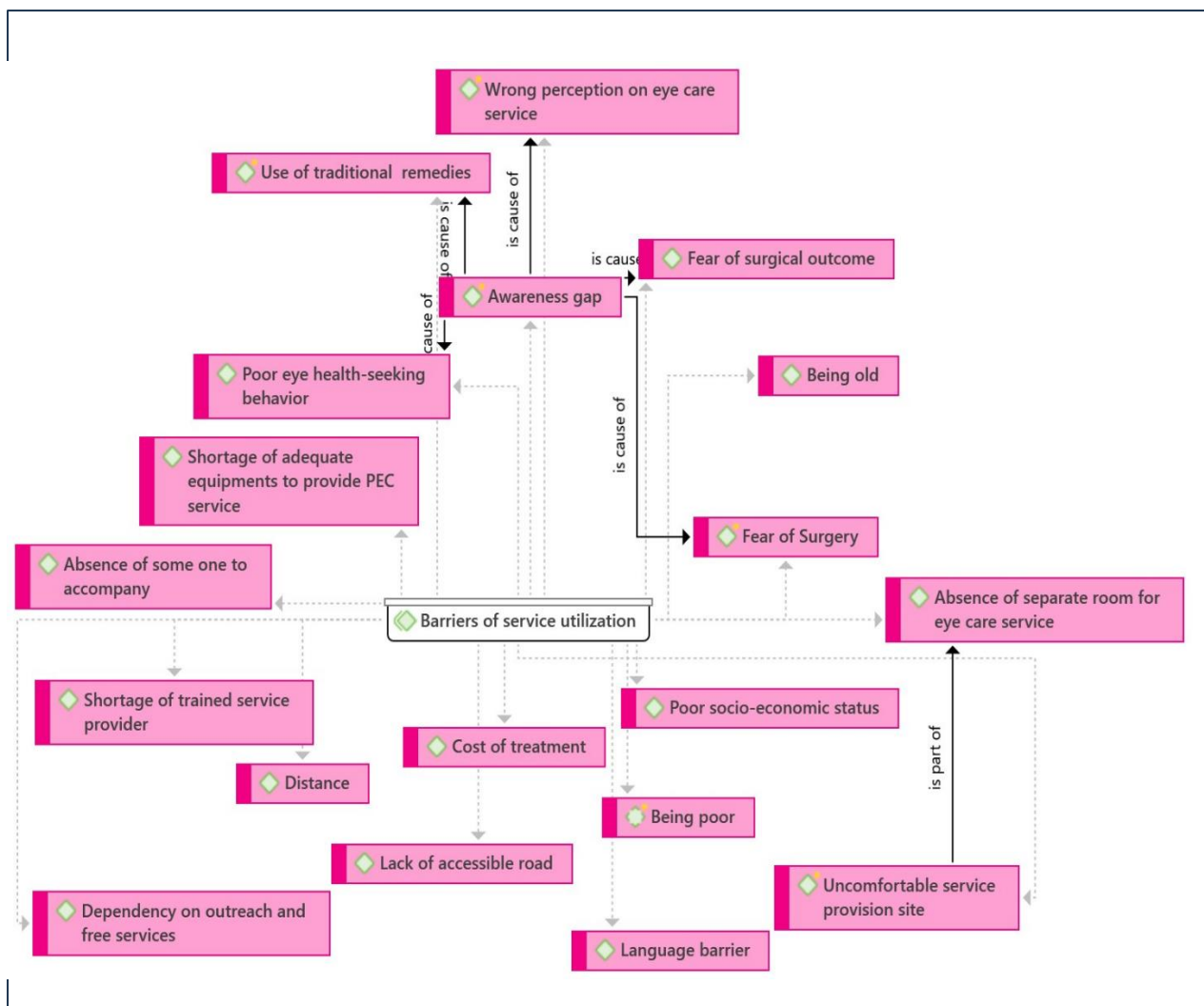


Figure 4.19 Coded barriers to PEC service in the four districts of the Southern Omo Zone, Ethiopia, with their relationship
(Exported from ATLAS. ti).

4.5.3.1 Category 3.1: Awareness gap

During the in-depth individual face-to-face interview organised with primary eye-care workers, many study participants presented the awareness gap as a barrier to primary eye-care service in the four districts of the South Omo Zone, Ethiopia. In this section, the awareness gap was well illustrated with sub-categories: information gap, lack of eye health-seeking behaviour, and the use of indigenous knowledge.

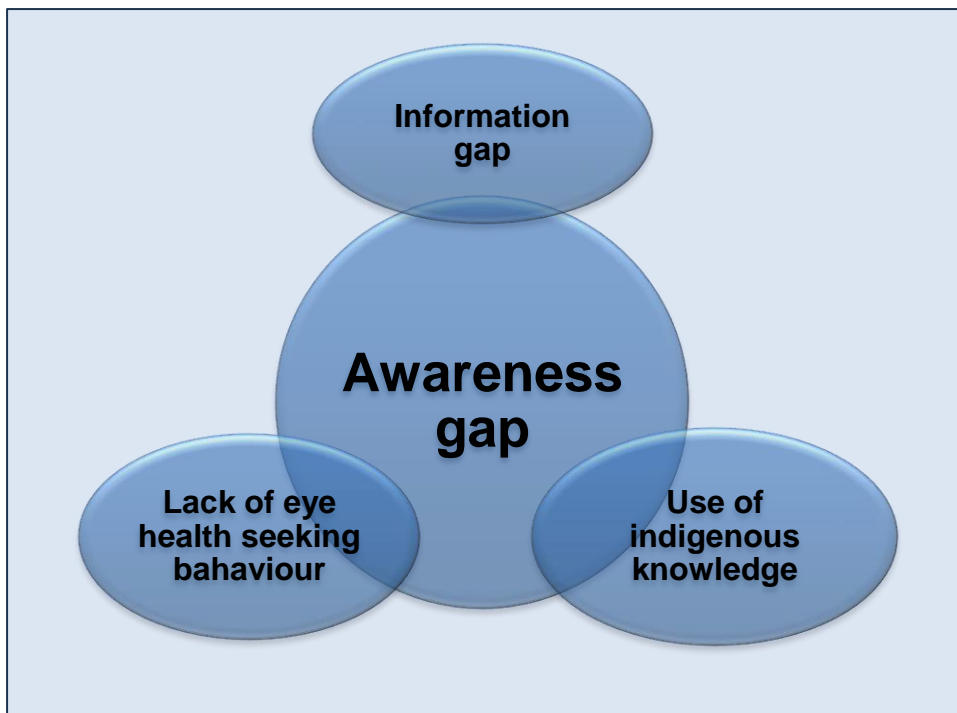


Figure 4.20 Sub-categories of awareness gap

4.5.3.1.1 Sub-category 3.1.1: Information gap

Primary eye-care workers magnified the presence of information gaps in the community there are blind people in his area who do not know about the presence of eye-care services in the primary eye-care unit. This result is consistent with a study result in Nepal (Gnyawali et al 2012:97).

He articulated:

“There are so many barriers to service provision. The information gap is the main. So many people did not know the presence of eye-care services nearby. The second barrier, in this community, was that people did not consider eye drops as a treatment for their eye condition.” 16:27 ¶ 13 In-depth individual face-to-face interview Three

Other study participants reported that due to the information gap, patients were blinded to a treatable condition.

“The flow to this PECU is very low. Patients come to this unit only when they develop serious complications or blindness. There are so many beneficiaries who

became blind and stay home due to lack of information and whose condition could be reversible if you get the service early.” 16:26 ¶ 11 In-depth individual face-to-face interview Three

The following quote from a study participant complements the idea:

“Due to the low awareness in the community about eye-care, the service utilisation rate is low. Patients are not well informed about service availability in static clinics. Most people wait at their homes. That is a serious information gap.” 12:28 ¶ 12 In-depth individual face-to-face interview One

The lack of eye health-seeking behaviour was also reported as part of the awareness gap and is discussed in the following subcategory.

4.5.3.1.2 Sub-category 3.1.2. The lack of eye health-seeking behaviours

Participants in the in-depth individual face-to-face interview reported that the lack of eye health seeker behaviour in the community was a barrier to service provision and utilisation. Similar to a study result in Pakistan, during the current study participants mentioned the existence of many blind people who are not willing to get eye-care services (Rehman & Sharif 2021:162).

One participant in the study said:

“Additionally, there is low eye health-seeking behaviour in this community. They will wait until they develop corneal opacity or permanent loss of vision before coming to this unit for treatment.” 11:4 ¶ 13 In-depth individual face-to-face interview Nine

Participants also stated that the lack of eye health-seeking behaviour in the community significantly affected the provision and use of primary eye-care services. This result is consistent with a study result in Nigeria (Senyonjo et al 2014:1).

Sample quote:

“Almost no patient comes to this unit unless I go to the villages. Poor eye health-seeking behaviour in the community is the main barrier. They do not consider being treated as a benefit.” 8:19 13 In-depth individual face-to-face interview Eleven

The use of indigenous knowledge and the application of traditional medicine have also been reported to be associated with a lack of eye health seeking behaviour, as discussed below.

4.5.3.1.3 Sub-category 3.1.3: Use of indigenous knowledge

During the current study, the use of indigenous knowledge was reported by many participants as a barrier to PEC services. During the in-depth individual face-to-face interview, integrated eye-care workers complained about the complications patients encountered using traditional remedies and its effect on treatment outcomes. A similar report was engendered from a study in Nigeria (Ebeigbe & Oveneri 2014:102).

One participant explained:

“Patients do not come to us until they lose vision or encountered serious complications while using traditional medications for an eye problem. The use of traditional medicine complicates cases and significantly affects the treatment outcome.” 18:18 ¶ 13 In-depth individual face-to-face interview Twelve

The other participant also said:

“The use of community services is not as good as other services in this primary health unit for numerous reasons. The community will not come to us until they lose their vision or encounter something difficult to manage by traditional healers.” 18:17 ¶ 11 In-depth individual face-to-face interview Twelve

4.5.3.2 Category 3.2: Service gap

The service gap was mentioned by many participants as a barrier to primary eye-care services. The service gap was sub-categorised into poor eye health infrastructure, equipment and supplies, and shortage of trained workforce. A detailed description of the

three sub-categories is presented below. The figure below presents the sub-categories of service gaps.

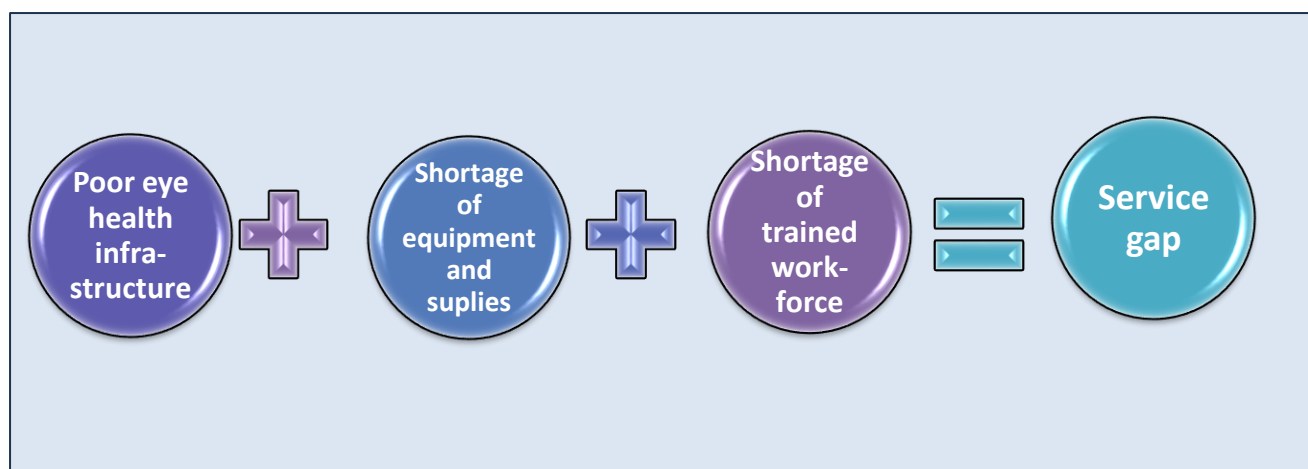


Figure 4.21 Sub-categories of service gap

4.5.3.2.1 Sub-category 3.2.1: Poor eye health infrastructure

The Ethiopian Ministry of Health (2016:36) claims that a PECU has a separate examination and surgery room having a minimum of two beds, one for examination and one for minor surgery. Even if the national strategic document says this, most of the participants condemned the poor eye health infrastructure of primary care units. They pointed out that it was a barrier to PEC services provision and questioned the capacity of units to provide ordinary eye-care services, similar to a study result in Pakistan (Rehman & Sharif 2021:164).

The following two quotes describe the story:

“The room assigned to the primary eye-care service is small and not standardised. We don’t have an operating table. We perform trichiasis surgery on emergency unit tables or delivery couches.” 9:26 ¶ 17 In-depth individual face-to-face interview Five

“There is no well-organised and dedicated room for primary eye-care services. We provide services for patients with eye complaints in any free room available during the arrival of patients, which causes serious discomfort and confusion in patients.” 17:8 ¶ 15 In-depth individual face-to-face interviews Two

Similarly, health posts, an ideal place to organise community outreach, were reported by many study participants as not standardised to provide services and presented as evidence of poor eye health infrastructure.

One of the service providers said:

“Most of the health posts around this primary health care unit were not well-structured and suitable for conducting basic screening and treatment.” 9:10 ¶ 15
In-depth individual face-to-face interview Five

The other complimented:

“Most health posts in this PECU are not cemented or cleaned to provide TT surgery. So, we prefer to provide TT surgery in static clinics only.” 14:8 ¶ 15
In-depth individual face-to-face interview Six

Equipment and supplies are the next sub-categories of the service gap identified during the current study as a barrier to primary eye-care services.

4.5.3.2.2 Sub-category 3.2.2: Shortage of equipment and supplies

The dearth of supplies and equipment was one of the main barriers to the primary eye-care service in the study area. Many participants in the study mentioned the shortage of equipment and supplies as a barrier during in-depth individual face-to-face interviews with service providers. A vision centre model study conducted in India reported similar findings (Khanna et al 2020:338).

Two participants said:

“In this primary eye-care unit, there is a huge shortage of equipment and supplies for Trachomatous Trichiasis surgery, such as surgical gloves, sets, and surgical blades. There is also no well-organised and dedicated room for the provision of primary eye-care service provision.” 17:8 ¶ 15
In-depth individual face-to-face interview Two

“As a barrier, I can mention a shortage of basic medications and equipment, lack of road access, and geographical barriers. Fear of surgery, and the absence of someone to escort old patients to the primary eye-care unit. The shortage of equipment and supplies is the main barrier on the service provider side.” 9:7 ¶ 13
In-depth individual face-to-face interviews Five

4.5.3.2.3 Sub-category 3.2.3: Shortage of trained workforce

The shortage of trained personnel was the last subcategory of the service gap reported in this study. The shortage of trained personnel was reported as a reason for the low use of primary eye-care services in the study area. Similar to previous studies, participants in the current study, related the shortage to the service gap (Rehman & Sharif 2021:164).

A participant said:

“Currently we are providing an eye-care service with selected eye drops and medications available. Different factors hinder the provision in this primary eye-care unit and the shortage of trained personnel is the main one. I work a shift (eight hours a day). When any patient visits the unit during my absence, they need to wait for me or come back another time, which causes a serious discomfort in patient satisfaction.” 16:25 ¶ 9
In-depth individual face-to-face interview of Three

Service providers mentioned the lack of quality and standardised treatment when the service was provided by other healthcare workers who do not receive auxiliary training in eye-care while working overloaded or out of the unit for outreach activities. They reported that such drift reduced patient satisfaction and reputation (Cicinelli et al 2020:321).

One of the participants said:

“There is a work overload on us, there are times in the month when both of us are out of the primary eye-care unit to do other activities assigned by the health office, and during that time, eye-care patients will not get the service they deserve.” 10:13 ¶ 17
In-depth individual face-to-face interview Four

Participants in the study also linked the lack of trained personnel to the lack of management commitment.

A participant in the in-depth individual face-to-face interview said:

“From the organisation’s point of view, the main barrier is the shortage of trained personnel in the unit. I am the only one providing service. The Ethiopian Ministry of Health advises the appointment of at least two ophthalmic nurses to health centres, but there is no one assigned here. There exists a lack of commitment from the management to hire additional workforce to expand the service.” 12:7 ¶ 14 In-depth individual face-to-face interview One

4.5.3.3 Category 3.3: Leadership and management gap

The leadership and management gap were the third category of barriers to PEC services identified during the current study. Loose relationships, lack of management support, and inadequacy of clean water were the sub-categories identified. Figure 4.19 presents the leadership and management gap with sub-categories.



Figure 4.22 Sub-categories of leadership and management gap

4.5.3.3.1 Sub-category 3.3.1: Loose relationship

During the current study, similar to the results of previous studies in India and Nigeria, integrated eye-care workers testified about the presence of a loose relationship between the PECU and the PHCU and management as a barrier to service (Aghaji et al 2018:3; Misra et al 2015:83).

An integrated eye-care worker said:

“As a challenge, I can mention the poor and weak communication this eye-care unit had with the management and the district health office. Additionally, there is a lack of attention, and eye-care is ignored as a job of an NGO.” 11:6 ¶ 17 In-depth individual face-to-face interview Nine

The other also said:

“The eye unit did not have adequate attention and relationship with the primary health centre and the district, and the activity is not integrated with the health extension package; if integrated, the health extension worker can screen and send more patients during their routine house-to-house visit 10 days a day.” 16:29 ¶ 17 In-depth individual face-to-face interview Three

Some participants believed that this loose relationship was due to the absence of income from the eye-care services.

“There is also a clear communication gap between the primary health centre and the district health office. As the eye-care service is provided free of charge and the health centre does not generate any income from the service, the management is not supportive and happy to allocate budget, medication, and support.” 17:14 ¶ 19 In-depth individual face-to-face interviews Two

4.5.3.3.2 Sub-category 3.3.2. Lack of management support

As a subdivision of the PHCU, the primary eye-care units need the support of the health system. As described above, the loose relationship was evidence of the lack of

management support cited by many participants in the in-depth individual face-to-face interviews and similar studies conducted in Pakistan (Rehman & Sharif 2021:164).

The three direct quotes from the in-depth individual face-to-face interview support the idea:

“From the management side, lack of attention and lack of support are the main challenges. They are not paying us the attention we deserve as an eye-care service unit. As I told you, the eye-care service is not well integrated with the general health care service.” 15:25 ¶ 17 In-depth individual face-to-face interview Ten

“As a barrier, I can mention the low support from the district health office and the Primary Health Care Unit. They all consider the activity as an activity of Orbis, an NGO working in the field, not as one basic component of primary health care and provide no support at all.” 15:23 ¶ 13 In-depth individual face-to-face interview Ten

“The district and the Primary Health Unit consider eye-care activity an additional job, not a mandatory task of the Primary Health Unit.” 12:21 ¶ 19 In-depth individual face-to-face interview One

The participants recommended that the use of the service would be improved if the management provided the necessary support to the unit.

Sample quote:

“I know that the eye-care service is free, but it would be excellent if the government and all stakeholders supported the eye-care unit. Things will change, and we will have a well-organised eye-care system that will satisfy the needs of all.” 17:30 ¶ 23 In-depth individual face-to-face interviews Two

However, primary eye-care workers mentioned the lack of commitment of the district health office as a testimony to the lack of management support.

4.5.3.3.3 Sub-category 3.3.3: Inadequacy of clean water

Many participants in the study reported the inadequacy of clean water as a barrier to PEC services in the four districts of the South Omo Zone, Ethiopia. Study participants attributed the inadequacy to the leadership and management gap.

A participant in the study said:

“The lack of clean water and toilets, including communal latrines, which are mandatory to eliminate blinding Trachoma, is one of the main barriers in this primary eye-care unit. If the leadership avail those facilities, Trachoma will be history in this community.” 13:10 ¶ 14 In-depth individual face-to-face interview Seven

The participants in the in-depth individual face-to-face interview also talked about the inadequate water supply that resulted in a favourable environment for the transmission of Trachoma.

The participants in the in-depth individual face-to-face interview said:

“As a barrier, we can list the living conditions of the community that are conducive to the transmission of infectious eye diseases such as Trachoma from one person to the other, the scarcity of clean water to drink and face washing, cultural taboos, fear of surgery, and the absence of someone to accompany them to this unit, especially with those who are bilaterally blind.” 15:23 ¶ 13 In-depth individual face-to-face interviews Ten

4.5.4 Theme 4: Suggestions to improve primary eye-care services

The last theme that emerged during the analysis of the in-depth individual face-to-face interview was suggestions to improve primary eye-care services. The participants in the in-depth individual face-to-face interviews suggested areas of improvement in the provision and utilisation of PEC services. Participants' suggestions were categorised into improved administration, improved service, and improved use. Table 4.11. below shows the categories and sub-categories of theme four.

Table 4.11 Theme 4: Categories and sub-categories

Theme	Categories	Sub-categories
Theme 4: Suggestions to improve primary eye- care services	4.1 Improved administration	4.1.1 Service Integration
		4.1.2 Service expansion
		4.1.3 Attention
	4.2 Improved service	4.2.1 Training for service providers
		4.2.2 Standardised primary eye-care units
		4.2.3 Provision of supplies and equipment
	4.3 Improved utilisation	4.3.1 Need-based service provision
		4.3.2 Awareness creation
		4.3.3 Advocacy

4.5.4.1 Category 4.1: Improved administration

As discussed in Section 4.5.3.3.2. The management and leadership gap were among the barriers to PEC services identified during the current study. The researcher labelled service integration, service expansion, and attention in the category of improved administration to increase the PEC services utilisation. The details of each subcategory are discussed in the following. Figure 4.22 presents the sub-categories of improved administration.



Figure 4.23 Sub-categories of improved administration

4.5.4.1.1 Sub-category 4.1.1: Service integration

As discussed in Barriers, primary eye-care service is not well integrated into the overall health system in most parts of the study areas. Study participants listed gaps related to awareness, service, leadership, and management as barriers to primary eye-care

services. The following discussion presented suggestions from the study participants to increase service use through service integration.

Similar to WHO recommendations to sub-Saharan regions, the study participants highly recommended service integration with other routine activities of the primary health care unit for better usage (Graham 2017:85).

The following two direct quotations tell that story.

“To improve the use of primary eye-care services in this primary eye-care unit, integration, and coordination are mandatory. Eye-care is a standalone activity followed and monitored by Orbis, an international NGO that works in the area.”

11:17 ¶ 19 In-depth individual face-to-face interview Nine

“To improve service, primary eye-care should be included in the overall PHC system and shortages must be filled. Discussions should be strengthened among all stakeholders in the field. Awareness-creation activities also need to be strengthened.” 9:27 ¶ 19 In-depth individual face-to-face interview Five.

The service providers had to integrate the activity with other tasks of the primary health care unit for a remarkable result. Saying:

“I know there are a high number of partially and fully blind people in this community. Therefore, we need to integrate this activity with other routine tasks of health extension workers, because health extension workers know who lives where. They are in a good position to show direction and determine outreach plans. So, if the activity is integrated into the system, the result will be superb. Strong commitment and follow-up must also be in place for a better outcome.” 16:22 ¶ 20 In-depth

individual face-to-face interview Three

Service expansion was the next largely proposed recommendation to improve eye-care services usage in the study area.

4.5.4.1.2 Sub-category 4.1.2: Service expansion

Most of the study participants recommended expanding the service to the rural community for better usage. This recommendation aligns with the WHO and Sub-Saharan region PEC service improvement recommendations (Graham 2017:85; WHO 2022d:16).

The following three quotations from the in-depth individual face-to-face interview participants elaborate:

“I strongly advise the establishment of a separate and well-equipped PECU. This PECU serves more than 25,000 population, so the expansion and standardisation of a unit is mandatory.” 6:22 ¶ 20 In-depth individual face-to-face interview Two

“The service provision should be expanded to serve the unserved. As you know, almost all blind people are poor. That means they need support from the government to get the service easily and early.” 5:24 ¶ 24 In-depth individual face-to-face interview Three

“I strongly advise the expansion of the unit to provide a full-blown eye-care service including major eye surgeries and eyeglass provision with a well-trained workforce.” 4:21 ¶ 24 In-depth individual face-to-face interview Six

The provision of adequate attention was the next largely proposed recommendation to improve eye-care services.

4.5.4.1.3 Sub-category 4.1.3: Attention

Many participants in the study pointed out that eye-care services did not receive adequate attention in the four districts of the Southern Omo Zone, Ethiopia. Activities aiming to develop infrastructure and human resources for eye health need attention if achieving elimination and control of avoidable blindness is a goal. This result is consistent with a study result in the Edo state, Nigeria (Ebeigbe & Ovenseri 2014:103). They reported that the lack of attention is evidenced by low utilisation and the poor eye health infrastructure (Aghaji et al 2018:3).

Two participants in the in-depth individual face-to-face interview said:

“Eye-care did not have attention in general. It has only been a year since the Ministry of Health DHIS (Demographic Health Information System) started recording eye health data. We are doing this just to serve the community. No one cares and asks for a report and justification. I suggest that all concerned pay adequate attention.” 13:9 ¶ 13 In-depth individual face-to-face interview Seven.

“The eye unit did not receive adequate attention from the primary health centre and the area health office, this is shown with the low utilisation of the service and the lack of standardised primary eye-care unit and service.” 16:18 ¶ 17 In-depth individual face-to-face interview Three.

4.5.4.2 Category 4.2: Improved service

As discussed above in themes one and three, primary care service provision in the four districts of the South Omo Zone, Ethiopia, was not improved due to numerous barriers. Taking these into account, the study participants suggested service improvement. To elaborate on the suggestion, this section is subcategorised into training for service providers, standardisation of primary eye-care units, and provision of supply and equipment. Figure 4.24 presents the sub-categories of improved service

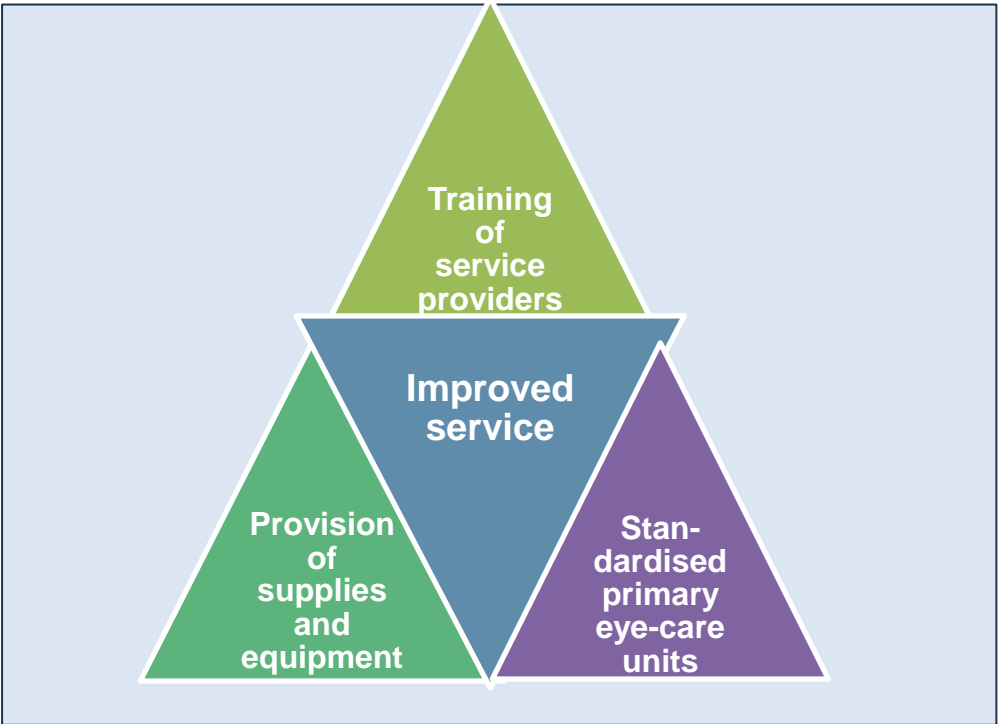


Figure 4.24 Sub-categories of improved service

4.5.4.2.1 Sub-category 4.2.1: Training for service providers

In most African regions, primary health workers provide primary eye-care services with no or minimal training, following the scarcity of ophthalmic professionals (WHO 2018a:43). Similarly, in the study area, many participants reported a shortage of these service providers. To fill the gap, the provision of training for service providers was suggested. This suggestion is consistent with previous suggestions made in Gurage, Ethiopia (Teshome et al 2021:7).

The two successive quotations of the study participants tell this:

“The common challenges in providing eye-care services in this PECU include a shortage of trained personnel. I am the only person trained here, and it is almost impossible to cover seven villages with one person. I strongly recommend the provision of training for more nurses.” 14:10 ¶ 17 In-depth individual face-to-face interview Six

“To improve the service, I strongly recommend the training of more nurses and the implementation of community outreach programmes until our village is free of communicable eye diseases.” 18:21 ¶ 19 In-depth individual face-to-face interview Twelve

Consistent with many other previous studies, the provision of refresher training for existing service providers was also presented as a recommendation to improve the PEC services provision in the four districts of the Southern Omo Zone, Ethiopia (Aghaji et al 2018:3; Hailu et al 2010:131).

One participant suggested:

“I recommend refreshment training for service providers. As we are looking at many patients, we need to be refreshed. All health extension workers under my supervision were trained. They should also be refreshed and motivated to integrate the activity with other preventive and promotional tasks.” 16:31 ¶ 20 In-depth individual face-to-face interviews Three

Orientation on common ocular morbidities and their remedies to all individuals assigned to the outpatient department was also presented as a recommendation for improved service.

“It would be great if an orientation was provided to all professionals examining patients in the outpatient department not to leave anyone with eye complaints untreated, strengthen outreach activities, and expand eye-care activities to health posts.” 17:29 ¶ 22 In-depth individual face-to-face interview Two

The next sub-category of service improvement is standardised primary eye-care units.

4.5.4.2.2 Sub-category 4.2.2: Standardised primary eye-care unit

The presence of unstandardised PECUs was discussed as a barrier to service and a cause of low utilisation in themes one to three. As a recommendation, participants of the in-depth individual face-to-face interviews suggested standardisation of primary eye-care units. Similar suggestions were reported in a former study conducted in India (Cicinelli et al 2020:321).

Sample quotes:

“To expand the service and provide the service well to the community, the unit shall be standardised and supplemented with equipment and supplies. It would be better if we could provide the service at least eight hours every day.” 10:23 ¶ 19 In-depth individual face-to-face interview Four

“The community wants the PECU to offer a full eye-care service that includes cataract surgery, Glaucoma treatment, and the provision of eyeglasses. The unit should at least meet the minimum standard of services.” 14:6 ¶ 13 In-depth individual face-to-face interview Six

4.5.4.2.2 Sub-category 4.2.3: Provision of supplies and equipment

During the study period, many of the service providers reported the inadequacy of supplies and equipment for eye-care services and recommended adequate delivery of supplies and equipment for better provision and utilisation of PEC services. This

recommendation is consistent with a recommendation of a former study in Ethiopia (Teshome et al 2021:4).

A participant in the study suggested that:

“As a long-term solution, an eye-care professional should be appointed for this unit, equipment and supplies should be availed and attention should be given to eye-care services in general.” 12:23 ¶ 21 In-depth individual face-to-face interview One

Other study participants also said:

“To improve the service, I recommend a full set of equipment and supplies mandatory for the provision of TT surgery and a separate room for primary eye-care services.” 7:10 ¶ 19 In-depth individual face-to-face interview Eight.

“To expand the service and provide the service well to the community, the unit shall be supplemented with equipment and supplies, and be standardised.” 10:14 ¶ 19 In-depth individual face-to-face interview Four.

The next category of suggestions to improve PEC services in the study area was improved utilisation.

4.5.4.3 Category 4.3: Improved utilisation

The last category of suggestions is improved utilisation. To improve the use of PEC services, participants in the study suggested provision of need-based services, awareness creation, and advocacy. Figure 4.20 presents the sub-categories of improved use.

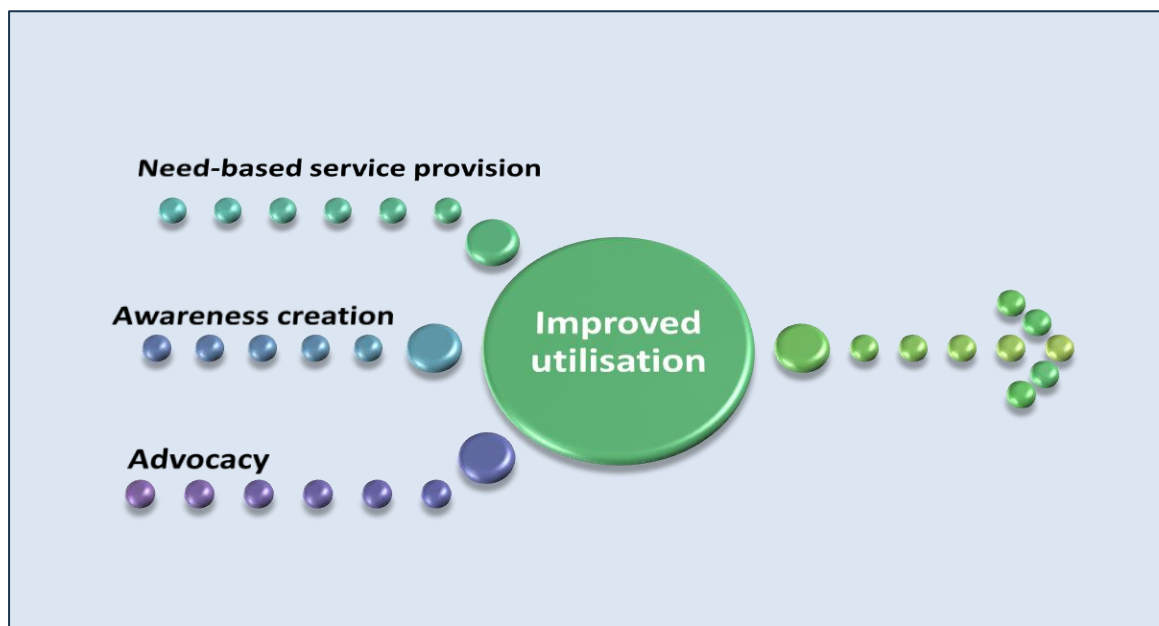


Figure 4.25 Sub-categories of improved utilisation

4.5.4.3.1 Sub-category 4.3.1: Need-based service provision

During the current study, many participants suggested the provision of need-based PEC services as the best tool to improve utilisation. Community involvement and provision of need-based services are mandatory to increase patient flow and appropriate access. This suggestion is consistent with the result of case studies conducted in different states of India which recommended need-based service provision for better utilisation (Sabherwal et al 2022:1).

One participant in the in-depth individual face-to-face interview enlightened me that:

“To improve the use of eye-care services, I think the provision of a community-based eye-care service is mandatory. The living conditions and lifestyle of the people living in this area are different from most parts of this country. Therefore, I strongly recommend the preparation and implementation of a pastoralist-centred eye health service that is conducive for them to access care wherever they go.”

8:21 ¶ 19 In-depth individual face-to-face interview Eleven

Many participants in the study recommended the need to organise community needs-based outreach programmes based on the need to improve service utilisation.

The following direct quote from one study participant supports this motive:

“To improve service, I strongly advise the implementation of community outreach programmes until our village is free of communicable eye diseases.” 18:21 ¶ 19 In-depth individual face-to-face interviews Twelve

4.5.4.3.2 Sub-category 4.3.2: Awareness creation

Many participants in the study cited the lack of community awareness as an obstacle to PEC services utilisation. This recommendation aligns with a recommendation from Edo state, Nigeria (Ebeigbe & Oveneri 2014:100).

The following quotation from the study participant describes:

“Due to the low level of eye-care awareness, the service utilisation rate is low. We need to work on creating awareness if the service is expected to be expanded.” 12:5 ¶ 12 In-depth individual face-to-face interview One

To fill the gap, study participants suggested consolidation of awareness-creation activities.

The direct quote of a study participant tells us the following:

“We must create awareness and spread eye health information to the greater community to improve primary eye-care services.” 11:12 ¶ 19 In-depth individual face-to-face interview Nine

Advocacy was the last subcategory of improved service presented as a suggestion to improve PEC services in the four districts of the South Omo Zone, Ethiopia.

4.5.4.3.3 Sub-category 4.3.3: Advocacy

Advocacy, which was among the key recommendations of the WHO, was presented by in-depth individual face-to-face interview participants as a final suggestion to improve PEC services usage (WHO & UNICEF 2020:18).

The following two quotations from study participants describe:

“Discussions should be strengthened among all stakeholders in the field. The PECU and the district health office shall advocate for eye-care services.” 9:20 ¶ 19

In-depth individual face-to-face interview Five

“I think there needs to be advocacy from all concerned for the establishment of strong communication and relationships for better service provision and utilisation.”

13:18 ¶ 20 In-depth individual face-to-face interview Seven

The distribution of codes in the document analysis (code-document analysis) of the in-depth individual face-to-face interview is shown below in a Sankey diagram. The diagram presented that the analysis of the in-depth individual face-to-face interview was derived from all interviews.

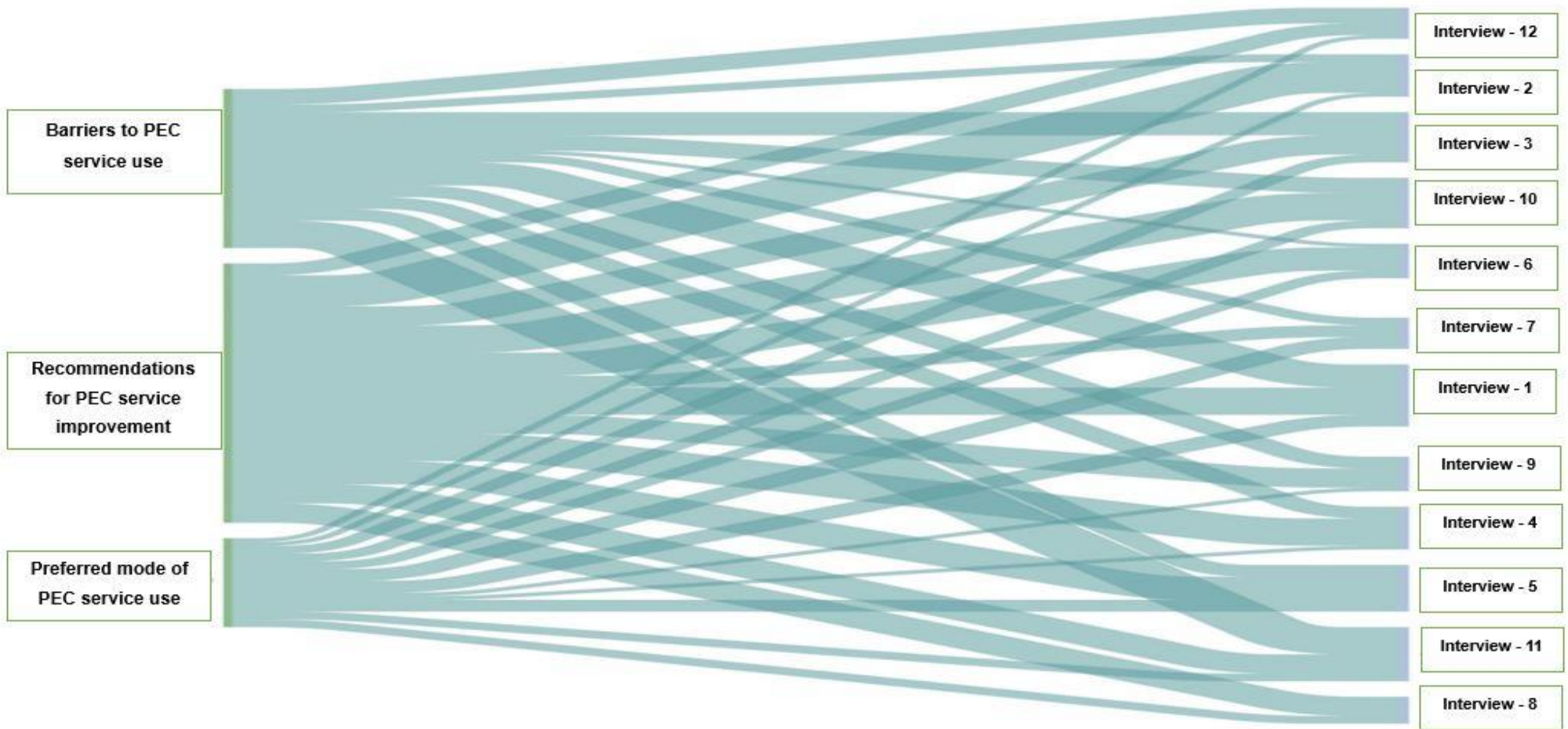


Figure 4.26 Sankey diagram with the distribution of the in-depth individual face-to-face interview
(Exported from ATLAS. ti)

4.6 IMPRESSION OF IN-DEPTH INDIVIDUAL FACE-TO-FACE INTERVIEW FINDINGS

The overview of the in-depth individual face-to-face interview results is presented below under the emerged themes of the study as discussed in Section 4.5 to respond to the second objective of the study:

- Experiences of service providers
- The preferred mode of service usage
- Barriers to primary eye-care services
- Suggestions to improve primary eye-care services

4.6.1 Experiences of service providers

The experiences of service providers were presented in two categories, service providers' perspectives and service access. From the experiences of service providers, seasonal service provision, integrated outreach service preferences, and work overload were identified as factors that hindered the use of primary eye-care services in the study area. Three factors were described as related to service access: preference for time, geographic inaccessibility, and direct and indirect costs of treatment.

4.6.2 Preferred mode of service use

During the current study, service users' preference was reported to affect the use of primary eye-care services in the four districts of the South Omo Zone, Ethiopia. Under these themes, two categories and six sub-categories were identified. The lack of comprehensive eye-care services, the need for foreign service providers, and the community's inclination for free service were reported as static clinic-related factors affecting the use of primary eye-care services. Similarly, variables of age and disability, inconvenient service provision sites, and wrong beliefs of the community were presented as outreach-related factors for low utilisation of primary eye-care services.

4.6.3 Barriers to primary eye-care services

The participants in the in-depth individual face-to-face interview identified the presence of gaps in knowledge, service, leadership, and management as barriers to primary eye-care services. The awareness gap includes the information gap, the death of the eye health seeker behaviour of the community, and the use of indigenous knowledge. The service-related gaps identified in this study were poor eye health infrastructure, lack of equipment and supplies, and lack of trained workforce. The leadership and management gap incorporated barriers such as loose relationships, lack of management support, and the inadequacy of clean water.

4.6.4 Suggestions to improve primary eye-care services

To improve the poor use of primary eye-care services in the four districts of the South Omo Zone, participants identified three areas of improvement: administration, service, and utilization. The study participants suggested administrative improvements in service integration, service expansion, and attention to eye-care services. To achieve better service: training for service providers, standardisation of primary eye-care units, and provision of supplies and equipment were suggested. Finally, to improve the use of primary eye-care services, the provision of need-based eye-care services, awareness creation, and advocacy were suggested by the study participants.

4.7 SUMMARY

In this chapter, a detailed result of the qualitative study is presented. The results collected from the six FGDs and 12 in-depth individual face-to-face interviews were presented in two sections. The findings of the focus group discussion were presented in three themes, seven categories (code groups), and 22 sub-categories (codes) to respond to the first objective of the study. Similarly, the findings of the in-depth study were presented in four themes, 10 categories (code groups), and 30 sub-categories (codes) to respond to the second objective of the study. During qualitative data analysis, codes were created from all documents. The study findings show that the use of primary eye-care services in the four districts of the South Omo Zone, Ethiopia, was low and fenced with different barriers that hindered the provision and utilisation of primary eye-care services. The next chapter presents the results of the quantitative study.

CHAPTER 5

QUANTITATIVE DATA PRESENTATION, ANALYSIS, AND DISCUSSION

5.1 INTRODUCTION

In Chapter 4, qualitative data presentation, analysis, and discussion were presented from the experience of adults, 40 years and older, to explore and describe primary eye-care services use in the four districts of the South Omo Zone, Ethiopia. Similarly, the experience of trained and certified primary eye-care workers was explored and described to reconnoitre the barriers to primary eye-care services in the study area. The results were classified and presented in seven themes. This chapter elaborates on the presentation, analysis, and discussion of quantitative data to respond to the third and fourth objectives of the study.

- Assess the knowledge and skills of primary eye-care workers in the four districts of the South Omo Zone, Ethiopia.
- Assess the readiness of primary eye-care units in equipment, infrastructure, and service delivery in the South Omo Zone, Ethiopia.

The findings and discussion of the quantitative phase of the study complemented the qualitative phase and assisted the development of the proposed primary eye-care model following the integration of the findings of the two phases in Chapter 6.

5.2 PRESENTATION OF QUANTITATIVE DATA ANALYSIS

The researcher collected quantitative data using a self-administered questionnaire and checklist prepared in the second phase of the study based on the findings of the qualitative study. A self-administered questionnaire was used to assess the knowledge and skills of mid-level health workers providing primary eye-care services in the four districts of the Southern Omo Zone, Ethiopia. The checklist was applied to assess the readiness of the primary eye-care units for equipment, infrastructure, and service delivery. The results presented here were analysed from 103 self-administered questionnaires and 32 checklists.

5.2.1 Quantitative data management and analysis

During this phase, data entry was performed using Epi-info data management version 6 software, and data analysis was performed using IBM SPSS version 28 software with the support of a statistician. Descriptive statistics were used. To present the results, tables, charts, graphs, means, and frequencies were used. The association of variables was processed using a logistic regression model. The crude odds ratios were calculated to determine the strength of the association of the variables and the adjusted odds ratios were used to control the effect of confounders. The bivariate analysis at a significance level of 0.25 was included in the multivariate analysis. Finally, the association of predictor variables with the outcome variable was presented using the adjusted odds ratio (AOR) with their 95% confidence interval.

5.3 RESULT OF KNOWLEDGE AND SKILL ASSESSMENT

The quantitative results described in the following section were derived from a self-administered questionnaire assessment with mid-level health workers providing primary eye-care services. The self-administered questionnaire had three sections: socio-demographic and basic data, knowledge assessment, and skill assessment. The discussion presented below is based on these sections of the data collection tool.

The researcher distributed 104 questionnaires to mid-level health workers providing primary eye-care services who met the set sampling criteria: a mid-level health care professional providing primary eye-care services at least for six months, a permanent employee of the unit providing primary eye-care services during the study period, and who were able to read and write English. Of the 104 self-administered questionnaires, 103 were filled out by the respondents giving a response rate of 99%. The response rate of the study shows the reliability and validity of the study (Gray et al 2017:690; Creswell & Hirose 2019:128).

5.3.1 Socio-demographic and basic data of the study respondents

In this section, the socio-demographic and basic data of the study respondents were presented and discussed.

5.3.1.1 Socio-demographic data of the study respondents

The socio-demographic data described here includes the age, sex, and marital status of the study respondents. Table 5.1 presents the sociodemographic data of the study respondents.

Table 5.1 Socio-demographic data of the study respondents exported from IBM SPSS (N=103)

Variable	Category	Frequency	Valid Percent
Age	20 -30	61	59.2
	31- 40	35	34.0
	> 40	7	6.8
	Total	103	100.0
Sex	Male	75	72.8
	Female	28	27.2
	Total	103	100.0
Marital status	Single	38	37.3
	Married	62	60.8
	Divorced	1	1.0
	Other	1	1.0
	Total	102	100.0

As described in Table 5.1 above, the majority 61 (59.2%) of the study respondents were in the age category of 20-30 years. The age category of 31-40 years comprises 34% of the respondents in the knowledge and skill assessment study. Only seven (6.8%) were over 40 years old. The sex distribution shows that the vast majority of the study respondents were male, covering 75 (72.8%) of the total. The marital status of the study respondents indicated that 62 (60.8%) were married and 38 (37.3%) were single. Figure 5.1 presents the marital status of the study respondents in a pie chart.

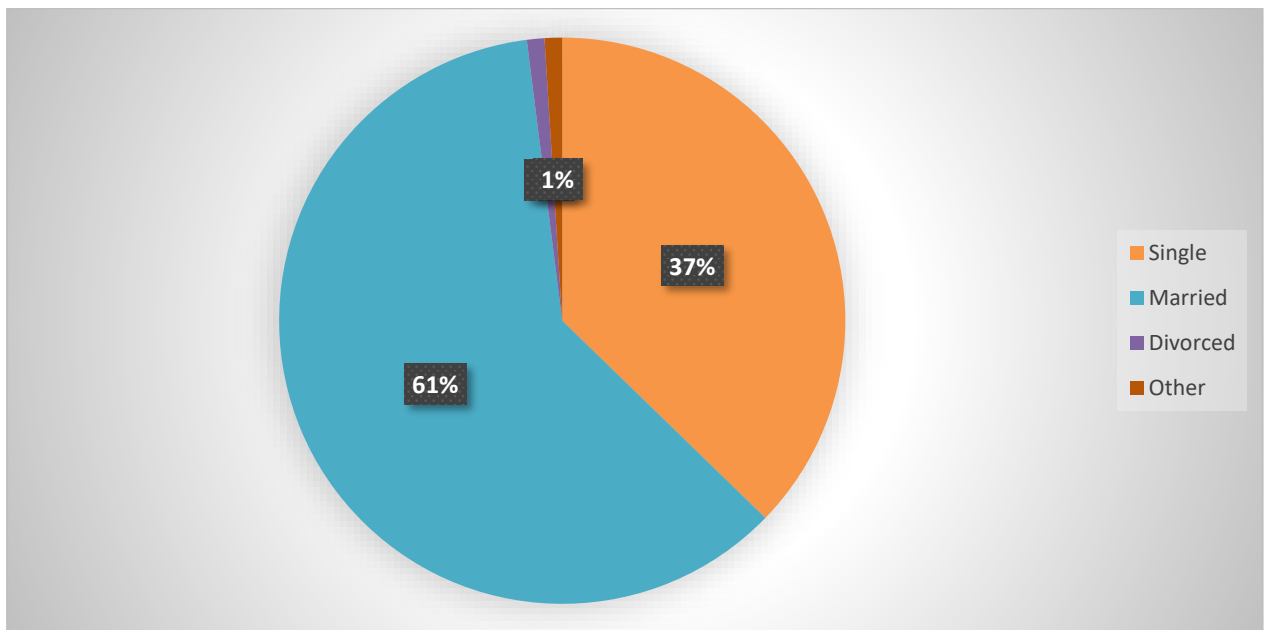


Figure 5.1 Marital status of study respondents (N=103)

5.3.1.2 Basic data of the study respondents

The variables used to assess the basic data of the study respondents include their profession, educational level, service year, source of knowledge, rounds of eye-care training, duration of eye-care training, and average number of patients seen in a month.

During this study, different mid-level healthcare workers were found to provide primary eye-care services in the four districts of the Southern Omo Zone, Ethiopia. Health officers or BSc holders nurses, general nurses, and integrated eye-care workers embrace the top list of professionals providing primary eye-care services by sharing 34%, 24.3%, and 22.3% of the professionals, respectively. Of the remaining 8 (7.8%) of the service providers were public nurses and 12 (11.7%) were other. The other category includes clinical nurses who specialise in paediatrics, maternity, and child health.

The presence of a mix of professionals providing primary eye-care services in the study area aligns with the WHO regional office for the Africa category of primary eye-care workers. The category was labelled mid-level health cadres such as clinical offices and nurses providing basic eye-care services, employed in primary health facilities as primary eye-care workers (Mabey et al 2019:4; WHO 2018a:30). Figure 5.2 presents a list of the professionals who provided primary eye-care services during the study period.

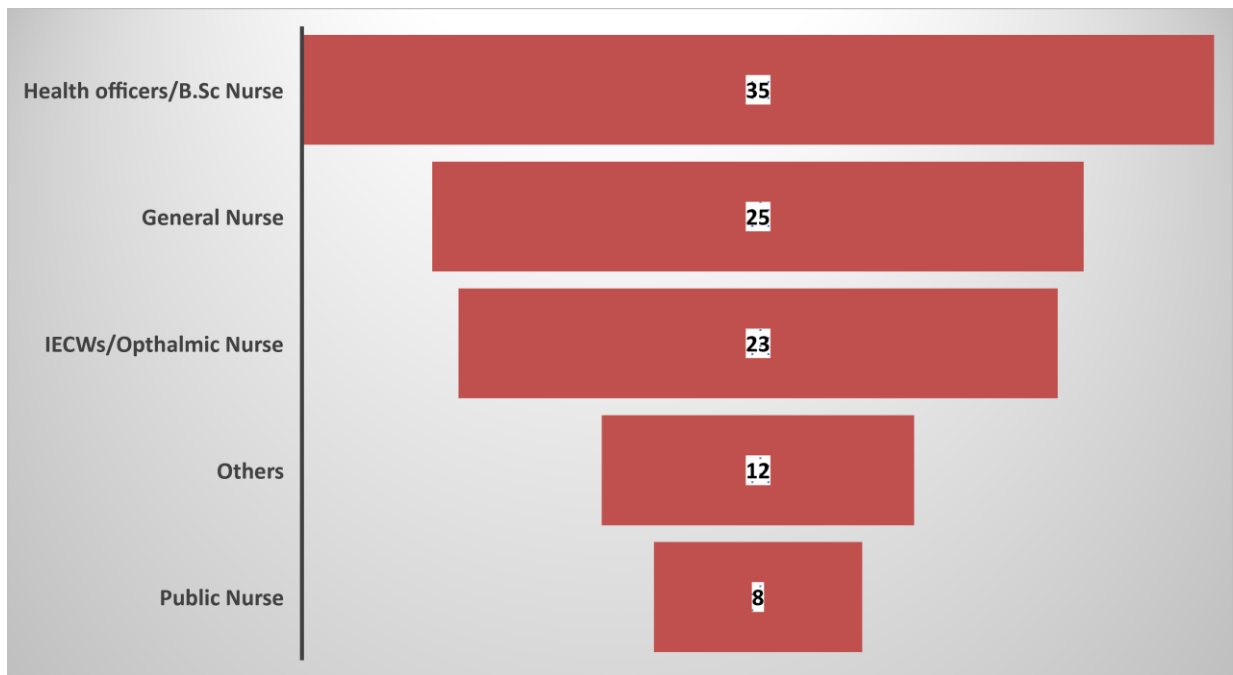


Figure 5.2 Professionals providing primary eye-care services in the study area (N=103)

The second variable used to assess the basic data of the study respondents was their level of education. As seen in Table 5.2. below, 56 (54.4%) of the study respondents have a first degree, 46 (44.7%) were diploma graduates, and only one (1%) of the respondents had a master's degree.

Table 5.2 The educational level of the study respondents

Educational level				
Category		Frequency	Valid percent	N
Valid	Diploma	46	44.7	103
	Degree	56	54.4	
	Master's and higher	1	1.0	
	Total	103	100.0	

(Exported from IBM SPSS V. 28)

The third variable used as a basic data statistic during the current study was the duration of service provision. As seen in Figure 5.3., most of the study respondents had less work experience. Those with service years of 1-2 years took the lead, comprising 39 (37.9%) of the respondents followed by those with a 6-months to 1 year experience, 24 (23.3%). In contrast, those with more work experience constitute a lesser portion of the study respondents. In summary, 20.7% of the respondents had a work experience of 5 years or more.

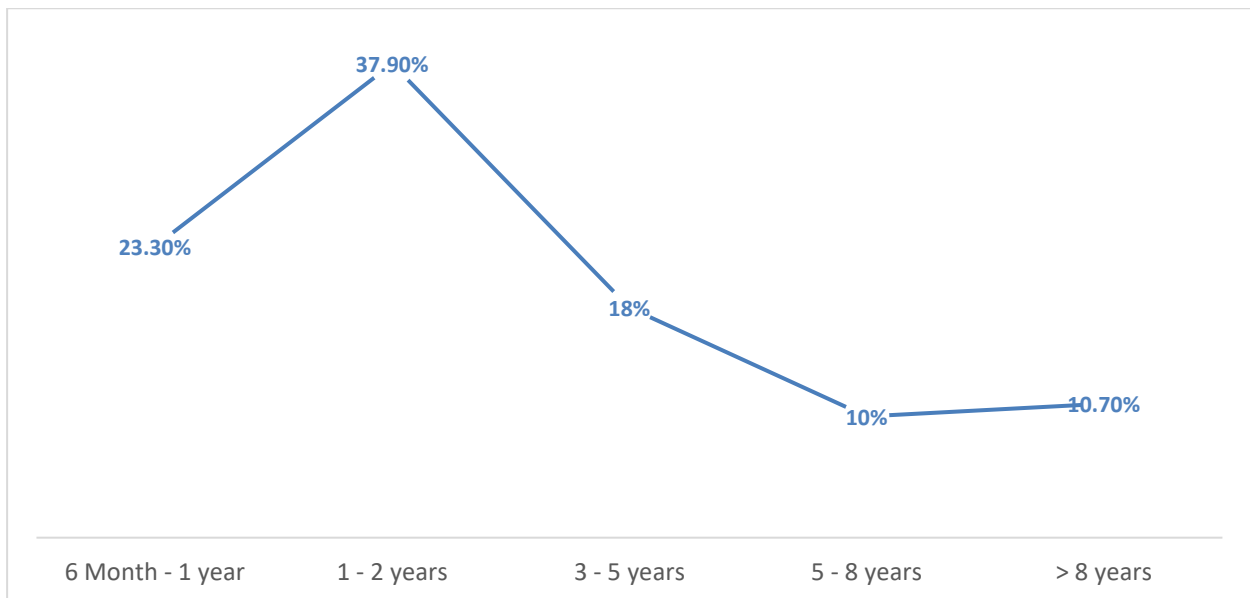


Figure 5.3 Service time of study respondents

The fourth variable of the basic data assessment was the source of knowledge and skill required for diagnosis and treatment of eye-care. The responses of the respondents were divided into four groups. Table 5.3 presents the details. The source of knowledge and skills for diagnosis and treatment for the majority 47 (45.6%) of the respondents was their pre-service or university or college courses. The second source of knowledge and skill was on-the-job training as reported by 34 (33%) respondents, followed by postgraduate supplementary training, which was the source of knowledge and skill for 12 (11.7%) respondents. The finding of this study is consistent with a study conducted in Ethiopia where pre-service and on-the-job training was the source of knowledge for 52% and 48% of the respondents respectively (Hailu et al 2010:129).

More than half (57,53%) of the study respondents reported that they had never received training in primary eye-care despite providing basic eye-care services. This finding is higher than one from Malawi where nearly 30% of primary eye-care service providers did not have basic training in eye-care (Kalua et al 2014:8). The proportion of trained personnel in the study area was much lower than that of service providers in Pakistan where 89.6% of primary health care workers received training in primary eye-care (Rehman & Sharif 2021:161).

Of those who received additional or on-the-job training, 19 (18.4%) were trained once, 12 (11.7%) were trained twice, and 15 (14.6%) were trained three or more times. As indicated in Table 5.3 below, of the trained respondents, 26 (25.2%) reported having

received their training in the past two years. This finding is consistent with the results of a study conducted in Kenya, Malawi, and Tanzania where 35.3% of professionals were providing primary eye-care services without training (Kalua et al 2014:3; Aghaji et al 2018:3). Each government and NGO were reported equally, by 44 (42.7%) of the study trained respondents as supporters of their eye-care training. Of the respondents, 15 (14.6%) reported that they self-supported their eye-care training.

Table 5.3 Source of knowledge and skill in diagnosis and treatment, training rounds, and time of the last basic result (refresher training) of the study respondents

Category		Frequency	Valid percent	N
Source of knowledge				
Valid	College/University training	47	45.6	103
	Post-graduate supplementary training	12	11.7	
	On-job training	34	33.0	
	Professional colleagues	10	9.7	
Rounds of eye-care training				
Valid	Once	19	18.4	103
	Twice	12	11.7	
	Three and more than three	15	14.6	
	Never (only as part of my college/University mandatory course)	57	55.3	
Time of last basic (refresher) training				
Valid	Less than 6 months	13	12.6	103
	6 months - 1 year	13	12.6	
	1 - 2 years	8	7.8	
	3 - 4 years	4	3.9	
	> 5years	8	7.8	
	NA	57	55.3	
Who supported the training				
Valid	Government	44	42.7	103
	NGO	44	42.7	
	Self	15	14.6	

(Exported from IBM SPSS V 28)

The last variable in the basic data of the study respondents was the average number of patients seen per month. As presented in Figure 5.4 below, the majority of study respondents, 59 (57.3%) reported providing primary eye-care services for less than 10 patients on average each month. One-fourth of the respondents stated that they diagnose and treat 11-30 patients per month, and only eight (7.8%) of the respondents reported seeing an average of 50 or more patients per month. This finding is similar to a study

result from Tanzania in which PECWs see less than one patient per week (Byamukama & Courtright 2010:250). Figure 5.4 below shows the average number of patients with eye complaints seen by study respondents per month.

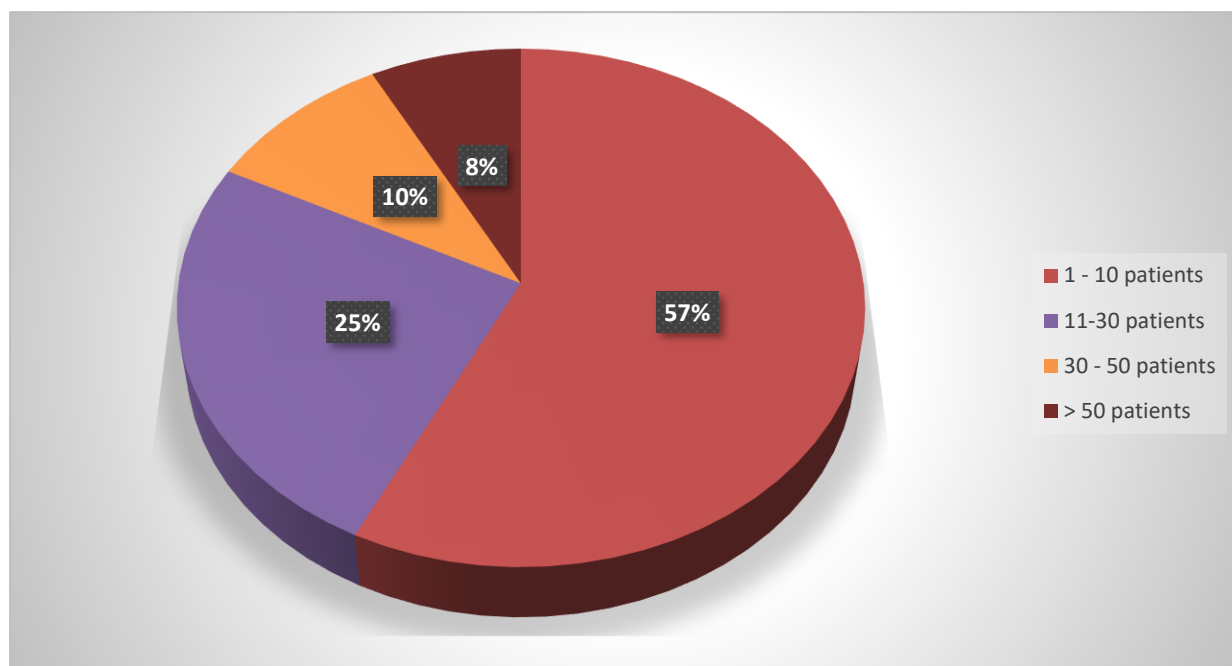


Figure 5.4 Number of patients seen by study respondents per month (N=103)

5.3.2 Result of the knowledge assessment

In this section, 14 variables were used to assess the knowledge of the study respondents. For ease of assessment, the variables were classified as key indicators of PEC service provision. The variables were drawn from the WHO training guideline for African region (Gilbert et al 2021:70). In these definitions, integrated primary care and public health service services refer to the identification and management of common ocular morbidities and accurate diagnoses and referral of complex conditions. Primary eye-care workers are expected to diagnose and treat common eye conditions, diagnose other conditions, describe possible interventions, and support patients in decision-making (Moyegbone et al 2020:3; Vision for Africa 2014:13).

In this knowledge assessment, variables related to preventive, promotive, curative, and rehabilitative primary eye-care activities were incorporated and presented in five sub-sections of knowledge of the standard definition of blindness, knowledge of Trachoma,

conjunctivitis, identification and management, urgent referral and basic components of primary eye-care services.

5.3.2.1 Definition and causes of blindness

Study respondents were requested to identify the correct WHO-endorsed definition of blindness in the self-administered questionnaire used to assess the knowledge and skills of PEC service providers in the four districts of the Southern Omo Zone, Ethiopia. The result showed that only 27 (26.2%) of the study respondents correctly defined blindness as the inability to see 3/60 in the better eye with the best possible correction (WHO 2019a:4). This result is slightly higher than the result of a study done in Ethiopia, where 87% of the study respondents were found not knowing of the standard definition of blindness (Hailu et al 2010:127). The level of training received by the study respondents and the engagement of diverse health professionals during this study were identified as a reason for the good understanding of the working definition of blindness.

Most of the study respondents, 59 (57.3%) defined blindness as loss of light perception. Similarly, blindness was reported as the inability to see in front, by 28 (27.2%) respondents, and 7 (6.8%) respondents reported that they did not know the working definition of blindness. Table 5.4 presents the definition of blindness as identified by the study respondents.

Table 5.4 Definition of blindness as described by study respondents

Category	Yes		No		N
	Frequency	%	Frequency	%	
Blindness is loss of light perception	59	57.3	44	42.7	103
Blindness is the inability to see in front	28	27.2	75	72.8	
Blindness is the inability to see 3/60 in the better eye with the best possible correction	27	26.2	76	73.8	
I don't know	7	6.8	96	93.2	

The second variable used during this study was the causes of blindness in children. As presented in the bar graph below, study respondents selected one or more of the common causes of blindness in children. Therefore, 70 (68%) of the study respondents reported Vitamin A deficiency. Similarly, Trachoma, measles, and trauma were reported as causes of blindness in children by 45 (43.7%), 40 (38.8%), and 29 (28.2%) respondents

respectively. The use of traditional medicine was also reported by 15 (14.6%) respondents as a cause of blindness in children.

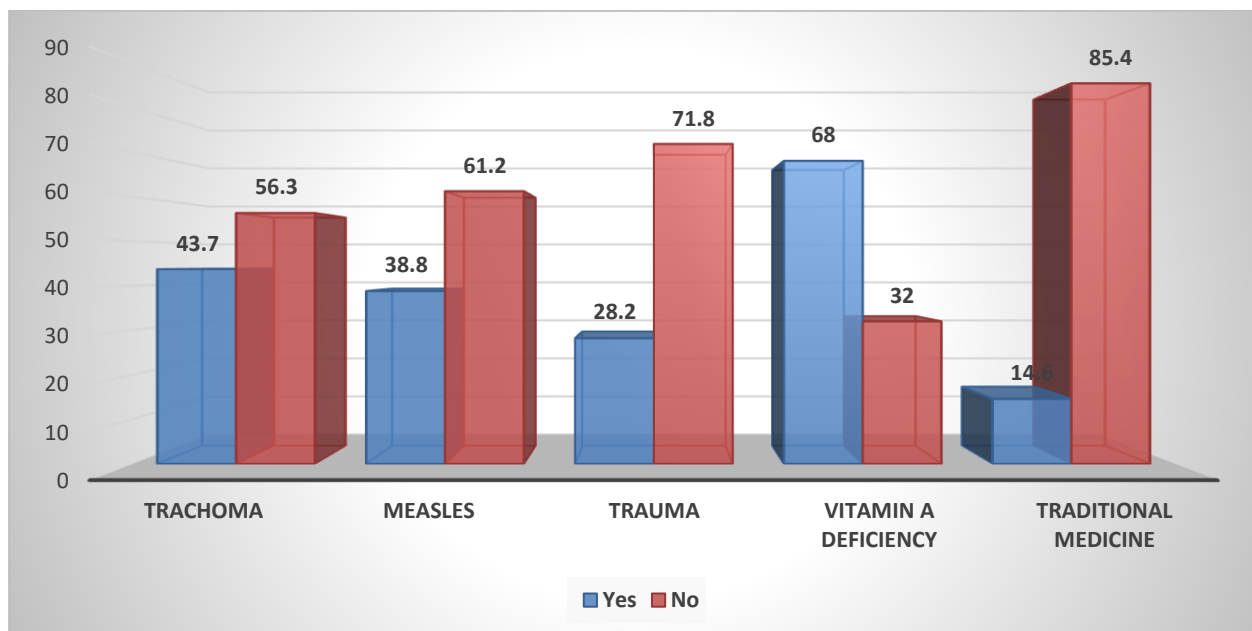


Figure 5.5 Causes of blindness in children, as described by study respondents (N=103)

In summary, 72 (69.9%) of the study respondents correctly chose at least three of the five (60%) leading causes of blindness in Ethiopian children (Hailu et al 2010:129).

5.3.2.2 Trachoma: Identification and management

Four variables were used to assess knowledge of Trachoma identification and management. Ethiopia has a high burden of Trachoma and most primary eye-care units should provide Trachoma-related services to most of the facility users (Ethiopian Ministry of Health 2016:16). The variables used were the identification of risk factors for Trachoma, signs and symptoms, and prevention strategies for Trachoma, and indication for Trachomatous Trichiasis surgery.

5.3.2.2.1 Identification of risk factors for Trachoma

Study respondents were asked to identify risk factors for Trachoma during a self-administered questionnaire-based evaluation. Consequently, 76 (73.8%) found poor sanitation, 42 (40.8%) flies, 36 (35%) crowded living conditions, 28 (27.2%) age, and 28 (27.2%) sex as risk factors for contracting Trachoma. This result is consistent with a study

conducted to assess the knowledge and skills of PEC service providers in northern Nigeria (Abdul Rahman, Rabiou & Alhassan 2015:768). The assessment result is shown below in Table 5.5.

Table 5.5 Risk factors for Trachoma as identified by study respondents

Category	Yes		No		N
	Frequency	%	Frequency	%	
Crowded living conditions	36	35.0	67	65.0	103
Poor sanitation	76	73.8	27	26.2	
Flies	42	40.8	61	59.2	
Age	28	27.2	75	72.8	
Sex	28	27.2	75	72.8	

In summary, only 36 (35%) of the respondents correctly identified at least three of the five (60%) risk factors for Trachoma in the study area (Hailu et al 2010:130).

5.3.2.2 Identification of signs and symptoms of Trachoma

The second variable used to assess the knowledge of Trachoma was the identification of signs and symptoms of Trachoma. The result is shown in Table 5.6.

Table 5.6 Result of the assessment of signs and symptoms of Trachoma

Category	Yes		No		N
	Frequency	%	Frequency	%	
Mild itching and irritation of the eyes and eyelids	28	27.2	75	72.8	103
Eye discharge containing mucus or pus	53	51.5	50	48.5	
Eyelid swelling	22	21.4	81	78.6	
Light sensitivity (photophobia)	50	48.5	53	51.5	
Eye pain	32	31.1	71	68.9	
Eye redness	37	35.9	66	64.1	

The result of the evaluation of the signs and symptoms of Trachoma presented in Table 5.6 above showed that eye discharge containing mucus or pus was the number one sign and symptom identified by 53 (51.5%) of the study. The second sign and symptom repeatedly recognised by the study respondents was light sensitivity (photophobia), which was indicated by 50 (48.5%). Thirty-seven (35.9%) and 32 (31.1%) of the respondents identified redness and pain in the eye.

In summary, 33 (32%) respondents correctly acknowledged at least four of the six clinical features of Trachoma in the study area. The knowledge of primary eye-care workers about the correct signs and symptoms of Trachoma in the study area was below a similar study result in the Gurage Zone of Ethiopia, where 89% of the study respondents correctly identified the clinical features of Trachoma (Hailu et al 2010:127).

5.3.2.2.3 Identification of the Trachoma elimination strategy

The WHO proposed a four-component strategy: surgery, antibiotics, facial cleanliness, and environmental hygiene (SAFE) to eliminate Trachoma (WHO 2022d:48). Respondents in the study were asked to verify this strategy. Consequently, 71 (68.9%) of the study respondents correctly recognised this strategy. This finding is higher than in the Gurage study, where only 10% of the study respondents acknowledged the strategy (Hailu et al 2010:127). Figure 5.6 presents the summary response of the Trachoma Elimination Strategy.

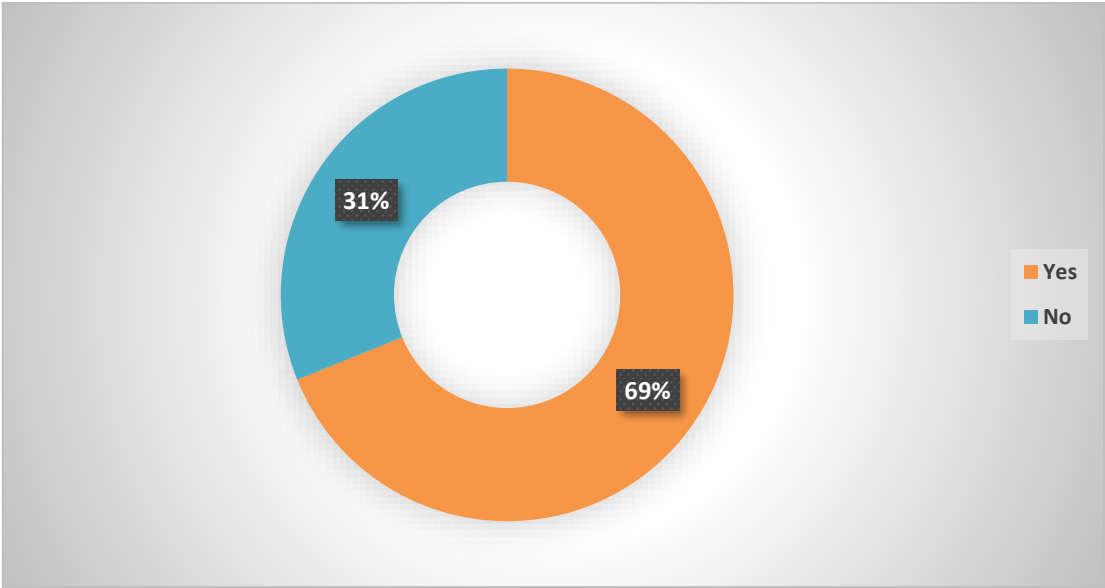


Figure 5.6 Respondents response to the Trachoma elimination strategy (N=103)

5.3.2.2.4 Identification of the indication for Trachomatous Trichiasis

In the self-administered questionnaire, study respondents were asked to identify what infectious misdirected (turned inward) eyelashes indicated. Most, 81%, of the study respondents identified the correct answer, Trachoma. Conjunctivitis, I don't know, and cataracts took the rest of the respondent's answer order and was recognised by 14%,

3%, and 2% of the study respondents, respectively. The finding is consistent with the result of a study conducted in Nigeria in which 83.1% of the respondents correctly identified Trachoma (Abdulrahman et al 2015:768). Figure 5.7 below shows the causes of misdirected eyelashes, as described by study respondents.

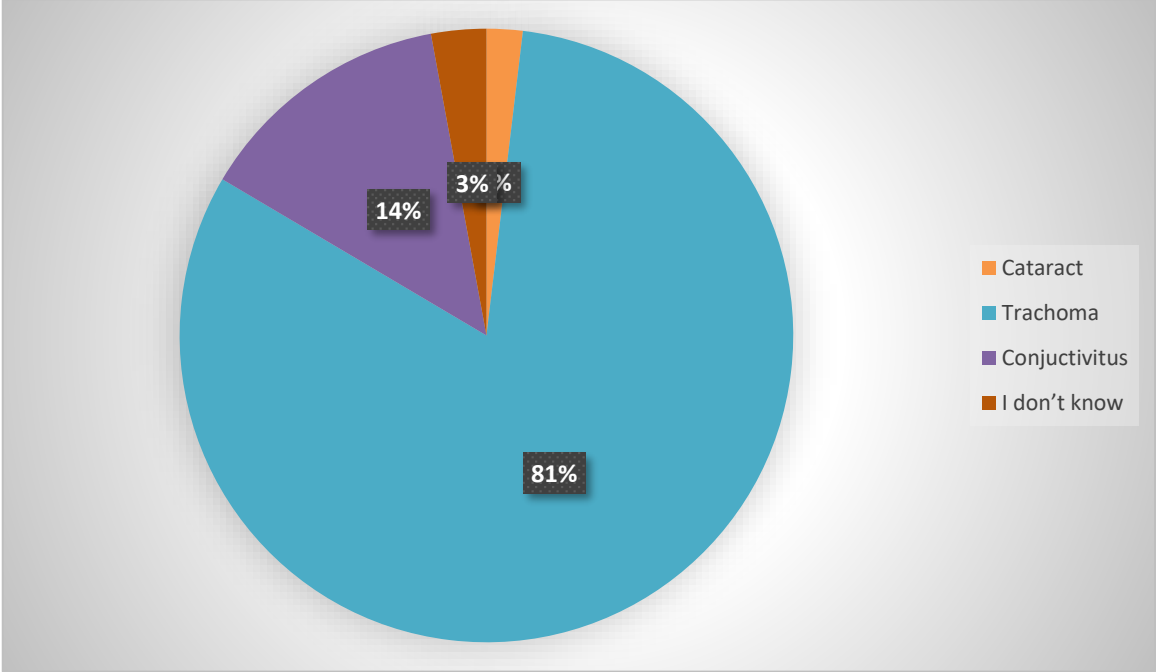


Figure 5.7 Respondent answers to cause of misdirected eyelashes (N=103)

5.3.2.3 Cataracts: Case identification and management

As part of the knowledge assessment, respondents evaluated three cataract-related variables for the detection, causes, and risk factors of cataract cases.

5.3.2.3.1 Cataract case identification

Study respondents were asked to discover what a white pupillary reflex means in children. Consequently, 70 (68%) correctly identified Cataracts (congenital), 22 (21.4%) considered them Glaucoma, eight (7.8%) of the study respondents selected night blindness, and three (2.9%) of the study respondents reported not knowing about them. This finding is relatively higher than the finding in Pakistan, where 55.7% identified cataracts, red eye, and is Glaucoma, and consistent with a study result in Tanzania where 67.3% of respondents correctly identified cataracts (Byamukama & Courtright 2010:250; Rehman & Sharif 2021:161).

The second variable used during the evaluation was the request to identify the painless causes of loss of vision. The result of the evaluation is presented in Figure 5.8 below. Consequently, most of the study respondents correctly identified cataracts (57.3%) and Glaucoma (39.8%) as the causes of loss of vision without pain (Rehman & Sharif 2021:161).

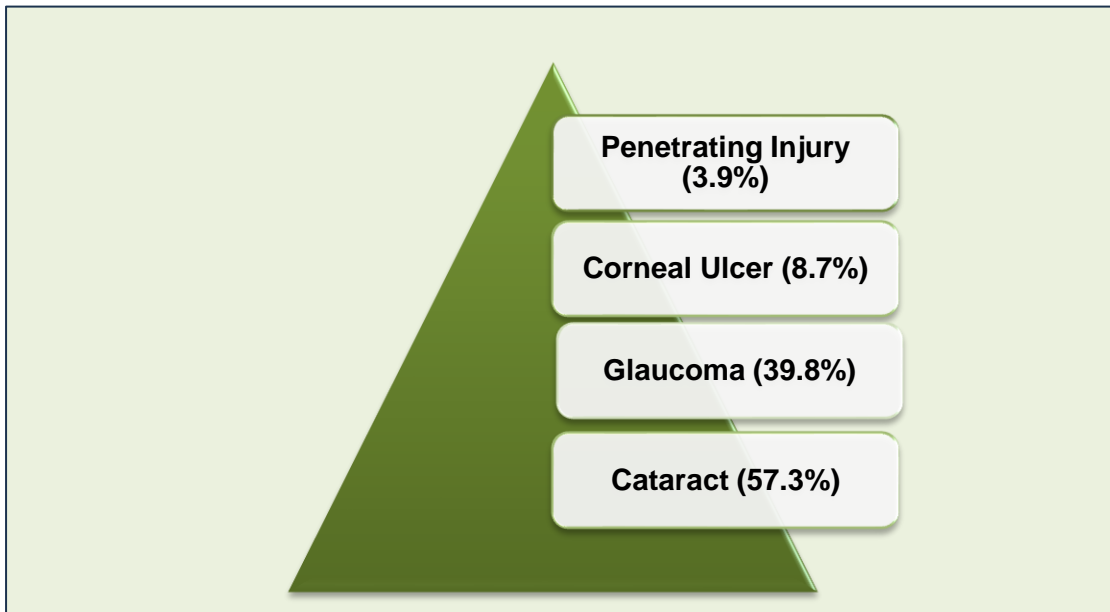


Figure 5.8 Respondent answers for the causes of vision loss without pain (N=103)

** - The sum of the responses was above 100% due to the multiple causes identified by the respondents

5.3.2.3.2 Risk factors for cataracts

Study respondents were asked to identify risk factors for cataracts during the current study. The result is shown in Figure 5.9. Most of the study respondents, 78 (75.7%), branded age as a risk factor. Other, 36 (35%), 29 (28.2%), and 22 (21.4%) respondents recognised diabetes mellitus, excessive exposure to sunlight, and high blood pressure, respectively. Similarly, 21 (20.4%) respondents recognised smoking, and 15 (14.6%) respondents identified obesity.

The evaluation result confirmed that only 24 (23.3%) of the respondents identified at least four of the six common risk factors for cataracts. The finding of this study is lower than

the result of a study carried out in Malawi, which reported that 34% of the respondents correctly identified risk factors for cataracts (Kalua et al 2014:3).

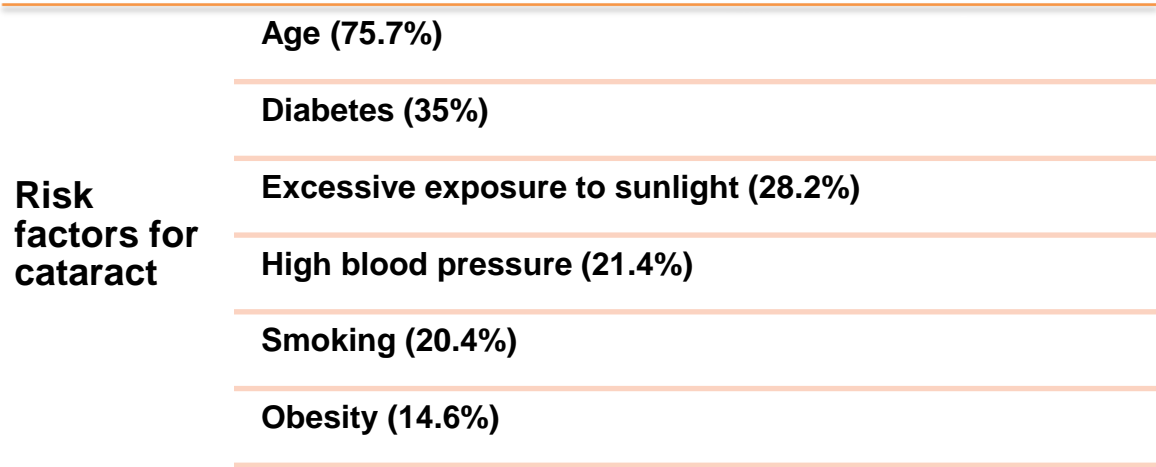


Figure 5.9 Respondent answers for risk factors for cataracts (N=103)

** - The sum of responses was above 100% due to the multiple risk factors identified by the study respondents.

5.3.2.4 Conjunctivitis and night blindness

As part of the knowledge assessment, mid-level healthcare workers providing primary eye-care services in the study area were asked to identify the leading cause of night blindness and the treatment of conjunctivitis. Study respondents labelled Vitamin A deficiency as the leading cause of night blindness in children. Accordingly, 89 (86.4%) correctly identified Vitamin A deficiency and 13 (12.62%) respondents identified the malnourished mother as the cause of night blindness.

Similarly, study respondents were encouraged to identify first-line treatment of Conjunctivitis at the PECU level. Of the respondents, 67 (65.7% of the valid %) correctly identified the medication as a treatment for Conjunctivitis. This result is consistent with a result of a study conducted in Tanzania, where 67.3% of the study respondents correctly identified the treatment of Conjunctivitis (Byamukama & Courtright 2010:250). The responses of the assessment respondents are presented below in Figure 5.10.

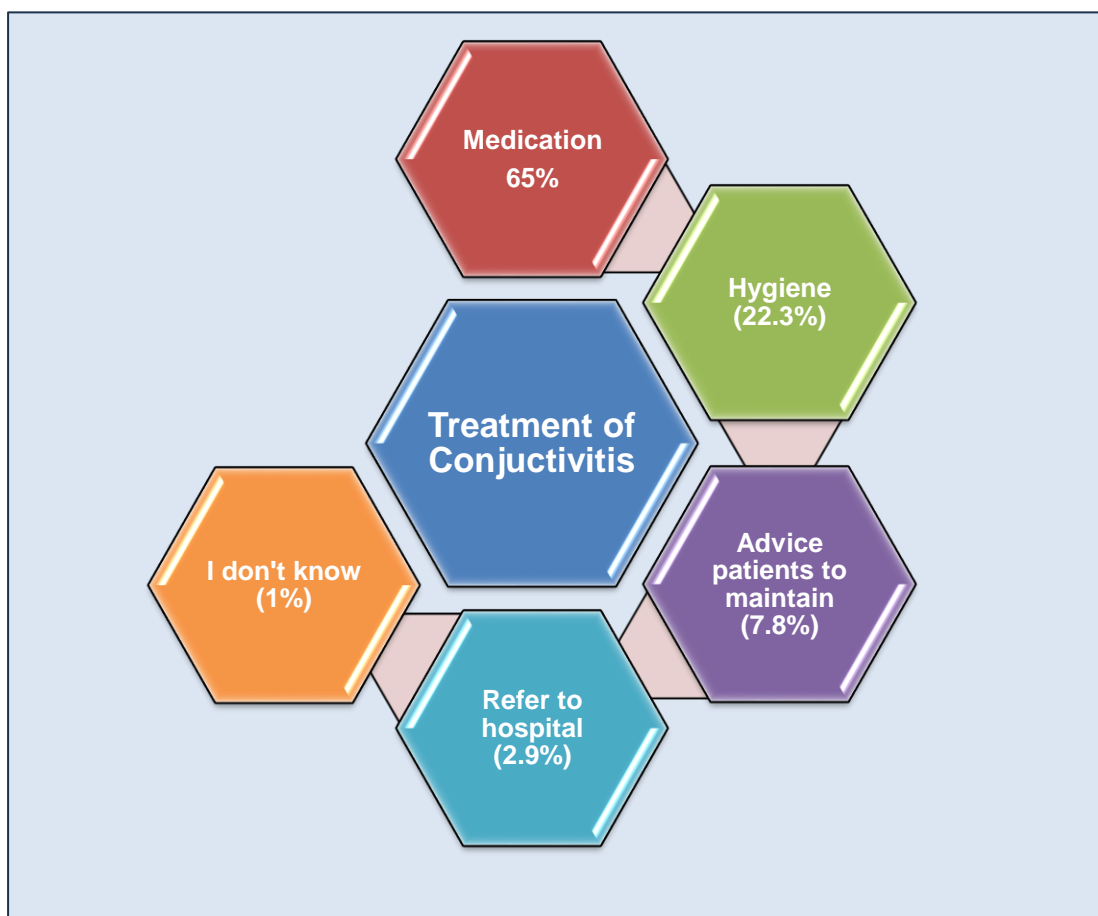


Figure 5.10 Response of study respondents to the treatment of conjunctivitis (N=103)

5.3.2.5 Need for referral

During the current study, respondents were provided with two case scenarios to identify the need for referral. The first scenario was the case of a two-week-old baby with a swollen eye and discharge of pus. Respondents were asked to identify the correct management of the case. More than half, 55 (53.9%) said starting antibiotics with eye drops and referring after 3 days if no improvement was the correct treatment, and 30 (29.4%) said starting antibiotics immediately and referring as correct case management. Eleven (10.8%) respondents pointed out referral to a local healer. In summary, as described in Table 5.7 below a third of the study respondents correctly found the need for referral.

Table 5.7 Response of study respondents to the need for referral

Category	Frequency	Valid percent	N	
Valid	Clean the eye counsel and send home	5	4.9	103
	Start antibiotics immediately and refer	30	29.4	
	Give steroid injection only	1	1.0	
	Start antibiotic eye drops and refer after 3 days if no improvement	55	53.9	
	Refer immediately to the native doctor as this is witchcraft	11	10.8	
	System missing	1		
	Total	103	100.0	

The second variable used in this study was the identification of the need for urgent referrals. Study respondents were asked to identify the need to urgently refer to lists of common ocular conditions. The vast majority, 84 (82%) of the respondents, selected chemical eye injury that needs urgent referral followed by 9 (9%) who selected red eye with pain. Red eyes with discharge and red eyes with itching were nominated by seven (7%) and two (2%) of the respondents, respectively (Akwataghibe, Samaranayake, Lemiere & Dieleman 2013:387). Figure 5.11. presented the responses of the study respondents to the need for urgent referral.

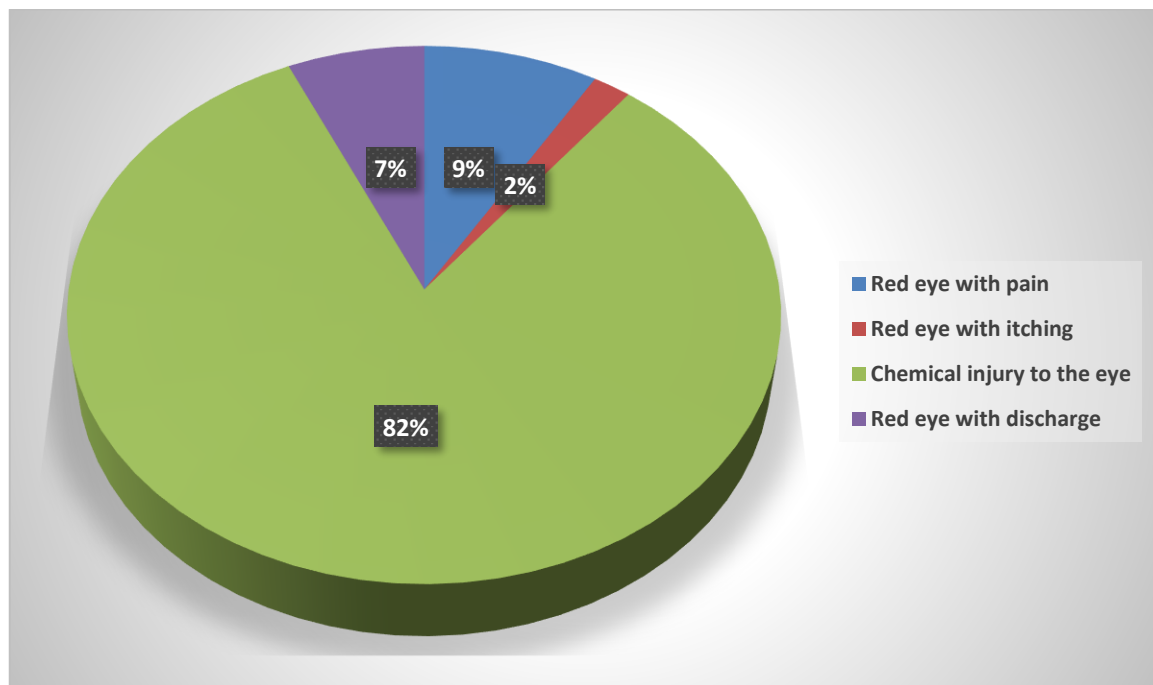


Figure 5.11 Need for urgent referral (N=103)

5.3.2.6 Provision of primary eye-care services

The last variable of the knowledge assessment was the need to provide PEC services. Study respondents were asked to identify why PEC services should be provided to the rural community and select one or more reasons. Their choices are presented in Table 5.8. below.

Table 5.8 Response of study respondents to the need to provide a primary eye-care service in the study area

Category	Frequency	Valid percent	N
Bring quality eye-care closer to the people			
Yes	40	38.8	103
No	63	61.2	
Reduce the patronage of untrained providers for eye-care services			
Yes	18	17.5	103
No	85	82.5	
Reduce the incidence of avoidable blindness at the grassroots			
Yes	35	34.0	103
No	68	66.0	
Prevent people from using harmful substances in the eye			
Yes	41	39.8	103
No	62	60.2	
Ensures early diagnosis and referral before a condition becomes serious			
Yes	64	62.1	103
No	39	37.9	

As presented in Table 5.8. above, 64 (62.1%) of the study respondents believed that the provision of primary eye-care services warrants early diagnosis and referral. The second reason that was largely identified was to prevent the community from using harmful substances in the eye, which was selected by 41 (39.8%) respondents. The third reason was related to access; 40 (38.8%) of the respondents believed that PEC would support providing quality eye-care services to the community. Thirty-five (34%) of the respondents think that primary eye-care can decrease the occurrence of blindness in the community and 18 (17.5%) considered that it will reduce the number of untrained eye-care service providers (Moyegbone et al 2020:3).

5.3.3 Result of the skill assessment

The provision of medical and surgical treatment was among the key tasks of a primary eye-care service provider. The community needs to receive basic eye-care services in the vicinity, including minor surgical remedies for ocular problems (Gilbert et al 2021:70). During this study, 10 variables derived from the WHO clinical skill protocol for PECWs were used to assess the skills of study respondents (WHO 2018a:49). The details of the study findings are presented and discussed in three sections: instrument usage skill, ability to perform procedures, and basic skills required from a primary eye-care worker.

5.3.3.1 Instrument usage skill

The first skill-related variable used for the assessment of was the instrument needed to evert the upper eyelid. The study respondents chose different responses. Thirty-six (35%) of the study respondents selected a gauze wad, followed by a clean cotton bud from 33 (32%) respondents. The screwdriver was selected by 21 (20.4%) respondents. Thus, only 32% of the study respondents correctly identified the instrument required to evert the upper eyelid. This result is consistent with a study done in Nigeria (Aghaji et al 2018:4).

The second variable used to assess the skill of the study respondent was an instrument required to remove a misdirected eyelash. As displayed in Figure 5.12. Most of the study respondents, 61 (59.2%), correctly recognised the epilation forceps. The remaining options of an ophthalmoscope, scissors, and a syringe were detected by 19.4%, 7.8%, and 1.9% of the respondents as an instrument to remove misdirected eyelashes, respectively.

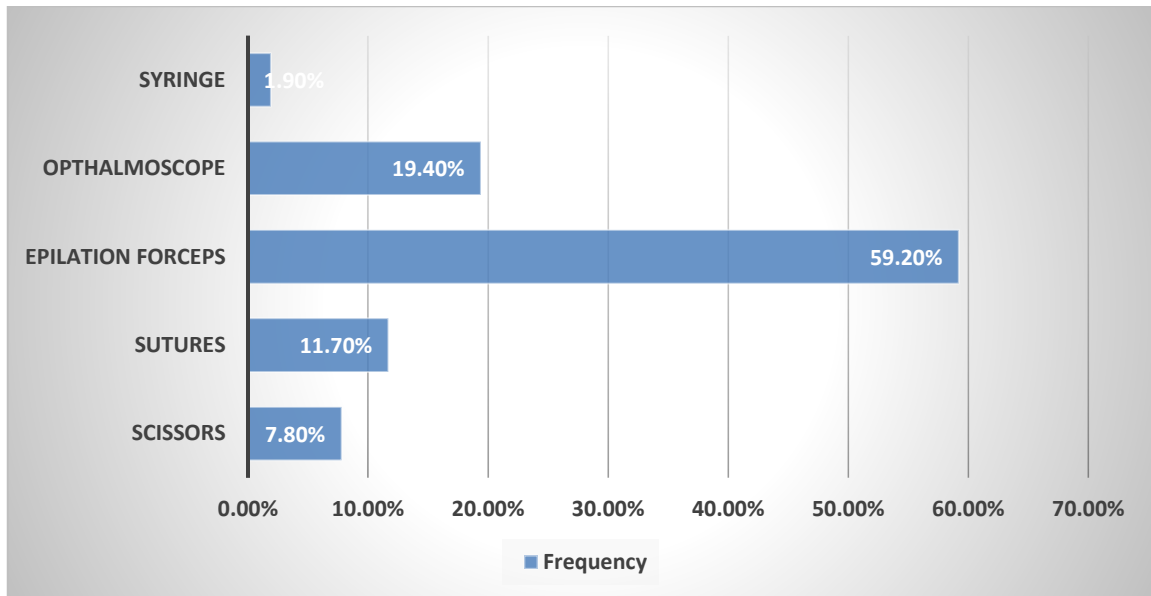


Figure 5.12 Respondent response on the instrument required to remove a misdirected eyelash (N=103)

Identifying the correct instrument needed to remove foreign bodies from the eye was the third variable used in this study. Consequently, 56 (54.4%) study respondents correctly identified the cotton bud as the instrument needed to remove foreign bodies from the eye. Scissors, fingernails, and broom were identified by 18 (17.5%), 17 (16.5%), and 8 (7.8%) of the respondents, respectively. Figure 5.13. presents the responses.

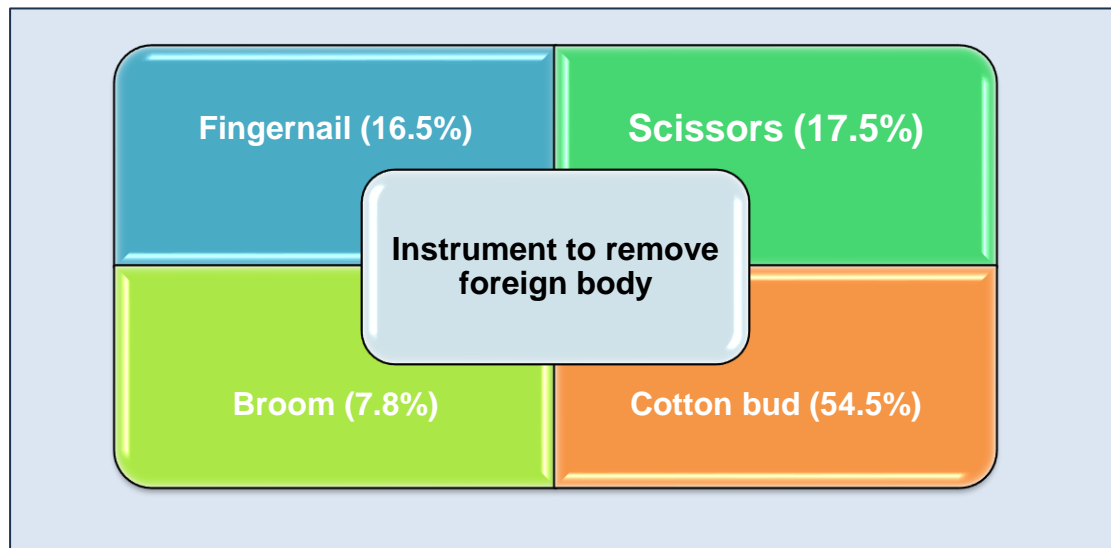


Figure 5.13 Study respondents response to the instrument needed to remove a foreign body (N=103)

5.3.3.2 Skill in performing procedures

To assess the performance skills of primary eye-care workers in procedures, five variables were used. First, study respondents were asked to identify the correct procedure to follow in the event of an acid burn to the eye. As described in Table 5.9 below, nearly three-quarters of the respondents, 76 (73.8%) correctly identified the procedure to follow during an acid burn to the eye: wash with plenty of water and refer (Graham 2017:85). Of the incorrect choices, 16 (15.5%) respondents responded that padding the eye and referring was the correct procedure.

Table 5.9 Response of study respondents to the correct procedure to follow during an acid burn

Category		Frequency	Valid percent	N
Valid	Apply antibiotic drops and send them home	8	7.8	103
	Pad the eye and refer	16	15.5	
	Give analgesics only	3	2.9	
	Wash with plenty of water and refer	76	73.8	
	Total	103	100.0	

The second variable for the evaluation of skills related to the procedure used during this study was what to use for irrigation. The respondents selected different fluids. Consequently, 76 (73.8%) of the respondents selected saline for irrigation. Fifty-five (53.4%) of the study respondents chose clean water. In summary, 97.1% of the study respondents correctly identified saline or clean water and or both as a fluid to use for irrigation (Burn et al 2020:165).

The third skill-related assessment request was to identify the correct procedures to be followed by a caregiver while instilling eye drops in the eye. Accordingly, 68 (66%) of the respondents said that the caregiver should wash their hands before pouring eye drops. Similarly, 53 (51.5%) identified installing drops into the correct eye as the exact duty of a caregiver. The remaining respondents 48 (46.6%) identified that the caregiver should inform the patient about the task and 5 (4.9%) said that they should wipe away excess drops (Shaw 2016:34). Table 5.10 below presents the responses.

Table 5.10 Response of the study respondents to the task of a caregiver during eye drop instillation

Category	Yes		No		N
	Frequency	%	Frequency	%	
Wash their hands	68	66.0	35	34.0	103
Instilling the drops into the correct eye	53	51.5	50	48.5	
Should inform the patient about the task	48	46.6	55	53.4	
Wipe away excess drops	5	4.9	98	95.1	

The fourth variable for the assessment of skill related to the procedure was the identification for appropriate methods of detaching foreign bodies from the surface of the eye. Most of the study respondents identified the acceptable procedure of irrigating with water or removing with a cotton bud. The individual response to the procedure showed that 62 (60.2%) of the respondents identified irrigation with water and 56 (54.4%) identified removal with a cotton bud as an acceptable procedure to remove foreign bodies from the surface of the eye (Kalua et al 2014:2).

The identification of the correct measurement distance of visual acuity in a PECU was the last question The response of the study respondents is presented in Figure 5.14. The majority, 84 (81.6%) identified 6 metres as the correct distance to measure visual acuity. This verdict is much higher than a result of a study in Tanzania, where only 6% of the study respondents considered taking a visual acuity at 6 metres as the right distance (Byamukama & Courtright 2010:250).

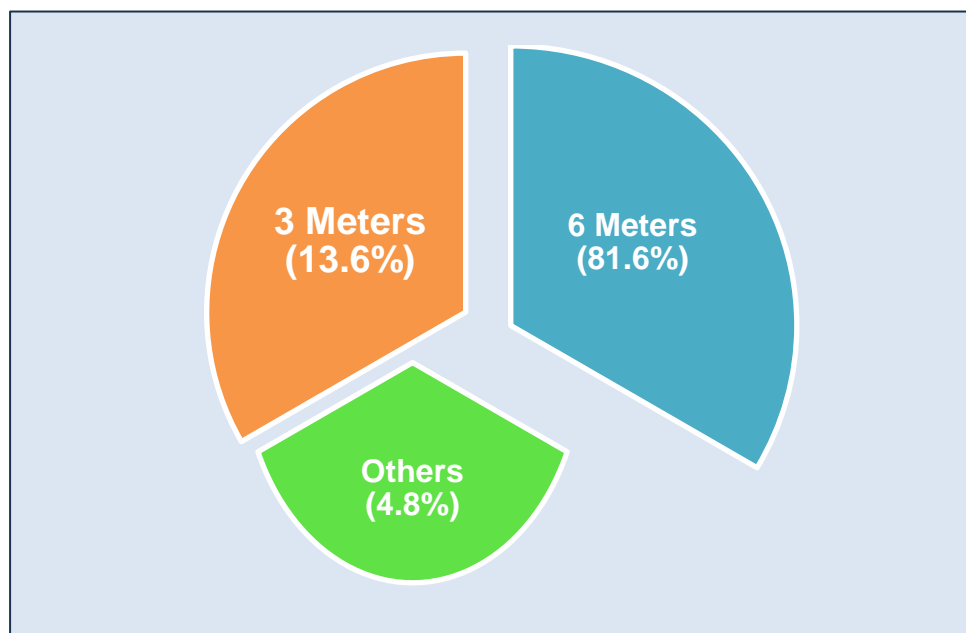


Figure 5.14 Answer for the correct distance to measure visual acuity (N=103)

5.3.3.3 Basic skills needed for a primary eye-care worker

The final variables of the skill evaluation were the identification of the basic skills needed from a primary eye-care worker in a health centre and the need to skip the detailed history. Respondents in the study were invited to identify the basic skills needed from a primary eye-care provider and selected one or more of the options presented adopted from the WHO training manual for the region of SSA (WHO 2018a:49).

The response of the study respondents is presented below in Figure 5.15. Screening was identified by 66 (64.1%) the study respondents, followed by health education and medical treatment, each of them was recognised by, 61 (59.2%), and 50 (48.5%) respondents, respectively. Provision of surgical treatment and referral was identified by 39 (37.9%) and 35 (34%) respondents.

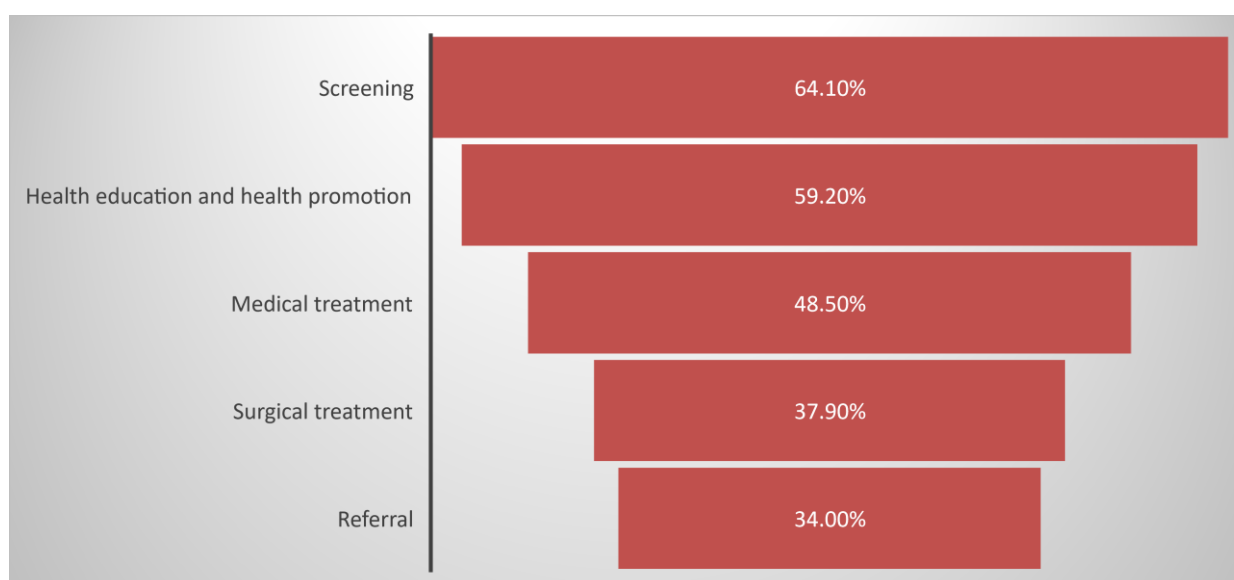


Figure 5.15 Response of study respondents to the basic skills needed from a primary eye-care worker (N=103)

** - The sum of responses was above 100% due to the multiple tasks identified by the respondents.

Study respondents were also asked to identify conditions in which to skip a detailed history of the four options presented. Only 28 (27.2%) of the study respondents correctly identified the ocular conditions in which they must skip a detailed history: chemical eye injury to the eye or burn. In segregation, 18 (17.5%) of the study respondents identified chemical injuries and 10 (9.7%) identified burns. Table 5.11. Presents the details of respondents' responses.

Table 5.11 Response of the study respondents for conditions to skip detailed history-taking

Category	Yes		No		N
	Frequency	%	Frequency	%	
Chemical injury to the eye	18	17.5	85	82.5	103
Burn	10	9.7	93	90.3	
Discharge in the eye	10	9.7	93	90.3	
Eye itching	8	8.7	95	91.3	

5.4 BIVARIATE AND MULTI-VARIATE LOGISTIC ANALYSIS RESULT

Logistic regression was performed to assess the association of the dependent variable with the independent variables. As presented above, a total of 22 variables were used to assess the knowledge and skills of mid-level healthcare workers providing primary eye-care services in the four districts of the Southern Omo Zone, Ethiopia. The respondents received a score of 0 for incorrect responses and a score of 1 for correct responses to each of the selected variables.

Consequently, the mean score for the knowledge and skill assessment was 13.63 with a standard deviation of 3.03. Of the study respondents, less than half (48.5%) were found to have intermediate level (good) knowledge and skills required from primary eye-care workers. This finding is relatively higher than a similar study conducted in Nigeria which showed that only 26.4% of CHWs who participated in knowledge and skill evaluation had a good score (Abdulrahman et al 2015:768).

The discovery of this study shows similar results to that from a study in Kenya which concludes that the presence of a skill gap among primary eye-care workers significantly affected utilisation in the study area (Med et al 2019:2). The overall result of the knowledge and skill assessment is consistent with a finding in three African countries. The result of a study conducted in Kenya, Malawi, and Tanzania reported that the skill of PECW is low, with a substantial fraction below the basic competence level (Kalua et al 2014:4).

5.4.1 Result of Bivariate analysis

Bivariate and multivariate logistic regression was performed to assess the association of the dependent variable, the knowledge, and skills of PECWs, with the independent variables of the study. During the bivariate analysis, seven independent variables were found to have an association with the dependent variable. These variables were education, profession, source of knowledge, rounds of eye-care training, time of last training, provider of eye-care training, and the average number of patients seen per month. Table 5.11 below presents the association of the knowledge and skills of primary eye-care workers with selected socio-demographic and basic data from study respondents.

Consequently, being an integrated eye-care worker [COR 9.33; 95% CI: 1.76–49.59] that has (P-value – 0.009), receiving on-the-job training [COR 16.5; 95% CI: 1.86–146.32] that has (P-value – 0.0012), receiving additional training [COR 45; 95% CI: 3.46–584.34] that has (P-value – 0.004), having two rounds of training [COR 6.00; 95% CI: 1.45–24.78] that has (P-value – 0.013), receiving three and more rounds of training [COR 13.00; 95% CI: 2.66–63.58] that have (P-value – 0.002) and serving more than 50 patients per month [COR 6.03; 95% CI: 2.09–17.35] that have (P-value – <0.001) were found to have a statistically significant association with good knowledge and skill of primary eye-care.

Similarly, training in 6 months to a year [COR 11.00; 95% CI 2.2 –54.71] has (P-value – 0.003), receiving training before 5 years [COR 6.00; 95% CI 1.10– 2.56] having (P-value – 0.038), being a graduate of the degree graduate [COR 7.29; 95% CI 3.01–17.69] having (P-value – <0.001) and receiving training in primary eye-care services supported by NGO [COR 5.32; 95% CI 1.44–19.57] that has (P-value – 0.012) was also found to have a significant association with good knowledge and skill of primary eye-care.

Bivariate analysis shows that having intermediate (good) knowledge and skills in primary eye-care is not associated with the age, sex, and marital status of the study respondents.

5.4.2 Multivariate analysis

During this stage of analysis, a multivariate approach was applied to identify factors that best explain and independently predict the knowledge and skills of the study respondents.

Accordingly, seven variables with a P-value <0.25 were selected as candidates for the multivariate analysis. The outcome of the final logistic regression model indicated that the profession, the rounds of eye-care training, the time of the last training, and the training provider have slipped out of the model. Only three variables maintained the model that showed a significant association with intermediate (good) knowledge and skills in primary eye-care services. These variables included receiving additional training, serving more than 50 patients per month, and having a first degree as shown in Table 5.12.

As shown in Table 5.12 below, the multivariate association showed that receiving additional training (P-value – 0.005), serving more patients per month (P-value – <0.001), and having a first degree (P-value – <0.001) had a significant statistical association with intermediate (good) knowledge and skill. On the other hand, the rest group had no statistically significant association with the dependent variable.

Therefore, those who served more than 50 patients per month were 25.44 [AOR 25.44; 95% CI 4.06–159.45] times more likely to have correct knowledge and skill in primary eye-care than those who served 1 to 10 patients per month. Similarly, those who received supplementary training were 100.5 [AOR 100.49; 95% CI: 3.96–2,551.58] times more likely to have the correct knowledge and skill of primary eye-care than those who learnt primary eye-care service provision from their professional colleagues. The final variable confirmed that having a statistically significant association with intermediate (good) knowledge and primary eye-care was having a first degree. Those with a first degree were 23.92 [AOR 23.92; 95 % CI 4.88–117.23] times more likely to have intermediate (good) knowledge and skills in primary eye-care services than holders of diplomas.

Table 5.12 Bivariate and multivariate analysis of the knowledge and skills of primary eye-care workers in four districts of the Southern Omo Zone, Ethiopia

Variables	Knowledge and skills of PECWs		COR (95% CI)	AOR (95% CI)
	Yes	No		
Profession				
Others	5	7	1.0	1.0
Public nurse	1	7	0.20 (0.02–2.18)	0.3 (0.15–5.92)
Health officer/BSc Nurse	15	20	1.87 (0.49–7.05)	2.72 (0.69–107.96)
IECW	20	3	9.33 (1.76–49.59) *	0.65 (0.63–6.65)
General nurse	4	21	0.27 (0.06–1.28)	0.18 (0.01–6.58)
Source of knowledge				
Professional colleagues	1	9	1.0	1.0
On job training	22	12	16.5 (1.86–146.32) *	2.68 (0.25–28.75)
Supplementary training	10	2	45 (3.46–584.34) *	100.49 (3.96–2,551.58) **
Pre-service training	17	30	5.10 (0.59–43.78)	10.43 (0.90–120.46)
Rounds of eye-care training				
Once	9	10	1.80(0.63–5.17)	0.83 (0.00–18.69)
Twice	9	3	6.00 (1.45–24.78) *	0.14 (0.00–79.62)
Three or more times	13	2	13.00 (2.66–63.58) *	0.09 (0.00–33.59)
Never	19	38	1.0	1.0
The average number of patients seen per month				
1-10	21	38	1	1
11-30	20	6	3.02 (0.66-13.89)	10.81 (0.73–159.09)
30-50	4	6	1.21 (0.31–4.76)	0.83 (0.12–6.06)
Above 50	5	3	6.03 (2.09–17.35) *	25.44 (4.06–159.45) **
Time of last training				
Less than 6 months	7	6	2.33 (0.68 -7.92)	10.86 (0.02–7,095.73)
6 months a year	11	2	11.00 (2.21–54.71) *	217.39 (0.52–91569.33)
1 year-2 years	4	4	2.00 (0.45-8.89)	0.14 (0.00–41.79)
3 years-4 years	3	1	6.00 (0.58-61.62)	4.04 (0.06–273.46)
Above 5 years	6	2	6.00(1.10-32.56) *	11.49 (0.03–5,104.69)
Not trained	19	38	1	1
Educational level				
Diploma	11	35	1	1
Degree	39	17	7.29(3.01–17.69) *	23.92 (4.88 -117.23) **
Master's and above	0	1	0.000	
Who supported the training				
Government	17	27	1.73 (0.47–6.32)	2.05 (0.20–20.64)
NGO	29	15	5.32 (1.44–19.57) *	0.19 (0.01– 7.66)
Self	4	11	1	1

* P-value < 0.25 in bivariate and ** P-value < 0.05 in multivariate

5.5 OVERVIEW OF THE RESULT OF KNOWLEDGE AND SKILL ASSESSMENT

During this study, different mid-level healthcare workers were found to provide PEC services. The source of diagnosis and treatment for eye-care for the majority 47 (45.6%) of the respondents was their pre-service training. The majority of the service providers

did not receive PEC training. In terms of service provision, most, 59 (57.3%), provide primary eye-care services to fewer than 10 patients per month, and only eight (7.8%) of the respondents reported seeing 50 or more patients each month.

The result of the knowledge assessment showed that only 27 (26.2%) of the study respondents correctly recognised the definition of blindness as the inability to see 3/60 in the best eye with the best possible correction, while the majority, 59 (57.3%) defined blindness as loss of light perception. Only 36 (35%) of the respondents correctly identified at least three of the five (60%) risk factors for Trachoma presented, and 33 (32%) respondents correctly recognised at least four of the six signs and symptoms of Trachoma in the study area. Most of the study respondents correctly identified the WHO-endorsed Trachoma Elimination Strategy.

Cataracts and Glaucoma were correctly identified by 57.3% and 39.8% of the study respondents as causes of loss of vision without pain. Only 24 (23.3%) of the respondents identified at least four of the six common risk factors for Cataracts in the study area. Of the respondents, 89 (86.4%) correctly identified the principal cause of night blindness, Vitamin A deficiency.

Skill assessment showed that only 32% of the study respondents correctly identified the instrument required to evert the upper eyelid. Most of the study respondents correctly recognised epilation forceps as an instrument to remove an inverted eyelash. Furthermore, 56 (54.4%) mid-level health workers detected the instrument needed to remove foreign bodies from the eye. Almost three-quarters of the respondents, 76 (73.8%) correctly mentioned the procedure to follow during an acid burn to the eye. The vast majority (91.3%) indicated the acceptable procedure of irrigating with water or removing with a cotton bud. A large number, 84 (81.6%) branded 6 metres as the correct distance to measure visual acuity. Only 29 (28.2%) of the study respondents correctly knew the ocular conditions in which they should skip a detailed history.

In summary, the knowledge and skill evaluation conducted in the four districts of the Southern Omo Zone in Ethiopia found that most of the study respondents did not have the necessary knowledge and skills to provide primary eye-care services. The mean score of the knowledge and skill assessment respondents was 13.63 of 22 selected variables with a standard deviation of 3.03. Of the study respondents, less than half

(48.5%) were found to have intermediate level (good) knowledge and skills required from primary eye-care workers. The multivariate association revealed that receiving additional training (P-value = 0.005), serving more patients per month (P-value <0.001), and having a first degree (P-value = <0.001) had a significant statistical association with intermediate knowledge and skill in primary eye-care.

Therefore, those who serve more than 50 patients per month were 25.44 [AOR 25.44; 95% CI: 4.06–159.45] times more likely to have correct knowledge and primary eye-care skills than those who serve 1-10 patients per month. Similarly, those who received additional training were 100.5 [AOR 100.49; 95% CI: 3.96–2,551.58] times more likely to have the correct knowledge and skill of primary eye-care than those who learnt from professional colleagues. Those with a first degree were 23.92 [AOR 23.92; 95 % CI 4.88–117.23] times more likely to have intermediate knowledge and skill in primary eye-care services than those with a Diploma.

5.6 RESULT OF EQUIPMENT, INFRASTRUCTURE, AND SERVICE DELIVERY ASSESSMENT (CHECKLIST)

A checklist adopted by the WHO was used to assess the readiness of primary eye-care units in the four districts of the South Omo Zone, Ethiopia (WHO 2018b:72; Topp, Abimbola, Joshi & Negin 2017:300). Accordingly, the equipment, infrastructure, and service delivery status of all primary eye-care units found in the study area were evaluated. The checklist had three sections, and the result displayed below is categorised into infrastructure, instrument, consumables, and equipment and service delivery sections.

A total of 32 primary eye-care units that met the set selection criteria were incorporated into the assessment: a public primary eye-care unit that provided service for at least six months, had at least one primary eye-care service provider and provided service routinely.

5.6.1 Infrastructure assessment

The presence of space to measure visual acuity, a visual acuity chart, a separate room for outpatient case detection and counselling, and a separate room for Trachomatous

Trichiasis (TT) surgery were evaluated as part of the infrastructure assessment of primary eye-care units in the study area. Table 5.13 shows the result of the assessment.

Table 5.13 Result of the evaluation of the infrastructure of the primary eye-care unit in the study area

Category	Yes		No		N
	Frequency	%	Frequency	%	
Space to measure visual acuity	23	71.9	9	28.1	32
Visual acuity chart	21	61.6	11	34.4	
Separate room for outpatient case detection and counselling	11	34.4	21	65.5	
Separate room for TT surgery	6	18.8	26	81.3	

As shown in Table 5.13, during the infrastructure assessment, 23 (71.9%) of the primary eye-care units were found to have a space to measure visual acuity. This result is lower than a study conducted in Nigeria to assess infrastructure, equipment, and service delivery status, which found that 90% of facilities had adequate visual acuity measuring space (Aghaji et al 2021a:4). A visual acuity chart, which is a key vital sign measurement tool for a primary eye-care worker, was available in 21 (61.6%) of primary eye-care units (WHO 2018b:36). Only 11 (34.4%) of the primary eye-care units had separate rooms for outpatient case detection and counselling.

Less than one-fifth, 6 (18.8%) of the primary eye-care units had a separate room for the provision of Trachomatous Trichiasis surgery. The result of this study is concurrent with a study result in South Africa that found that less than 10% of the eye-care units were found to have separate eye-care clinics staffed with 50% of the minimum human resource for eye-care according to the South African National Department of Health PHC Guidelines (Lilian et al 2018:4).

In summary, only 39.53% of the PECUs were found to have the minimum infrastructure standard of service provision. This finding is consistent with the conclusion of a study conducted in South Africa on primary eye-care, indicating the presence of poor eye-care infrastructure in the country (Lilian et al 2018:3). Figure 5.16 presents the summary result of the infrastructure assessment in a pie chart.

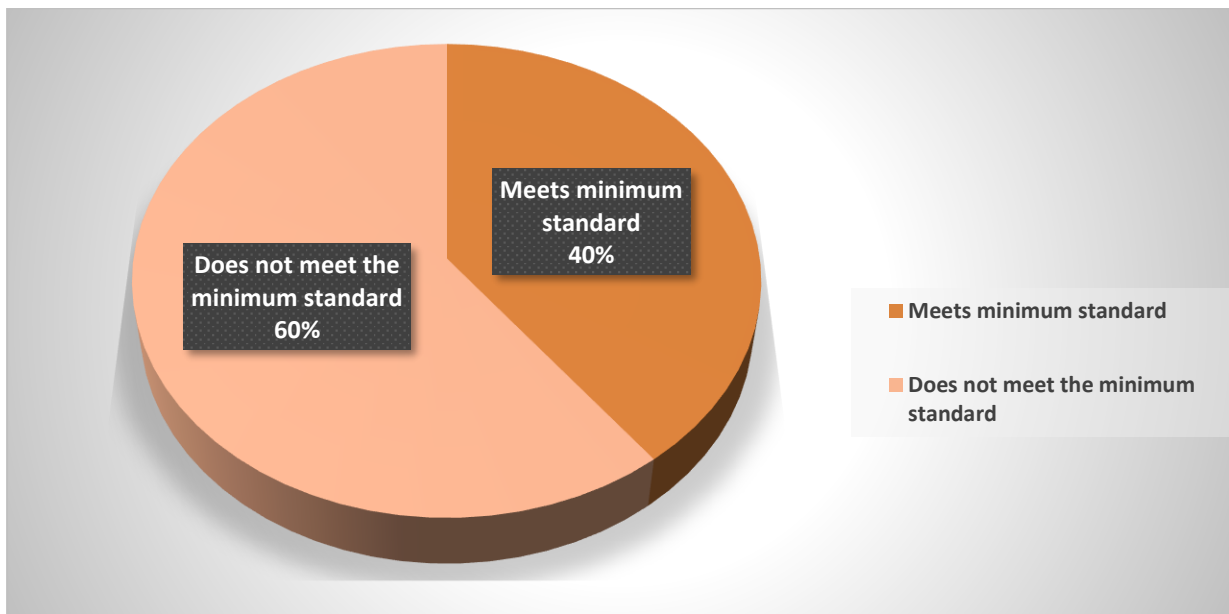


Figure 5.16 Summary of the evaluation of the results of the infrastructure of primary eye-care units (N=32)

5.6.2 Instruments, Consumables, and Equipment assessment

The indicators used in this section were mandatory instruments, consumables, and equipment to provide primary eye-care services, including TT surgery (WHO 2013:66). A total of 20 indicators were used, as shown in Table 5.13.

A minimum of three TT sets were available in 18 (56.3%) of the units covered in the assessment. A magnifying loop, stethoscope, and blood pressure apparatus were not available in most primary eye-care units. Only seven (21.9%), five (15.6%), and five (15.6%) had magnifying loops, stethoscopes, and BP apparatus, respectively. Basic surgical equipment such as stools, tables, bins, trays, and lights were available in less than half of the primary eye-care units assessed; 14 (43.8%) (Moyegbone et al 2020:5).

Medications mandatory for the prevention and treatment of Trachoma were available in sufficient amounts in most units. Tetracycline eye ointment was available in 30 (93.8%) units and Zithromax tablets were available in 20 (62.5%) units. Injectable lidocaine, which is mandatory for minor lid surgery, was available in 22 (68.8%) of the primary eye-care units covered in the evaluation. Paracetamol 500 mg, alcohol 90% and 10% povidone iodine solution were available in 15 (46.9%), 24 (75%) and 22 (68.8%) of primary eye-care units, respectively (Lilian et al 2018:13).

Half of the primary eye-care units, 16 (50%), had enough gowns, masks, and caps. Sterile drapes, sterile gauze, and sterile gloves were on hand at 15 (46.9%), 17 (53.1%), and 19 (59.4%) units correspondingly. A disposable syringe was available in 20 (62.5%) of the primary eye-care units during the study period (Ebeigbe & Oveneri 2014:99). Less than half of the units had sufficient suturing materials and adhesive tape. Interestingly, 12 (37.5%) and 14 (43.8%) primary eye-care units had suturing materials and adhesive tape during evaluation. More than half of the units had scalpel blades, 20 (62.5%), and enough torches/batteries, 19 (59.4%). The result of the current study is consistent with a study carried out in Nigeria (Aghaji et al 2021a:4).

Table 5.14 Results of instrument, consumables, and equipment assessment in four districts of south Omo, Ethiopia

Category	Yes		No		N
	Frequency	%	Frequency	%	
Sufficient TT sets (each kit containing instruments according to the available standard list available)	18	56.2	14	43.8	32
Magnifying loops	7	21.9	25	78.1	
Stethoscope	5	15.6	27	84.4	
Blood pressure apparatus	5	15.6	27	84.4	
Basic surgical equipment: stool, table, bins, tray, and light	14	43.8	18	56.2	
Zithromax tablet	20	62.5	12	37.5	
Tetracycline eye ointment	30	93.8	2	6.2	
2% injectable Lidocaine (with and without adrenaline)	22	68.8	10	31.2	
Paracetamol tablet 500 mg	15	46.9	17	53.1	
Alcohol 90%	24	75.0	8	25.0	
Povidone Iodine solution 10%	22	68.8	10	31.2	
Sufficient gowns, masks, caps	16	50.0	16	50.0	
Sterile drapes	15	46.9	17	53.1	
Sterile gauze 40 x 40	17	53.1	15	46.9	
Sterile gloves—size 7, 7.5, 8	19	59.4	13	40.6	
Syringes 5 CC+ needles, 21 G	20	62.5	12	37.5	
Suturing material + needles, 16 and 19 mm 3/8 circle cutting	12	37.5	20	62.5	
Adhesive tape	14	43.8	18	56.2	
Scalpel blades	20	62.5	12	37.5	
Sufficient torches/ batteries	19	59.4	13	40.6	

In summary, the evaluation revealed that only 10 (31.25%) primary eye-care units had the minimum amount of instruments, consumables, and equipment for PEC services. This

result is relatively higher than the finding of a similar study in Gurage, Ethiopia, which reported that 20% of PECUs were equipped according to the national standard for primary eye-care units (Soboka et al 2018:5). However, the result of this study is relatively similar to a study finding in Anambra state of Nigeria that concluded that the availability of instruments and equipment in most PECUs was insufficient (Aghaji et al 2021a:9).

5.6.3 Service delivery assessment

The final section of the checklist-based assessment was the review of the status of service delivery. In this section, six indicators were used. Record of outpatient and outreach services, monthly primary eye-care reports, supervision reports, performance and supervision feedback, review meetings, and meeting minutes. The assessment result is displayed in Table 5.15 below.

Table 5.15 Result of the evaluation of the service delivery conducted in four districts of the Southern Omo Zone, Ethiopia

Category	Yes		No		N
	Frequency	%	Frequency	%	
Record for OPD patients	24	75.0	8	25.0	32
Record for outreach services	5	15.6	27	84.4	
Monthly primary eye-care reports	15	46.9	17	53.1	
Supervision reports	9	28.1	23	71.9	
Performance and supervision feedback	2	6.3	30	93.7	
Review meeting	4	12.5	28	87.5	
Meeting minutes	2	6.3	30	93.7	

The result of the service evaluation showed that three quarters, 24 (75%) of the primary eye-care units evaluated had an outpatient record for patients coming to static clinics, but only 5 (15.6%) had a record for outreach services. A copy of the monthly report and a submission confirmation were found in less than half of the units, 15 (46.9%). Only nine (28.1%) of the primary eye-care units evaluated had a supervision report and two (6.3%) had a copy of the performance and supervision feedback. Evidence of organising review meetings and sharing meeting minutes was found only in four (12.5%) and two (6.3%) primary eye-care units, respectively (Med et al 2019:10; Rehman & Sharif 2021:164).

In summary, the evaluation of PECUs in the study area found that only 27.23% of the units meet the standard of primary eye-care service delivery. The result of this study is

consistent with the result of a study carried out in different sub-Saharan African countries, which confirmed that supervision, review meetings, and organisation of basic monitoring and evaluation activities were insufficient (Aghaji et al 2021a:10; Bailey, Blake, Schriver, Cubaka, Thomas & Martin 2016:123). Similarly, the finding is consistent with a result of the primary eye-care assessment result from the sub-Saharan African region, which identified the availability and functionality of primary eye-care infrastructures as a major barrier in most developing countries (Gilbert et al 2021:71). Figure 5.17 presents the evaluation of the summary results of the service delivery carried out in four districts in the Southern Omo Zone, Ethiopia.

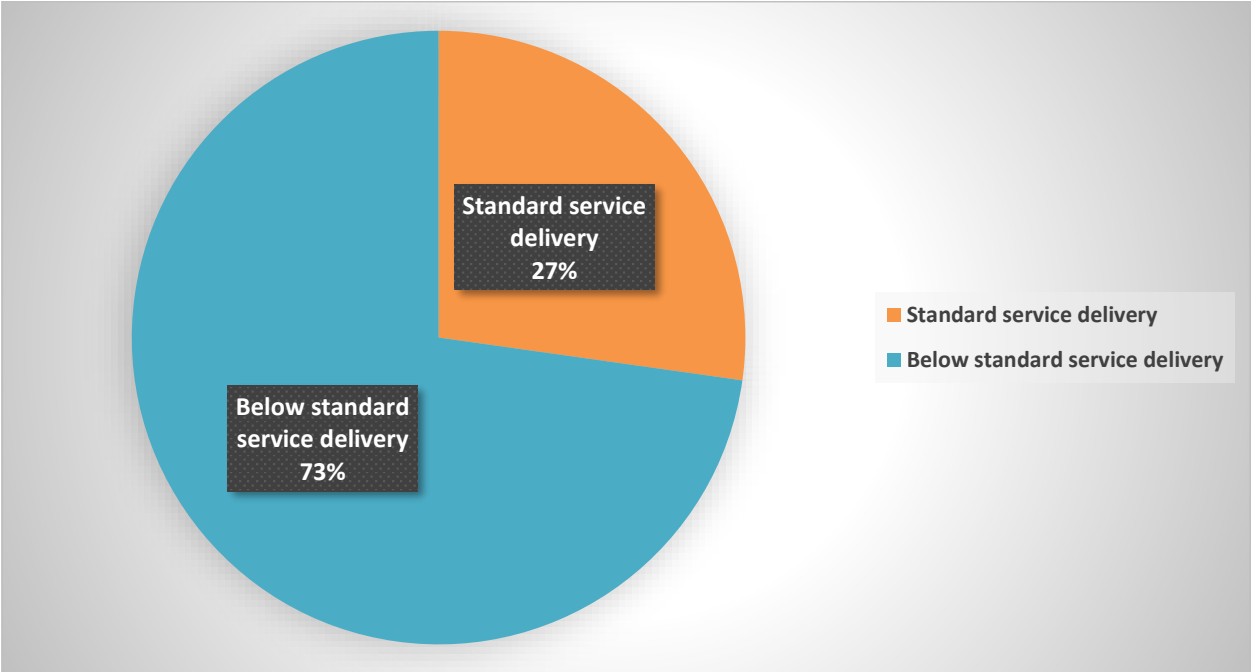


Figure 5.17 Result of the service delivery in the four districts of the South Omo Zone, Ethiopia (N=32)

The general average of infrastructure, instruments, consumables, and equipment and service delivery assessment carried out in the four districts of the Southern Omo Zone of Ethiopia showed that only a third, 32.63% of primary eye-care units were ready to provide service according to the minimum requirement standard. This finding aligns with an overview of primary eye-care services in sub-Saharan Africa, which concludes that lack of infrastructure and corruption, unrest, limited funding, and the absence or shortage of dedicated personnel significantly affected PEC service provision in the region (Cicinelli et al 2020:321). Figure 5.18. shows this summary finding.

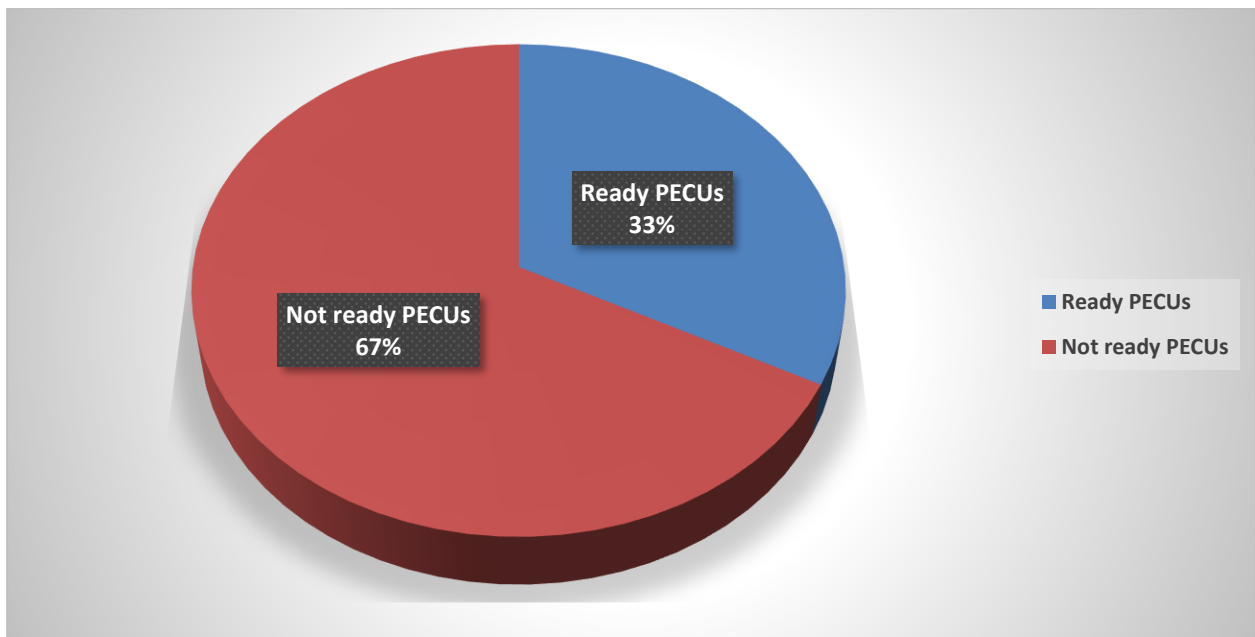


Figure 5.18 Summary of the readiness of the primary eye-care unit in the study area (N=32)

5.7 OVERVIEW OF THE READINESS OF PRIMARY EYE-CARE UNITS' ASSESSMENT

The result of the evaluation of infrastructure, equipment, and service delivery showed that only 11 (34.4%) of the primary eye-care units had separate rooms for detection and counselling. Less than one-fifth, 6 (18.8%) of the primary eye-care units had a separate room for the provision of Trachomatous Trichiasis surgery. In summary, only 39.53% of PECUs were found to have the minimum infrastructure standard to deliver services.

The evaluation also revealed that only 10 (31.25%) primary eye-care units had the minimum amount of instruments, consumables, and equipment needed to provide primary eye-care services. The evaluation of the PEC service delivery report found that less than a third, 27.23% of the units meet the standard service delivery. The general result of the evaluation of infrastructure, instruments, consumables, and the evaluation of equipment and service delivery carried out in the four districts of the Southern Omo Zone, Ethiopia, showed that only one-third, 32.63% of the primary eye-care units were ready to provide service as required by the minimum requirement standard.

5.8 SUMMARY

In this chapter, the findings of quantitative data from a self-administered questionnaire and checklist were presented and discussed. The evaluation result showed that most of the study respondents did not have satisfactory knowledge and skills to provide primary eye-care services. Of the mid-level healthcare workers who provided primary eye-care services, less than half were found to have intermediate-level (good) knowledge and skills required from primary eye-care workers. The multivariate association revealed that receiving additional training, serving more patients per month, and having a first degree had a significant statistical association with intermediate knowledge and skills in PEC services.

The result of the evaluation of infrastructure, instruments, consumables, equipment, and service delivery carried out in the four districts of the South Omo Zone in Ethiopia showed that only a small number of PECUs were found to have the minimum infrastructure standard, minimum amount of instruments, consumables and equipment needed and only a quarter of them meet the standard of primary eye-care service delivery. In total, only a third of primary eye-care units were prepared to provide service according to the minimum standard requirement. The next chapter will discuss the integration of the results from the qualitative and quantitative phases and the development and validation of the model.

CHAPTER 6

DATA INTEGRATION, MODEL DEVELOPMENT, AND VALIDATION

6.1 INTRODUCTION

The previous chapter presented and discussed the results of quantitative data collected using a self-administered questionnaire and checklist. The results of the knowledge and skill assessment organised with mid-level healthcare workers was presented in three sections. Similarly, the results of the assessment conducted to measure the readiness of PECUs in infrastructure, equipment, and service delivery were presented and discussed. This chapter describes data integration, model development, and validation to response to the final study objective: develop and validate a primary eye-care model to support the optimal provision of eye-care services.

6.2 CONVERGENCE OF THE KEY QUALITATIVE AND QUANTITATIVE FINDINGS

Data integration is the last step of an exploratory sequential mixed-method study design. Therefore, in this section, the key findings of the qualitative and quantitative study were integrated and supported the development of the primary eye-care model. In addition to the study findings collected through in-depth individual face-to-face interviews, focus group discussions, self-administered questionnaires, and checklists, findings from similar studies were used.

6.2.1 Main findings

The main findings of this thesis were classified and presented below as PEC service utilisation, barriers to service, knowledge, and skills of service providers, and readiness of PECUs in infrastructure, equipment, and service delivery.

6.2.1.1 Using the primary eye-care service

The study result indicated that primary eye-care services utilisation in the study area was low. Many participants reported bad experiences while accessing primary eye-care

services in the past six months. The FGDs held during Phase I of the study (Section 4.3.1) identified different factors for low utilisation. The lack of world-class eye-care service, disrespectful service providers, inadequate information, and lack of escort were reported as service-related aspects for the low use of primary eye-care services. Similarly, study participants reported factors related to service providers, such as language barriers, seasonality of services, and lack of commitment to provide primary eye-care services. Long waiting times, travel distance, and financial implications were identified as factors related to service access.

Similarly, the in-depth individual face-to-face interview organised with trained and certified primary eye-care workers identified the preferences of communities in time, geographic inaccessibility, and direct and indirect costs of treatment as factors related to service access, discussed in Section 4.5.1. Service providers reported seasonality of service provision, integrated outreach preferences, and work overload as contributing to the low use of PEC services.

6.2.1.2 Barriers to primary eye-care services

During the FGD and in-depth individual face-to-face interviews organised with service users and service providers, different barriers to primary eye-care services were identified. As presented and discussed in Sections 4.3.2. and 4.5.3. Participants in both groups identified the gaps in the following areas: awareness, service, leadership and management, and quality as barriers to the use and provision of PEC services. Figure 6.2 presents the barriers identified in categories.

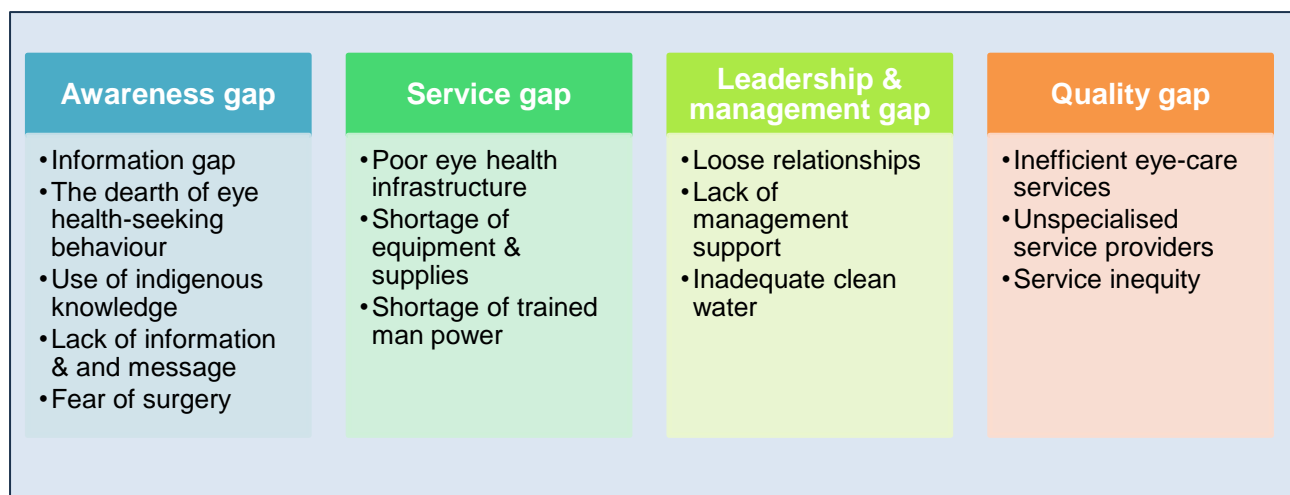


Figure 6.1 Barriers to primary eye-care services identified by the study

6.2.1.3 Knowledge and skill of primary eye-care service providers

The results of the knowledge and skill evaluation organised with mid-level healthcare workers providing PEC services in the study area found that more than half (55.3%) of mid-level healthcare workers provided basic PEC services without having received additional training. Most of the study participants, 59 (57.3%), provide primary eye-care services to fewer than 10 patients per month. During knowledge assessment, only 27 (26.2%) of study participants correctly recognised the WHO-endorsed definition of blindness, 36 (35%) identified at least three of the five (60%) risk factors presented for Trachoma, and 33 (32%) recognised at least four of the six signs and symptoms of Trachoma in the study area. Skill assessment showed that only 32% of the study participants correctly identified the instrument required to lift the upper eyelid. Furthermore, 56 (54.4%) mid-level health workers recognised the instrument needed to remove foreign bodies from the eye. Only 29 (28.2%) of the study participants correctly knew the ocular conditions under which they could skip a detailed history.

In summary, the knowledge and skill evaluation conducted in the four districts of the Southern Omo Zone in Ethiopia found that more than half of the study participants did not have sufficient knowledge and the skills to provide services. The mean score of the knowledge and skill assessment participants was 13.63 of 22 selected variables with a standard deviation of 3.03. Of the study participants, less than half (48.5%) had intermediate-level (good) knowledge and skills required from primary eye-care workers. The multivariate association revealed that receiving additional training (P-value -0.005),

serving more patients per month (P-value <0.001), and having a first degree (P-value <0.001) had a significant statistical association with intermediate (good) knowledge and skills in primary eye-care.

6.2.1.4 Readiness of primary eye-care units in infrastructure, equipment, and service delivery

The result of the infrastructure, equipment, and service delivery assessment conducted in the study area showed that only 39.53% of the PECUs had the minimum infrastructure standard to provide services. The evaluation also revealed that only 10 (31.25%) primary eye-care units had the minimum amount of instruments, consumables, and equipment needed to provide services. The service delivery assessment report found that less than a third, 27.23% of the units met the standard of service delivery. The general result of the infrastructure, instrument, and consumable evaluation for the evaluation of equipment and service delivery carried out in the four districts of the South Omo Zone of Ethiopia showed that only a third, 32.63% of primary eye-care units were ready to provide service according to the minimum requirement standard.

6.2.2 Approach of data integration

During this phase of the study, key results of the study were combined to develop the integrated community-based primary eye-care model discussed in Section 6.3.3. A built-in approach was used to integrate the study findings, considering the fact that the Phase I study, qualitative data collection and analysis, informed the development of the quantitative phase. In the course of data integration, the findings of both studies were displayed side by side to shape the convergence and support the development of the PEC model. The joint display supports the drawing of a new concept by visualising the presentation of qualitative and quantitative data simultaneously (Creswell & Creswell 2018). Table 6.1 presented the visual presentation of the study findings discussed in the previous two chapters.

The researcher also presented a comparison of the findings of the study findings to better describe the service provision in the study area (McCrudden & McTigue 2019:382).

The result of data integration showed that the PEC services were not well integrated into the PHC system in the study area. As evidenced during the in-depth individual face-to-face interview with certified and qualified PECWs, primary eye-care service was a standalone programme with poor or no leadership and management support, as shown by loose relationships and management follow-up (Section 4.5.3.3). This case was also proven by the presence of many primary eye-care units with poor infrastructure, equipment, and service delivery (Section 5.6.3).

The result of the checklist-based evaluation showed that only 32.6% of the primary eye-care units in the study area were equipped with infrastructure, equipment, and service delivery to provide PEC services (Section 5.6). In the same way, the shortage of equipment and the supplies and lack of comprehensive eye-care services were reported during the focused group discussion and in-depth individual face-to-face interview. As described in Section 4.5.2, the participants in the in-depth individual face-to-face interview identified that the inconvenience of the service delivery site as a factor that affected the use of PEC services, which was, in turn, evidenced during the evaluation of the primary eye-care units.

The majority of the knowledge and skills assessment study participants were found to lack intermediate-level knowledge and skills required from primary eye-care service providers. This was also identified during the focus group discussion with service users. The participants in the FGD mentioned the presence of inefficient eye-care services and unspecialised service providers that affected their use of PEC services. Similarly, the in-depth individual face-to-face interviews identified a shortage of properly trained service providers in the study area. The lack of world-class eye-care services and the provision of inadequate eye health information reported by FGD participants are also associated with poor knowledge and skills of service providers. Additionally, the community's preference for a foreign service provider and integrated outreach service provision is also related to the knowledge and skill gap of primary eye-care service providers.

Poor eye health infrastructure and deficiency of supplies and equipment was identified in both phases of the study. The presence of a poor eye health infrastructure, knowledge, and skill gaps in service providers, in addition to the awareness gap in the community, contributed to the low use of PEC services and the reported inequity in the study area. Geographic factors and treatment-related costs were also associated with the quality of the service provider and the standard of the primary eye-care units.

This study also identified a community awareness gap, evidenced by the presence of an information gap, the lack of eye health seeker behaviour, the use of indigenous knowledge, fear of surgery and surgical results, and lack of adequate information and messaging. The awareness gap significantly affected the PEC services usage. Table 6.1 displays the amalgamation of the key results of the study.

Table 6 1 Integration of key qualitative and quantitative findings of the study

Objective of the study	Developed themes	Key qualitative findings (in quote)	Key quantitative findings	Integration of the data set
Explore and describe the use of primary eye-care services in the four districts of the South Omo Zone, Ethiopia.	Experience in the use of community service utilisation	<p><i>“To your surprise, there is no separate examination room for eye-care services, the professional working here examines all patients who come for eye-care in an open area (outdoors), and I don’t think the unit even has basic eye examination materials. In general, they are not committed to providing service.”</i> 6:2 ¶ 4 in FGD Two</p> <p><i>“The absence and scarcity of trained eye-care professionals is the main barrier in this PECU. You must wait a long time until a trained eye-care professional is free to provide services.”</i> 5:12 ¶ 14 in FGD Three</p> <p><i>“There was excessive tearing in my eye for more than a year. I got surgery for that. The tear stopped. But I am developing a sort of cloudiness in that operated eye. Now I am a bit worried about the outcome.”</i> 2:1 ¶ 3 in FGD Four</p>	<p>Only 34.4% of the PECUs had a separate room for patient screening and only 18.8% had a separate room for TT surgery.</p> <p>Only 31.3% of PECUs had the minimum amount of instruments, consumables, and equipment needed to provide primary eye-care services.</p> <p>Of the PEC service providers, 55.3% received training in the provision of PEC services. 51.5% of primary eye-care service providers did not have the minimum knowledge and skills required from a PECW.</p>	<p>The findings of FGD and the check evaluation showed that most primary eye-care units were not standard and lacked world-class eye-care service provision.</p> <p>The results of the self-administered questionnaire and the FGD were consistent. Knowledge and skills of service providers were found to be below the standard and affected the provision and use of eye-care services.</p>
	Barriers to primary eye-care	<p><i>“The main barrier to primary eye-care is the absence of medication for the eye-care service. They had very few eye drops and used to provide us with prescriptions to get the medication from private pharmacies, which were too expensive. This is our right, but they do not have enough medication or appropriate treatment.”</i> 5:6 ¶ 9 in FGD Three</p>	<p>42.2% of PECUs lack basic medications to provide PEC services according to the national standard.</p>	<p>The findings of both studies showed that the lack of medication was one of the main barriers to primary eye-care services in the study area.</p>

Objective of the study	Developed themes	Key qualitative findings (in quote)	Key quantitative findings	Integration of the data set
	Suggestions to improve PEC services	<p><i>“If the government made the service available nearby, no one would think twice about getting the service. There will be distance, cost, or fear of missing someone to accompany them when considering the use of PEC services, especially among the blind, elderly, and those with serious eye conditions. I am sure everyone will come and enjoy the service and our village will be free of eye problems.”</i> 3:24 ¶ 26 in FGD One</p> <p><i>“As you can see, the eye-care unit is located far from the main entrance of the primary health centre. The way to the unit is not comfortable. How come a blind patient walks this road?”</i> 5:21 ¶ 22 in FGD Three</p>	Only one-third, 32.63% of primary eye-care units, were ready for infrastructure, equipment, and service delivery.	The findings of the FGD and the checklist evaluation showed that most PECUs were not comfortable and ready to provide service to their target groups.
Explore and describe the barriers to primary eye-care services in the four districts of the South Omo Zone, Ethiopia.	Experience of the service provider	<p><i>“There are times when I am out of the unit for different conditions, like during training and personal leave, at that time the service will freeze. There will be no eye-care service at this primary health centre, and patients with eye problems must wait until I return.”</i> 14:16 ¶ 11 In-depth individual face-to-face interview six</p> <p><i>“The shortage of qualified employees to provide eye-care is the main challenge. I am the only person who provides service in this PECU and, in addition to eye-care, I am the person for immunisation and stock management of the health centre.”</i> 18:13 ¶</p>	Of the PEC service providers, 55.3% received training in the provision of PEC services. 51.5% of primary eye-care service providers did not have the minimum knowledge and skills required from a PECW.	The result of the in-depth individual face-to-face interview, checklist, and self-administered questionnaire confirmed the presence of a shortage of trained personnel, untrained service providers, and a skill and knowledge gap between service providers.

Objective of the study	Developed themes	Key qualitative findings (in quote)	Key quantitative findings	Integration of the data set
	Preferred mode of service utilisation	<p>17 In an in-depth individual face-to-face interview twelve</p> <p><i>“Old people and those with unilateral or bilateral blindness did not come to the unit due to the poor geography and lack of a conducive environment for them in the primary eye-care unit.”</i> 7:13 ¶ 13 In-depth individual face-to-face interview eight</p> <p><i>“Most of the health posts around this health centre are not well structured and suitable for conducting basic screening and treatment for the very old and people with a disability.”</i> 9:25 ¶ 15 in In-depth individual face-to-face interviews five</p>	<p>Only 39.53% of primary eye-care units were found to have the minimum infrastructure standard to provide services.</p> <p>Only 34.4% of the PECUs had a separate room for patient screening and only 18.8% had a separate room for TT surgery.</p>	Results of the in-depth individual face-to-face interview and the checklist-based assessment showed that poor infrastructure significantly affected service use in the study area.
	Barriers to primary eye-care services	<p><i>“The room assigned to the eye clinic is small and is not standardised. We do not have an operating table. We perform trachomatous trichiasis surgery on emergency room tables or delivery coaches.”</i> 9:26 ¶ 17 In-depth individual face-to-face interview five</p> <p><i>“There is no well-organised and dedicated room for primary eye-care services. We provide services for patients with eye complaints in any free room available during the arrival of patients, which causes serious discomfort and confusion to patients.”</i> 17:8 ¶ 15 In-depth individual face-to-face interviews of two</p>	<p>Only 34.4% of the PECUs had a separate room for patient screening and only 18.8% had a separate room for TT surgery.</p> <p>Only 31.3% of PECUs had the minimum amount of instruments, consumables, and equipment needed to provide PEC services.</p> <p>42.2% of PECUs lack basic medications for the provision of PEC services</p>	<p>The results of both in-depth individual face-to-face interviews and the checklist assessment confirmed that the poor eye health infrastructure in the study area affected the provision of services.</p> <p>The shortage of basic supplies, instruments, and equipment was identified in both phases of the study.</p>

Objective of the study	Developed themes	Key qualitative findings (in quote)	Key quantitative findings	Integration of the data set
		<p><i>“In this primary eye-care unit, there is a huge shortage of equipment and supplies for Trachomatous Trichiasis surgery, such as surgical gloves, sets, and surgical blades.”</i> 17:8 15 In-depth individual face-to-face interview two</p> <p><i>“Currently we are providing an eye-care service with selected eye drops and medications available.”</i> 16:25 ¶ 9 In-depth individual face-to-face interview of three</p>		
	Suggestions for improving primary eye-care services	<p><i>“I strongly advise the establishment of a separate and well-equipped PECU. This PECU is serving more than 25,000 population, so the expansion and standardisation of a unit is mandatory.”</i> 6:22 ¶ 20 In-depth individual face-to-face interview Two</p> <p><i>“The eye unit did not receive adequate attention from the primary health centre and the district health office; this is shown with the low use of service and the lack of standardised primary eye-care unit and service.”</i> 16:18 ¶ 17 In-depth individual face-to-face interview three</p>	Only 34.4% of PECUs had a separate eye screening room and 31.3% were equipped with the minimum standard instruments, supplies, and equipment for PECUs.	The findings of the two phases of the study are consistent and show that most of the PECUs in the study area were not standardised and ready to provide service according to the national minimum service provision standard.
Assess the knowledge and skills of primary eye-care workers in the four districts of the South Omo Zone, Ethiopia.		<i>“Common challenges in this PECU include a shortage of trained personnel. I am the only one trained here, and it is almost impossible to cover seven villages in one person. I strongly recommend the provision of training for more nurses.”</i> 14:10 ¶ 17 In	Less than half, 44.7% of PEC service providers received training. Only 18.4% were trained once, 11.7% were trained	The results of the qualitative and quantitative study showed the presence of a shortage of trained personnel and a lack of knowledge and skills of service providers.

Objective of the study	Developed themes	Key qualitative findings (in quote)	Key quantitative findings	Integration of the data set
		<p>an in-depth individual face-to-face interview, six</p> <p><i>“I recommend refreshment training for service providers. As we look at many patients, we need to be refreshed. All health extension workers under my supervision are trained. They should also be refreshed and motivated to integrate the activity with other preventive and promotional tasks.”</i> 16:31 ¶ 20 In In-depth individual face-to-face interviews three</p> <p><i>“It would be great if an orientation was provided for all patients who examine patients in the outpatient department not to leave anyone with eye complaints untreated, strengthen outreach activities, and expand eye-care activities to health posts.”</i> 17:29 ¶ 22 In-depth individual face-to-face interview two</p>	<p>twice, and 15 (14.6%) were trained three or more times.</p>	
<p>Assess the readiness of primary eye-care units in equipment, infrastructure, and service delivery in the Southern Omo Zone, Ethiopia.</p>		<p><i>“To expand the service and provide the service well to the community, the unit shall be standardised and supplemented with equipment and supplies. It would be better if we could provide the service for at least eight hours every day.”</i> 10:23 ¶ 19 In-depth individual face-to-face interview of four</p> <p><i>“As a long-term solution, an eye-care professional shall be appointed for this unit, equipment and supplies shall be availed,</i></p>	<p>Only 40.6% of primary eye-care units had the supplies and equipment to perform TT surgery.</p> <p>Only 6.3% of the PECU evaluated had a performance and supervision report and support from the respective district.</p>	<p>The findings of the in-depth individual face-to-face interview, the FGD, the checklist, and the questionnaire showed the presence of a gap in the delivery of PEC services in the study area.</p>

Objective of the study	Developed themes	Key qualitative findings (in quote)	Key quantitative findings	Integration of the data set
		<p>and attention shall be given to eye-care services in general.” 12:23 ¶ 21 In an in-depth individual face-to-face interview, one</p> <p><i>“To improve the service, I recommend a complete set of equipment and supplies mandatory for the provision of TT surgery and a separate room for primary eye-care services.”</i> 7:10 ¶ 19 In an in-depth individual face-to-face interview eight</p> <p><i>“To expand the service and provide the service well to the community, the unit shall be supplemented with equipment and supplies, and be standardised.”</i> 10:14 ¶ 19 in In-depth individual face-to-face interview four</p>	<p>Only 18.8% of the PECUs had a separate room to perform minor surgeries and provide counselling.</p>	
<p>Propose and validate a primary eye-care model to support the optimal provision of eye-care services.</p>		<p><i>“To improve the use of eye-care services, I think the provision of a community-based eye-care service is mandatory. The living conditions and lifestyle of people living in this area are different from most parts of this Zone. Therefore, I strongly recommend the preparation and implementation of a pastoralist-centred eye health service that is conducive for them to access care wherever they go.”</i> 8:21 ¶ 19 In-depth individual face-to-face interview eleven</p> <p><i>“To improve service, I strongly recommend the implementation of community outreach programmes until our village is free from</i></p>	<p>Only 12.5% of primary eye-care units had a programme-specific review meeting and only 6.3% had a meeting minute.</p>	<p>The findings of both phases of the study showed the absence of a primary mode of delivery of eye-care services in the community in the study area.</p>

Objective of the study	Developed themes	Key qualitative findings (in quote)	Key quantitative findings	Integration of the data set
		<p><i>communicable eye diseases.” 18:21 ¶ 19 In an in-depth individual face-to-face interview, twelve</i></p> <p><i>“To improve the use of primary eye-care services in this PECU, integration, and coordination are mandatory. In this PECU, eye health is a standalone activity followed and monitored by Orbis, an international NGO that works in the area. To sustain the service advocacy and ownership is mandatory.” 11:11 ¶ 19 in In-depth individual face-to-face interview nine</i></p> <p><i>“From the management side, lack of attention and lack of support are the main challenges. They are not paying us the attention we deserve as an eye-care service unit. As I told you, the eye-care service is not well integrated with the general health care service.” 15:25 ¶ 17 Depth interview ten</i></p>		

6.3 PROPOSED MODEL DEVELOPMENT

6.3.1 Background

Primary eye-care is one of the eleven key components of PHC aiming to reach the underserved community (Gilbert et al 2021:70). PEC is prepared to contribute to the decline of avoidable blindness and low vision in developing countries, thus improving their quality of life (Kalua et al 2014:4).

The first World Report on Vision (WHO 2019a) sanctioned by the member states in November 2020 suggested that the PHC delivery model should be reoriented and incorporate PEC to better serve the community. In this report, the WHO recommended interventions having high impact and low cost for developing countries (Mueller, Keel & Cieza 2021:88). Integrating PEC with existing PHC being the main domain, different models have been used to implement PEC worldwide. So far, studies about these models have been reported in very few countries and regions of Latin America, India, Nepal, and Nigeria.

There is no uniformity in the definition and implementation of PEC models in sub-Saharan Africa. Even if different models were used in the region, few evaluation reports of the effectiveness of the intervention were found (Aghaji 2021a:3). Although the Ethiopian Ministry of Health (2016:5) prepared a guideline for PEC services as part of its national eye-care strategic plan, there is no verified evidence on which eye-care model is implemented in the country and is well tested in addition to advocating for the integration of PEC with the main domain, PHC.

This study developed an integrated community-based primary eye-care model to ensure optimal provision of primary eye-care services to Ethiopians and fill the gap. The development and application of the model are mandatory to optimise the provision of PEC services in the study area, resulting in an expanded service and a reduction in the prevalence of blindness and low vision in the country, contributing to improving quality of life. The model will serve as baseline data for other researchers to develop a model in

situations with high burdens and low utilisation. Therefore, it can be applied in other LMICs with settings similar to those in Ethiopia.

During the course of model development, the study responded to all five objectives.

6.3.1.1 Primary eye-care service provision in practice

Even though Ethiopia has a high burden of blindness and low vision, eye-care services do not receive adequate attention at all levels. This is evidenced by the lack of up-to-date national strategic eye-care plans and studies in the field. To date, there is no approved and practical PEC model in the nation. There exists a model of PEC service provision endorsed by the WHO for the sub-Saharan region named the WHO AFRO PEC package, but its applicability to Ethiopia has not been studied.

The complete PEC package should be implemented that includes the completion of basic supplies, equipment, and consumables for an eye examination, education, and promotion, documented referrals, supportive supervision, health information, and feedback systems. Furthermore, advocacy and support from the government in addition to clear financing mechanisms and good governance are needed (Aghaji et al 2018:3). The application of the PEC package to the reduction of avoidable blindness and low vision in the country should consider the local situation.

6.3.1.2 Primary eye-care policy in Ethiopia

Primary eye-care should consider policies and actions that are multisectoral and capable of creating community empowerment in addition to the delivery of comprehensive eye-care services (Gilbert et al 2021:70). As noted above, Ethiopia does not have a separate policy or strategic plan for the PEC service. PEC was included in its five-year vision strategy for 2016 to 2020 as an eye-care element. The Five-Year National Strategic Plan promotes the integration of the PEC with the PHC.

The Ethiopian Ministry of Health's (2016:16) Eye Health Strategic Plan (2016-2020) identified the following weaknesses in the nation's eye-care programme: budget

constraints for supplies, equipment, and infrastructure, inadequacy of trained eye-care personnel, poor attention to eye-care, weak and uncoordinated Integrated Support Supervision (ISS) for eye-care facilities, poor progress in scaling up SAFE implementation for Trachoma elimination, poor data quality and insufficient inclusion in the Health Management Information System (HMIS) (Ethiopian Ministry of Health 2016:16).

As discussed in Chapter 4 and Chapter 5, this study found that the use of the scarcely available PEC services was low and fenced with different barriers. The study also identified that most primary eye-care providers did not receive basic training to provide services. Most of them stipulate PEC services for less than 10 patients per month. The evaluation of knowledge and skills found that most service providers do not have the average (intermediate) knowledge and skills required from a PEC service provider according to the acceptable national standard. Only a third of PECUs were found to have the infrastructure, equipment, and supplies needed to provide PEC services. In general, the study found that PEC services are not well integrated into the service delivery at the lower level, PHC.

6.3.1.3 Pattern of primary eye-care services integration with primary health care

The WHO's (2013b:128) Global Action Plan (2014-2019) recommends the implementation of PEC as the best tool to attain widespread eye health coverage (Khanna 2020:334). Universal Eye Health Coverage strongly advises that eye health services must be equitable, accessible, comprehensive, high quality, and affordable for all. The SDG focusses on Universal Eye Health Coverage Goal number three (WHO & UNICEF 2020:51).

The WHO Evidence-Based PEC Intervention Packages for Africa advocate for the integration of PEC-PHC for its contribution to improving eye health coverage and strengthening the eye-care system (Aghaji et al 2021a:2; Keel, Evans & Block 2020:1). For ease of use, the package can be broadly categorised into facility-based eye-care interventions and health promotion activities. Facility-based eye-care interventions include visual acuity measurement, foreign body removal, eye medication administration,

counselling, and referral. The package was shown to be effective in solidifying knowledge and skills of CWs and expanding access to eye-care (Graham 2017:85; Kalua et al 2014:5). Similarly, Ethiopia's MOH advocates integration for better service provision.

The presence and use of different primary eye-care models in different settings contributed to awareness, access, and demand creation to reduce avoidable blindness (Chadalavada, Marmamula, Yanamala & Khanna 2023:306; Misra et al 2015:79; Yasmin & Schmidt 2022:i38). A study in India found that the integration of PEC with the existing PHC service was a sustainable and resource-efficient intervention. This model was found to be rewarding, effective, and easy to follow for PEC services in India (Misra et al 2015:81). Another study conducted in Nigeria to assess the integration of eye-care into PHC in the Nigerian health system confirmed that the incorporation of PEC into the PHC model significantly subsidised to the improvement in the provision of health care of the nation (Moyegbone et al 2020:6).

6.3.2 Methodology used to develop the model

To conduct the study, ethical clearance was obtained from the University of South Africa, with reference number 58528660_CRECHS_2023 (Annexure A). Subsequently, permission to conduct the study was obtained from the South Omo Zone Health Department, and the four districts covered in the study (Annexures B-G). The integrated community-centred primary eye-care model was developed in two phases: the empirical phase and the model development phase.

6.3.2.1 Empirical phase

The study applied an exploratory sequential mixed method study design and explored and described primary eye-care service provision in the four districts of the Southern Omo Zone, Ethiopia. During this study, four groups of participants were included. During the qualitative phase adults, 40 years and older, who had used PEC services in the last 6 months and trained and certified PECWs participated in the FGDs and in-depth individual face-to-face interviews, respectively. To conduct the quantitative study (Phase III), mid-level healthcare service providers providing PEC services were included in the self-

administered questionnaire-based knowledge and skill assessment of service providers. All PECUs found in the study area were incorporated for the checklist-based assessment of the readiness of PECUs in infrastructure, equipment, and service delivery.

Before organising data collection with all groups, written informed consent was obtained (Annexure I). Data analysis and presentation were performed at both stages of the study to warrant the exploratory sequential design of the study. The methodology and steps followed during each phase are briefly stated in Chapter 3. The results and a discussion of the qualitative analysis are presented in Chapter 4. Similarly, Chapter 5 presents the results, analysis, and discussion of the quantitative study.

6.3.2.2 Model development phase

The integrated community-based PEC model is explained in Section 6.3.3. The model was built based on the core study findings, theoretical framework and results of a systematic review of the literature. Four steps were followed to develop the model. The steps used were analysis of concepts, building relationships, model explanation, and model evaluation (Chinn & Kramer 2011:164).

6.3.2.2.1 Analysis of concepts

Chinn and Kramer (2011:94) labelled concept analysis as an initial phase of model development and incorporates selecting and determining a purpose, exploring data, and developing suitable criteria for the concept. Concepts and their denotation are formed by the use of observations of experience (Chinn & Kramer 2011:94). In this study, concepts were identified and described according to the contribution to the optimal provision of PEC services, resulting in a reduction in avoidable blindness and low vision, which in turn improves quality of life (Walker & Avant 2013:161).

During the current study, the researcher applied the analysis of the concept as cited in (Walker & Avant 2013:165).

Concept selection

The results of the qualitative study, the quantitative study, and data integration were presented in Chapters 4 and 5, and the first section of Chapter 6 respectively. During the chapter workout, the researcher selected the main concept of the study, the optimal provision of integrated community-based primary eye-care services. Consequently, this concept was selected as a basis for model development.

Response to the reasoning for the investigation

According to Walker and Avant (2013:167), the next step of concept analysis is to respond to the main reason for an investigation. A single concept may have different meanings depending on an individual definition and use. Therefore, the researcher opted to understand and apply a dictionary and contextual meaning of the key study concepts. Understanding the reason for the investigation helped the researcher develop an integrated community-based primary eye-care model discussed in Section 6.3.3.

Identification of the use of the word

The third step is to identify the use of the word from vocabulary, the locus of the word, and any other accessible sources (Walker & Avant 2013:167). This helped the researcher understand the meaning of the concept from various sources. The concept should correctly inform the proposed meaning.

Definitions

In this section, the definitions of the main concept are presented. The core objective of the concept analysis is to confirm the definition and explanations provided for the concept from known sources (Walker & Avant 2013:161). Primary eye-care is a comprehensive concept and is labelled by the WHO as one of the key milestones in reducing blindness and low vision. Consequently, the researcher defined each word in the main concept of the study as 'optimal provision of integrated community-based primary eye-care services.

During definition and analysis, dictionary definitions, concepts from the literature, and models were used (Chinn & Kramer 2011:166; Walker & Avant 2013:161).

Optimal: In the *Cambridge Dictionary* (2023a), optimal (adjective) means best, most likely to bring success or advantage. Similarly, the *Collins English Thesaurus* (2023a) presents optimal as the best possible; producing the best possible result. Synonym is best or most favourable.

Provision: In the *Collins English Thesaurus* (2023b), provision (noun) means the action of providing or supplying something for use or an amount or thing supplied or provided. In the *Cambridge Dictionary* (2023b), provision (noun) means the act of providing something to someone.

Integrated: In the *Cambridge Dictionary* (2023d), (adjective) means with various parts or aspects linked or coordinated. Integrated (contextual meaning) is a set of cohesive service delivery factors implemented to create an improved service provision that contributes to an improved quality of life.

Support: In the *Cambridge Dictionary* (2023d), (verb) means to agree with and give encouragement to someone or something because you want him, her, or it to succeed. In the *Collins English Thesaurus* (2023e), support (verb) means to bear all or part of the weight of: hold up.

Community-based: In the *Cambridge Dictionary* (2023c), (adjective) means focused on or relating to a community. Community-based refers to an intervention designed and implemented to involve the community in the course of development. According to Murray (2010:89), the community-based intervention was meant to show concerted functions within the community to achieve a desired result (Murray 2010:89).

Model: (noun) means something used as an example to follow or imitate. A model represents a design prepared to show the optimal provision of primary eye PEC services. According to Walker and Avant (2013:169), a model is derived from the work of a researcher or from reality.

6.3.2.2.2 *Classification of concepts*

The Dickoff et al (1968) survey list to mind map the model through the concepts using the six survey list items of an agent of change, recipient, context, procedure, dynamics,

and terminus was used to classify the main study concepts (Dickoff et al 1968:425; Duke & Rakhude 2021:3). Consequently, this study identified primary eye-care workers as agents of change, adults, 40 years and older, as the recipient of PEC services, PECUs as the context for the provision of health care services, multisectoral collaboration, community engagement, integration, management support, and capacity building as a procedure, determinants in the provision of PEC as a dynamics, and the optimal provision of PEC services contributing to the reduction of avoidable blindness and low vision as the terminus. Figure 6.3 presents the classification of concepts in the study according to the Dickoff et al (1968:425) survey list.

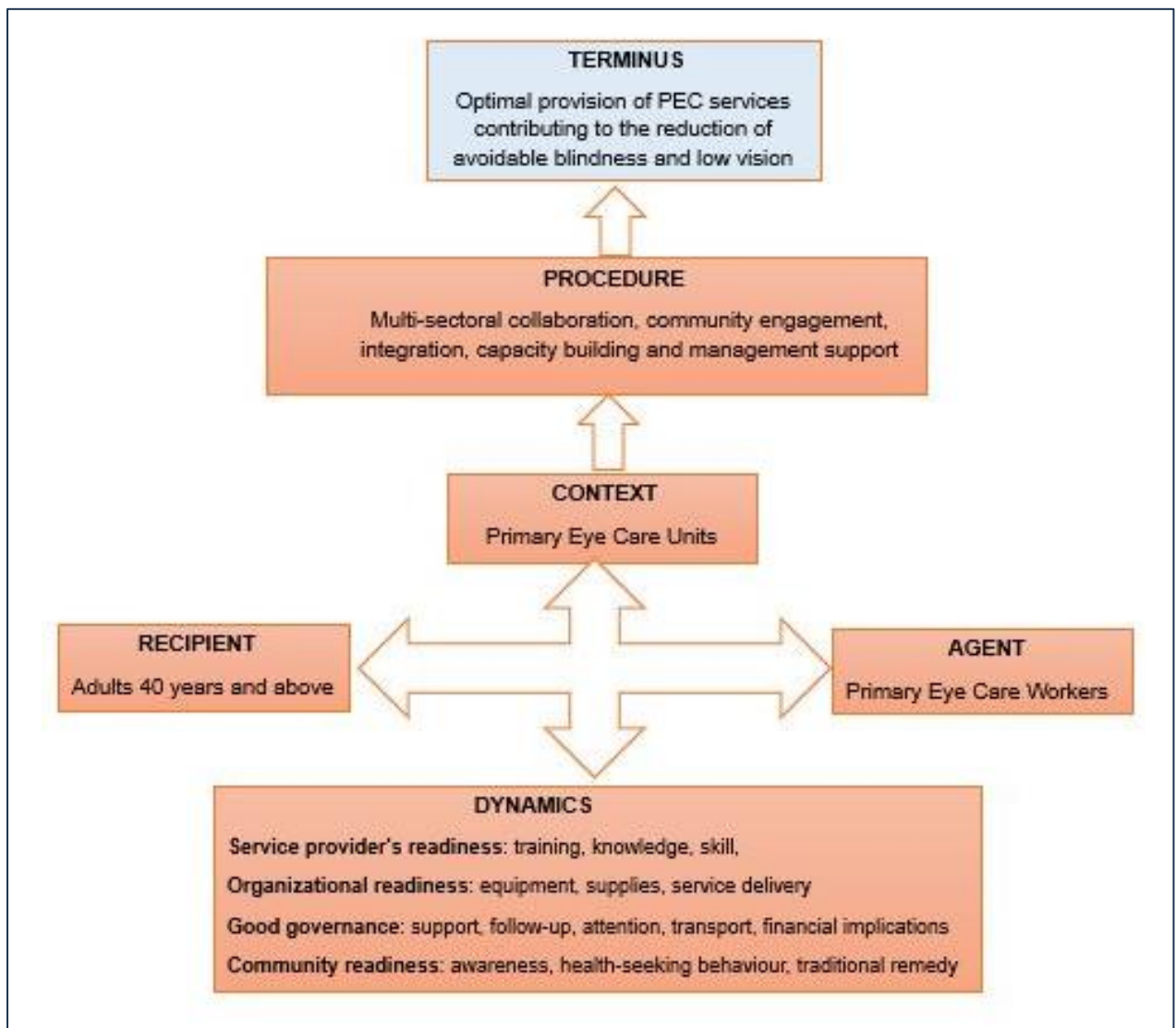


Figure 6.2 Classification of the study
(Adapted from Dickoff et al 1968:425)

Agents of change

The agent of change refers to the main person accountable for accomplishing a task (Dickoff et al 1968:426). During the current study, PECWs were identified as agents of change due to their main duty of providing PEC services to the rural community. More than 85% of Ethiopians live in the countryside, and PECUs, which are a component of a PHCU, are the only option to access nearby eye-care services. In Ethiopia, the PEC service is currently run by an IECW, a mid-level eye health cadre who has received short training on PEC, including TT surgery.

The Ethiopian Ministry of Health (2016:34) listed eye health promotion and education, detection of major ocular morbidities, including cataracts, Trachoma, Glaucoma, and reactive errors, treatment of minor eye conditions, provision of TT surgery, postoperative consultation, follow-up, referral, and supervision as a job list of integrated eye-care workers.

The following direct quotes from study participants confirm the role of PECWs as an agent of change.

“Service providers are scarce in this primary eye-care unit. The government needs to deploy more nurses as delivery assistant nurses. The assignment of only one nurse to serve all residents around here is unfair.” 6:15 ¶ 14 in FGD Two

“The absence and scarcity of qualified eye-care professionals is the main barrier in this PECU. You must wait a long time until that trained eye-care professional is free to provide service.” 5:12 ¶ 14 in FGD Three

The self-administered questionnaire-based assessment organised during Phase III to evaluate the knowledge and skills of PEC service providers also found that PECWs are agents of change, and their scarcity and lack of adequate training, knowledge, and skill affected the provision of PEC services in the study area.

Recipients

The recipient refers to a person who is a direct beneficiary of an activity or service (Dickoff et al 1968:426). In this study, adults, 40 years and older, are identified as recipients of primary eye-care services because as people age, the need for basic eye-care services increases. The study selected this age category due to the elevated risk of developing common eye health problems such as Cataracts, Presbyopia, Trachomatous Trichiasis, and Diabetic Retinopathy within this age category. During the FGD organised with adults who accessed PEC services in the last six months, the recipients identified different barriers. The lack of world-class eye-care service, disrespectful service providers, inadequate information and lack of escort, long waiting times, distance to the service provider site, and financial implications were the main barriers identified in this study.

The following quotations show that older adults are recipients of PEC services in the study area.

“Most of our customers are elderly and have difficult mobility; they prefer outreach-based service provision. There is a time when we fail to get one patient per month unless we organise outreaches.” 15:24 ¶ 15 In in-depth individual face-to-face interview Ten

“Most of our target groups are old and reject receiving eye-care service due to the absence of someone to take care of them after surgery, which is a serious barrier to service provision in this primary eye-care unit.” 10:8 ¶ 13 in In-depth individual face-to-face interview four

Context

The context refers to the place where the action took place. Primary eye-care services are performed in primary eye-care units and outreach sites. According to the Ethiopian Ministry of Health (2016:36), primary eye-care units are expected to provide primarily preventive and promotion eye health services. The Primary Eye-care Unit is expected to practice the promotion, prevention, and treatment of eye health. The unit also performs

minor surgeries, basically TT surgery, and screens and refers to uncorrected refractive errors, cataracts, and other eye conditions that can be managed in secondary and tertiary eye-care units (Ethiopian Ministry of Health 2016:38).

During this study, participants identified this context:

“I was not happy with the service provided in this unit, to your surprise, there is no separate examination room for eye-care services, the professional working here is examining all patients coming for eye-care in an open area (outdoor) and I don’t think the unit has even basic eye examination materials. In general, they are not committed to providing service.” 6:2 ¶ 4 in FGD Two

“The room assigned to the primary eye-care service is small and is not standardised. We do not have an operating table. We perform Trachomatous Trichiasis surgery on emergency unit tables or delivery couches.” 9:26 ¶ 17 In-depth individual face-to-face interview Five

“Old people and those with unilateral or bilateral blindness did not come to the unit due to the poor geography and lack of a conducive environment for them in the primary eye-care unit.” 7:13 13 In-depth individual face-to-face interview Eight

The result of a checklist-based assessment carried out to measure the readiness of PECUs in infrastructure, equipment, and service delivery found that only 34.4% of PECUs had a separate room for patient screening and only 18.8% had a separate room for TT surgery. Similarly, only a third, 31.3%, of the PECUs found in the study area had the minimum amount of instruments, consumables, and equipment needed to provide primary eye-care services according to the national standard.

Procedure

The procedure refers to how the action takes place. Dickoff et al (1968:430) indicated that procedures are protocols, principles, or guides that take place to accomplish a task (Dickoff et al 1968:430). The participation and collaboration of stakeholders was found to have a huge impact on the provision of the PEC service in the study area. In this study,

the procedure refers to the contribution of the community, the management, and other stakeholders to the optimal provision of PEC services.

The current study identified the presence of loose relationships, lack of management support, and weak supervision and follow-up as among the barriers that affect the provision of PEC services. Therefore, multisectoral collaboration, community participation, management support, capacity building activities, integration, and strong follow-up were identified as procedures for model development. The study results demonstrate the procedure:

“The activity shall be integrated with other healthcare activities. It is a standalone programme. That is why most people do not use the service appropriately. There are so many blind people in my community who need help.” 1:23 ¶ 24 in FGD Five

“As a challenge, I can mention the poor and weak communication this eye-care unit has with the PHCU and the district health office. Furthermore, there is a lack of attention, and eye-care is ignored as a job of an NGO.” 11:6 ¶ 17 In-depth individual face-to-face interview Nine.



Figure 6.3 Guidance procedure for developing an integrated community-based primary eye-care model

Multi-sectoral collaboration

Multisectoral collaboration is one of the main procedures identified in this study to provide optimal PEC services. Participation of policymakers, implementers, and decision makers is essential and productive in the provision of public health interventions. This model aimed to include multisectoral cooperation between the PHC team, district health offices, transport authorities, nongovernmental organizations, and local leaders with PECU. The main objective of multisectoral cooperation is to create a favourable environment for the provision of PEC services.

Community engagement

In eye-care service, community participation has been described as one of the most important procedures to accomplish the desired results (Murthy & Shamanna 2022:3). This model focusses on community participation as an important tool to ensure the optimal provision of PEC services. Community engagement is the key component of the success of public health interventions (Evans & Hudson 2014:4; WHO 2010b:18).

Community involvement is expected at all levels of the intervention and is considered vital to increase patient flow and the appropriate access and use of primary eye-care (Sabherwal et al 2022:1). The provision of outreach services is one of the contexts of the provision of PEC services in this model. Community involvement in the evaluation, design, planning, mobilisation, implementation, monitoring, and evaluation is compulsory to achieve the desired results.

Integration

The WHO Evidence-Based PEC Intervention Packages advocate for the integration of PEC-PHC for its contribution to improving eye health coverage and strengthening the eye-care system (Aghaji et al 2021a:2). Integration of PEC with the existing PHC system was found to be cost-effective in most developing countries. Even if its productivity is not studied well, Ethiopian MOH advocates integration (Ethiopian Ministry of Health 2016:16). This study identified the integration of PEC into PHC as a mandatory procedure to provide PEC services to the great community.

Capacity building

Capacity building is an important process to establish a knowledgeable community. This model refers to capacity building procedures to train service providers and other members of the PHCU. It is also important to create a community that facilitates optimal use of PEC services. Therefore, community members and front-line health personnel must be trained to improve provision and use.

Management support and follow-up

As mentioned in multi-sectoral cooperation, PEC is not an independent programme. In order to implement the proposed PEC model effectively, management support and robust monitoring are needed.

Dynamics

In this study, dynamics are presented as factors that shape the success of the proposed primary care model (Dickoff et al 1968:431). The optimal provision of PEC services that result in a reduction in avoidable blindness and low vision in the study area is determined by factors such as the knowledge and skills of the service providers, the presence of trained personnel, the suitability of supplies, equipment, and service delivery, good governance, community perspectives, awareness, and health-seeking behaviours. During model development, these dynamics are presented in four groups of readiness: service provider, organisation, community, and governance. Evidence identified during the study demonstrates the facts:

“Almost everyone in my village thinks that blindness is part of the natural ageing process and thinks there is no treatment for it.” 3:13 ¶18 in FGD One

“There is a fear of surgery in the community. Most people with eye complaints believe that surgery will cause permanent loss of vision rather than correction of vision.” 1:11 ¶ 15 in FGD Five

“There have been traditional remedies for eye problems in this community for a long time. Like epilation (plugging of the inverted eyelashes) and removal of pterygium from the cornea. The community considers that as a single treatment for their problem.” 4:9 ¶ 14 in FGD Six

“Additionally, there is low eye health-seeking behaviour in this community. They will wait until they develop corneal opacity or permanent loss of vision before coming to this unit for treatment.” 11:4 ¶ 13 In-depth individual face-to-face interviews Nine



Figure 6.4 Dynamics of the model

Organisational readiness

Organisational readiness is one of the dynamics identified during model development for optimal provision of PEC services. As evidenced in both phases of the study, the PECUs were not adequately equipped and supplied to provide PEC services.

“In this primary eye-care unit, there is a huge shortage of equipment and supplies for Trachomatous Trichiasis surgery, such as surgical gloves, sets, and surgical blades. There is also no well-organised and dedicated room for eye-care services.”

17:8 ¶ 15 In-depth individual face-to-face interview Two

Similarly, the result of the checklist-based assessment found that only a third of the PECUs were ready to provide PEC services with equipment, supplies, and service delivery according to the minimum national standard. Therefore, the readiness of the organisation providing the service is an important dynamic for the optimal provision of primary eye-care services.

Service providers' readiness

The study found that the availability, knowledge, and skills of primary eye-care providers were key factors in the provision of services. PECWs are vital, as explained in the section agents of change". Consequently, the readiness of these service providers is a driving force behind the development and implementation of the integrated Community-based PEC model.

Community readiness

Poor awareness, lack of eye health seeker behaviour, use of traditional remedies, fear of surgery, and surgical outcome were among the blockades identified to the use of PEC services in the study area associated with the readiness of the community. To achieve optimal provision of PEC services and thus reduce the high burden of blindness and low vision, community readiness is identified as a dynamic during model development.

Terminus or goal

The term refers to the possible outcome of an intervention (Dickoff et al 1968:426). The terminus/ goal of the model is the optimal provision of PEC services which contributes to the reduction of avoidable blindness and low vision, which in turn results in improving the quality of life in the study area. The optimal provision of primary eye-care services depends on the five key survey lists described in Sections 6.3.2.2.1. to 6.3.2.2.5. Direct quotes extracted from an in-depth individual face-to-face interview with a service provider demonstrate the need for a community-based integrated eye-care model.

"To improve the use of eye-care services, I think the delivery of a community-based eye-care service is mandatory. The living conditions and lifestyle of people living in this area are different from most parts of this Zone. Therefore, I strongly recommend the preparation and implementation of a pastoralist-centred eye health service that is conducive for them to access care wherever they go." 8:21 ¶ 19 In-depth individual face-to-face interview Eleven

“If the government made the service available nearby, no one would think twice about getting the service. There will be distance, cost, or fear of missing someone to accompany them when considering the use of primary eye-care services, especially among ageing, blind, and those with serious eye conditions. I am sure everyone will come and enjoy the service and our village will be free of eye problems.” 3:24 ¶ 26 in FGD One

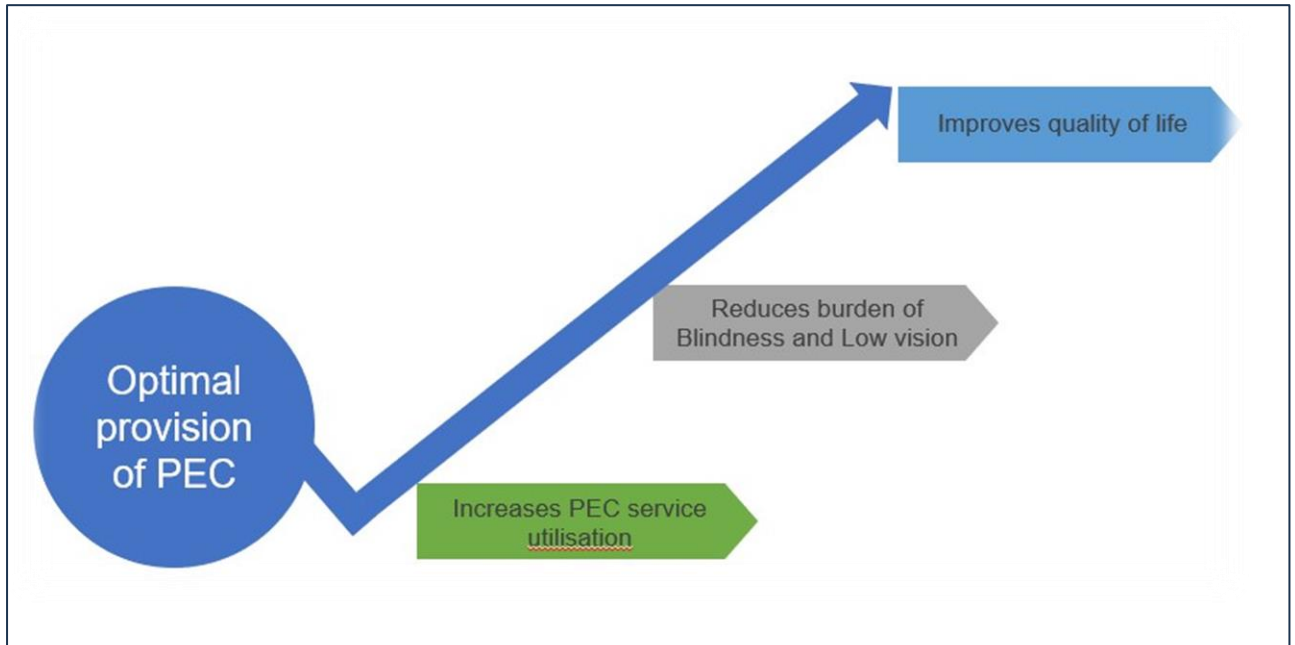


Figure 6.5 The terminus/goal of the model

6.3.2.2.3 Building relationships

In this phase of model development, relationships were built on key concepts of the study. The relationship between the concepts was built as follows:

- Optimal provision of PEC services can reduce the high burden of avoidable blindness and low vision, improving quality of life.
- The optimal provision of PEC services in the study area is dependent on the following dynamics identified by this study: knowledge and skill of service providers, presence of trained personnel, adequate supply, equipment, and service delivery, good governance, community perspectives, awareness and eye health-seeking behaviours of the community.

- Despite the good integration and application of the procedure and dynamics in the study area, different challenges can affect optimal provision, including poor eye health infrastructure, lack or shortage of trained eye health personnel, poor socioeconomic status, and level of the community.
- Optimal primary eye-care service provision depends on the well-organised participation of change agents and recipients. Knowledge, skills, and level of training of service providers and awareness and eye health-seeking behaviour of recipients may affect the PEC service provision.
- Primary eye-care services can be provided in a designated PECU, as part of other services within the PHCU, or through outreach programmes organised at satellite health facilities under the resistance of the PHC.
- The district health office, the zonal health department, the PHC, and NGOs must create a conducive environment for the optimal provision of PEC services.

6.3.3 Model explanation

According to Chinn and Kramer (2011:185), model development occurs once concepts are defined and categorised, and a relationship is built. Among many purposes, structure and assumptions are the key indicators to describe a model (Chinn & Kramer 2011:185). The integrated community-based PEC model is described below according to the three key indicators.

6.3.3.1 Purpose of the model

The model aimed to support the optimal provision of primary eye-care services for Ethiopians to contribute to reducing avoidable blindness and low vision and improving quality of life.

6.3.3.2 Structural explanation of the model

A structural explanation of a model gives an overall description of the model and its content. It helps to draw the relationship between concepts, their occurrence, and

interfaces. The integrated community-based primary eye-care model is described in Figure 6.6 with detailed descriptions of shape, colour, and basic components.

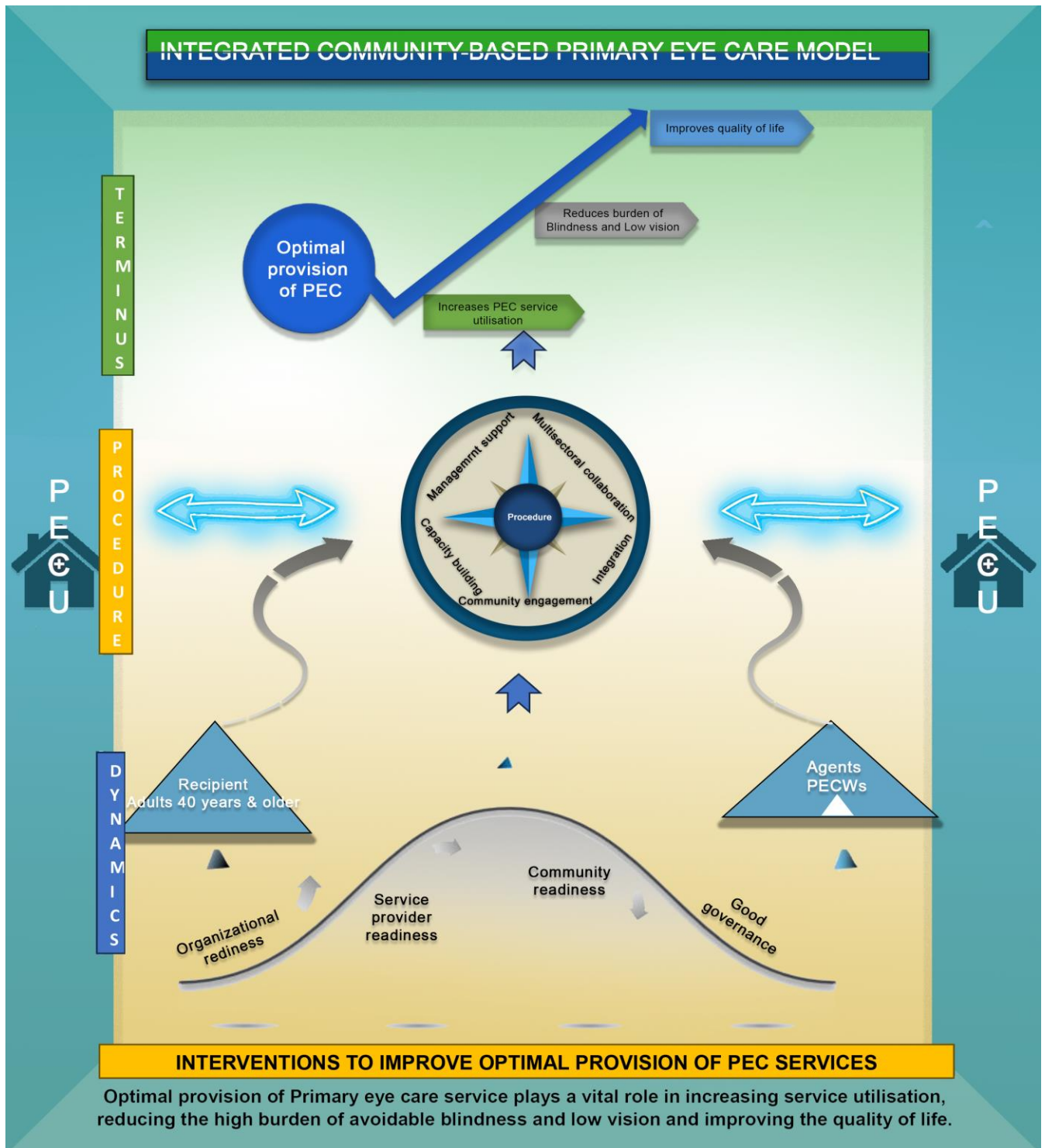


Figure 6.6 An integrated community-based primary eye-care model to support optimal primary eye-care service provision

(Developed by the researcher)

The model had six elements: change of agent, recipient, context, dynamics, procedure, and terminus. The description of the model components is displayed below:

- The outer layer of the model is symbolic to represent the study context, a PECU. A small black house symbol was inserted to represent the facility. The blue colour is used to represent positive energy and shows the level of hope and contribution of the context in the optimal provision of PEC services.
- The dynamics of the study is labelled on the basis to show their compulsory role as the basis of the model. The orange background colour represents the energy that the dynamic of the model shares.
- The agent and the recipients are labelled in light blue above the dynamics and are connected to show their interdependency.
- The procedure is placed in a circle to demonstrate continuous support for achieving the target/issue. The blue colour in the middle and the light blue colour that appears as a ray represent the hope of achieving the goal following the application of the procedures.
- The terminus/goal of the model is presented at the top. The three possible results of increased service use, a reduction in blindness burden, and improved quality of life were presented in the blue arrow to show hope and positive energy. The background of the terminus is light green in colour to show hope and the result of harmony.
- All arrows that move upward are used to show the movement of the action toward the achievement of the intended result.

6.3.3.3 Model assumptions

Assumptions refer to known or identified facts on which the model development is based and relationships are maintained. The assumptions also refer to the logical basis behind the development of the model (Dube & Rakhudu 2021:6). Therefore, they should be clearly presented.

The assumptions of the current model are presented below:

- Optimal provision of PEC services increases the use of PEC services, reduces the burden of blindness and low vision, and in turn improves quality of life.
- Primary eye-care workers are the main agents of change in the provision of PEC services, and if trained and equipped with the required knowledge and skills, they will provide quality PEC services to the larger group.
- Poor eye health infrastructure, lack or shortage of trained eye health personnel, poor socioeconomic status, and community awareness can affect the provision and use of PEC services.
- Organisational readiness, facility readiness, community readiness, and good governance are dynamics of PEC service delivery.
- For optimal provision of PEC services, the following procedures must be followed: service integration, multisectoral collaboration, community participation, management support, and follow-up and capacity building.

6.3.3.4 Model validation

Chinn and Kramer (2011:204) identified five criteria for validating a model prior to application. These criteria are clarity, generality, simplicity, importance, and accessibility (Chinn & Kramer 2011:204). This model was evaluated by study supervisors and field experts with experience. Their recommendations are incorporated.

Clarity: In this study, clarity was obtained by applying identical concept characterisation during the model development process. These concepts were classified by applying the steps of model development cited in Chinn and Kramer (2011:164) and the six steps of concept analysis as described in Dickoff et al (1968:423).

Simplicity: Refers to the intricacy of the structure and correlation between classification (Chinn & Kramer 2011:205). With this indicator, the structure of the model was found to be simple with a clear drawing of the relationship between categories.

Generality: This model was prepared to support optimal provision of PEC services in the rural South Omo Zone, Ethiopia, where there is a high burden of blindness and low vision and few facilities and PECWs that provide service with low-use reports. However, the model can be applied to any other part of the country or the world with a similar setting and situation.

Accessibility: The findings of this study will be shared with the Southern Ethiopia Region Public Health Institute (PHI), the South Omo Zone Health Department (ZHD), and the district health offices. Similarly, the results will be presented at annual scientific conferences and symposiums. Furthermore, the study will be published and distributed to the larger group in reputable journals.

Importance: the model is significant in improving the provision of the PEC service in the study area. The model will also contribute to the increase in the use of PEC services and to the reduction of blindness and low vision. Reduced blindness and low vision in the community improves overall quality of life.

6.3.3.4.1 Model evaluation by experts

The researcher selected seven experienced PEC experts, whose description is listed in Table 6.2. below, and shared the proposed integrated community-based primary eye-care model by email. The evaluators were drawn from Ethiopia's MOH, RHB, ZHD, universities, and NGOs working in the field. Experts evaluated the model with the five criteria of clarity, generality, simplicity, importance, and accessibility (Chinn & Kramer 2012:204).

They used four rating scales 'not acceptable', 'needed major revision', 'needed minor revision', and 'acceptable as described' (Annexure P). None of the experts scored 'not acceptable' or 'needed a major revision'. Two of the experts gave a 'needed minor revision' on two separate criteria and their comments were incorporated. The revised version was sent again to the experts for final confirmation. The model described in Section 6.3.3. incorporates those comments.

Table 6.2 List of experts involved in the evaluation of the integrated community-based primary eye-care model

Code of expert	Qualification	Area of expertise/place of work	Experience
PEC–OO1	MD, MPH, Consultant Ophthalmologist, Assistant Professor	PEC consultant, INGO leader, and researcher published twelve articles	A total of 29 years, of which eighteen were on PEC and research
PEC–OO2	PhD. in Public Health, Senior Public Health Professional Specialist, Assistant Professor of Public Health	Researcher, director, and research advisor at FMOH–Ethiopia. Published 23 articles	A total of 14 years, of which 8 were in research
PEC–OO3	MBA, MPH, and PhD. candidate. Expert public health professional	Trachoma, Eye-care, deputy country director of an INGO working in eye-care, published six articles on Ethiopian eye-care service delivery	More than 25 years, of which 9 were in eye-care
PEC–OO4	MSc., MPH, PhD. candidate at Ghent University. Assistant Professor of Public Health	Assistant Professor of the University and Researcher of Public Health. Publisher a total of eight articles	A total of 19 years in the research and academic area
PEC–OO5	B.Sc. MPH, Junior Public Health Expert	Neglected Tropical Diseases, Researcher, and Director at The Regional Health Bureau. Publisher 2 articles	A total of 23 years, of which fourteen were on NTD
PEC–OO6	MD, Ophthalmologist, assistant professor	Manager of the eye-care unit manager. Publisher 4 articles	A total of 9 years
PEC–OO7	B.Sc., MPH, Ph.D. Fellow at UNISA, Expert Public Health Professional	Public health intervention, Deputy Head of Zonal Health Department and published one article	A total of 21 years

6.3.3.4.2 *Operationalisation of the model*

The following intervention objectives and strategies were prepared to operationalise the model.

Objectives

The integrated community-based primary eye-care model is prepared with the following objectives:

General objective

The general objective of the integrated community-based primary eye-care model is to contribute to the optimal provision of PEC services in areas with a high burden of avoidable blindness and low vision with scarce facilities and service providers.

Specific objectives

The specific objectives of the model are as follows:

- Increase the use of primary eye-care services.
- Reduce the high burden of avoidable blindness and low vision.
- Increase awareness and access to PEC services.
- To improve quality of life.
- To create community participation.
- To create multisectoral collaboration and engagement.
- Increase the knowledge and skill of PECWs.
- To improve the readiness of PECUs in equipment, infrastructure, and service delivery.

Proposed strategies

The researcher proposed the following strategies to obtain the best result from the integrated community-based primary eye-care model.

Strategy 1: Capacity building

To implement this model, PECWs must receive basic training to fill the shortage and high turnover. The presence of trained and experienced service providers is one of the key determinants of service use. Consequently, comprehensive training based on the PEC package must be provided to at least two mid-level health workers per health centre. Additionally, refresher training or continuing medical education courses must also be provided to trained and deployed IECWs to refresh their knowledge and update their skills.

An orientation should also be provided for other members of the Primary Health Care Unit on basic PEC services so as not to miss any patient who comes to the unit during the absence of PECW. Community participation is one of the key components of this model. Therefore, training must be provided to front-line health personnel: HEWs, and HDAs to screen, escort, and refer patients with eye complaints to the PECU.

Strategy 2: Awareness creation

Having proper awareness is among the dynamics discovered in this study for the optimal use of PEC services. Therefore, awareness-creation activities must receive adequate attention to increase the use of services and reduce the burden of avoidable blindness and low vision in the community.

Strategy 3: Multisectoral collaboration

Optimal provision of primary eye-care service requires multisectoral collaboration and engagement. As identified during model development, sectors identified as having contributions to improved service delivery must be fully engaged for optimal PEC service provision.

Strategy 4: Community engagement

Community participation was also identified as a key factor in the optimal provision of PEC services. The community shall actively participate in the entire course of the provision of PEC services.

Strategy 5: Quality assurance practice

Quality assurance activities are among the key tools to measure service delivery and the effectiveness of the proposed PEC model. PECUs must be supported to provide the service, have a strong follow-up, eye-care-specific monitoring and evaluation systems, and have complete and quality data to improve the delivery of the service and contribute to the ultimate goal of improving quality of life.

Strategy 6: Expand PECUs

Distances, financial implications, and long waiting times are among the main barriers identified during the current study to the low use of PEC service use. To implement this model and improve the optimal provision of PEC services to the greater community, PECUs should be expanded.

Strategy 7: Integrated primary eye-care service

The amalgamation of basic PEC services into PHC is vital to achieve the goal proposed by the model. In Ethiopia currently, it is not feasible and efficient to advocate for a mobile primary eye-care service or vision centre due to the cost implications and living conditions of the community. Without further investment, it is possible to provide basic eye-care services in the existing PHCU, which was built for an average of 25,000 people.

Strategy 8: Equip PECUs with adequate supplies and equipment

Primary eye-care units must be provided and equipped with standard items according to the minimum national standards for a PECU. Furthermore, trained professionals must consider the functionalities of available equipment and supplies.

6.4 SUMMARY

This chapter presented the results of data integration, model development, and validation. The integrated community-based primary eye-care model was developed in two phases. Empirical phase: where four diverse groups of participants participated in two segments. The second phase was the model development phase done according to Chinn and

Kramer's (2011:164) model development guideline and Dickoff et al (1968:423) survey list of concept analysis. The components of the model include the following:

- Primary eye-care workers as agents of change.
- Adults, 40 years and older, as recipients.
- Primary eye-care unit as a context.
- Knowledge and skill of service providers, presence of trained personnel, adequacy of supplies, equipment, and service delivery, good governance, community perspectives, awareness, and eye health-seeking behaviours of the community (organisational readiness, community readiness, service provider readiness, and good governance) as dynamics.
- Provision of PEC services through integration, capacity building, multisectoral collaboration, community engagement, and management support and follow-up as a procedure.
- Optimal provision of PEC services as a goal/terminus.

The next chapter presents the conclusion, recommendations, limitations, and contribution of the study.

CHAPTER 7

CONCLUSION, RECOMMENDATIONS, CONTRIBUTION, AND LIMITATIONS OF THE STUDY

7.1 INTRODUCTION

The previous chapter presented the integration of the findings from the qualitative and quantitative studies. From the assimilation, an integrated community-based primary eye-care model was developed to support the optimal provision of primary eye-care services in the four districts of the Southern Omo Zone, Ethiopia. Experts validated the proposed primary eye-care model. The conclusion and the recommendation section presented here considered that.

In this chapter, the conclusions, recommendations, contributions, and limitations of the study were presented. Recommendations were proposed for primary eye-care workers, district, Zone, region, and ministry-level implementers of primary eye-care, policymakers, and scholars interested in conducting studies in the field.

7.2 OVERVIEW OF THE STUDY

The purpose of this study was to develop a model to support optimal provision of primary eye-care services by exploring and describing the provision of eye-care in the rural Southern Omo Zone, Ethiopia.

7.2.1 Research design and methods

In this study, a three-phased sequential exploratory mixed-method research design approach was applied. The experiences of adults aged 40 years and older who used primary eye-care services in the last six months and the experience of the service providers were triangulated with the knowledge and skills of primary eye-care workers and the readiness of primary eye-care units in the four districts of the study area. During Phase I, qualitative data were collected through FGD and in-depth individual face-to-face interviews. On the other hand, quantitative data was collected in Phase III through a self-

administered questionnaire and checklist developed during the second Phase of the study. Finally, the data was combined, and an integrated community-based PEC model was developed and validated by PEC experts to support optimal provision of PEC service provision.

This study was carried out in four districts of the South Omo Zone, Ethiopia. A total of six FGDs, 12 in-depth individual face-to-face interviews, 103 self-administered questionnaire-based assessments, and 32 checklist-based evaluations were conducted with four different groups of participants. ATLAS.ti and SPSS software was used to analyse the results of the qualitative and quantitative study, respectively. The results of the FGD were presented within three themes, seven categories, and 22 sub-categories, and those of the in-depth individual face-to-face interviews in four themes, 10 categories, and 30 sub-categories.

The results of the evaluation of the knowledge and skills of PECWs and the readiness of PECUs in infrastructure, equipment, and service delivery were presented through tables, graphs, means, and frequencies. The association of variables was processed using a logistic regression model. Crude odds ratios were calculated to determine the strength of association and AOR was used to control the effect of confounders. Bivariate analysis at a significance level of 0.25 was included in the multivariate analysis. Finally, the association of predictor variables with the outcome variable was presented using the AOR with its 95% CI.

To guarantee the worth of the study, the researcher followed the criteria for improving trustworthiness, validity, and reliability. Credibility, dependability, confirmability, transferability, authenticity, weakness minimisation, and validity and reliability (Creswell & Hirose 2019:24). Before conducting the study, ethical clearance was obtained from all gatekeepers: including UNISA CREC, Southern Ethiopia PHI, South Omo Zone Health Department, and the four district health offices. Written informed consent was collected from all study participants prior to data collection.

7.2.2 Overview of the qualitative study result (Phase I)

During Phase I, data was collected through FGDs and in-depth individual face-to-face interviews. The participants in the focus group discussion were adults, 40 years and older,

who had used primary eye-care services in the last six months. In-depth individual face-to-face interviews were conducted with trained and certified primary eye-care workers who worked in public primary eye-care units for a year, were permanent employees of the unit, and provided service during the study time. The study finding shows that the use of primary eye-care services in the four districts of the South Omo area, Ethiopia, was low and fenced with many barriers. The summary of the study findings is presented below in two sections.

7.2.2.1 Overview of the findings of the focus group discussions

The overview of the results of the FGDs is presented and categorised into emerging themes to respond to the first objective of the study: explore and describe the experience of adults who used primary eye-care services in the four districts of the South Omo Zone, Ethiopia.

The themes developed were:

- The experience of community service use.
- Barriers to primary eye-care services.
- Suggestions to improve primary eye-care services.

7.2.2.1.1 Experience of community service use

During FGD, most study participants reported that they encountered bad experiences in the last six months when accessing primary eye-care services. The factors identified that affect the use of community primary eye-care services were classified and presented under three categories: service-related, service provider-related, and service access. The service-related experiences reported were lack of world-class service, presence of disrespectful service providers, inadequate information, and lack of escorts.

Language barriers, seasonal use of services, and lack of commitment were given as factors related to service providers for the poor use of primary eye-care services in the four districts of the Southern Omo Zone, Ethiopia. From the service access point of view, three factors were identified: long waiting time, distance to travel, and financial implications.

7.2.2.1.2 Barriers to primary eye-care services

Participants in the FGD identified the presence of quality and awareness gaps as barriers to primary eye-care services. The quality gaps identified in this study were inefficient eye-care services, unspecialised service providers, and service inequity. The awareness gap includes the lack of information and messages, fear of surgery, and the use of Indigenous knowledge.

7.2.2.1.3 Suggestions to improve primary eye-care services.

To improve the poor use of primary eye-care services in the four districts of the South Omo Zone, Ethiopian participants identified two areas of improvement: service and use. To achieve better services, the expansion, attention, and deployment of service providers were suggested. Finally, to improve the use of primary eye-care services in the study area, the participants suggested reconciling primary eye-care units, creating awareness, and the expansion of outreach services.

7.2.2.2 Overview of the in-depth individual face-to-face interview findings

The overview of the in-depth individual face-to-face interview results is presented below under the developed themes of the study to respond to the second objective of the study: explore and describe the barriers faced by PECWs in the provision of primary eye-care services in the four districts of the South Omo Zone, Ethiopia.

The themes were:

- The experiences of service providers
- The preferred mode of service use
- Barriers to primary eye-care services
- Suggestions to improve primary eye-care services.

7.2.2.2.1 The experiences of service providers

Following in-depth individual face-to-face interviews with trained and certified primary eye-care workers, the experiences of service providers were presented in two categories,

service providers' perspectives and service access. From the perspective of service providers, seasonal service provision, integrated outreach service likings, and work overload were reported as factors that hindered the use of primary eye-care services. From the service-access point of view, three factors were illustrated: preference for time, geographic inaccessibility, and direct and indirect treatment costs.

7.2.2.2 Preferred mode of service utilisation

The community preference for primary eye-care service delivery modes has been reported to affect primary eye-care service utilisation. Under these themes, two categories and six sub-categories were identified. The lack of comprehensive eye-care services, the need for foreign service providers, and the community's predilection for free service were reported as static clinic-related factors that affect the use of primary eye-care services. Variables of age and disability, inconvenient service provision sites, and community beliefs were presented as outreach-related factors for the low use of primary eye-care services in the four districts in the South Omo Zone, Ethiopia.

7.2.2.3 Barriers to primary eye-care services

During the current study, the participants in the in-depth individual face-to-face interviews identified the presence of a knowledge gap, a service gap, and a leadership and management gap as barriers to primary eye-care services. The awareness gap includes the information gap, the dearth of eye health seeker behaviour of the community, and the use of indigenous knowledge. The service-related gaps identified in this study were poor eye health infrastructure, lack of equipment and supplies, and lack of trained workforce. The leadership and management gap incorporated barriers such as loose relationships, lack of management support, and insufficient clean water.

7.2.2.4 Suggestions to Improve primary eye-care services

To improve poor utilisation of primary eye-care services in the study area, participants in this group identified three areas of improvement: administration, service, and use. They suggested administrative improvements in service integration, service expansion, and attention to eye-care services. To achieve better service, the participants suggested training for service providers, standardisation of primary eye-care units, and provision of

supplies and equipment. Finally, to improve the use of primary eye-care services in the four districts of the South Omo Zone, Ethiopia, the provision of need-based eye-care services, awareness creation, and advocacy were suggested by study participants.

7.2.3 Overview of the results of the quantitative study (Phase III)

Quantitative data was collected through a self-administered questionnaire and a checklist developed based on the findings of the qualitative study. Respondents in the self-administered questionnaire were mid-level health workers who provided primary eye-care services in the study area. A checklist was applied to assess the readiness of all primary eye-care units with respect to infrastructure, instruments, consumables, equipment, and service delivery found in the study area. The quantitative result was generated from 103 self-administered questionnaires and 32 checklists. The overview of the quantitative result is presented in two sections.

7.2.3.1 Overview of the knowledge and skill assessment (self-administered questionnaire)

A self-administered questionnaire was used in the third phase of the study to respond to the third objective of the study: assess the knowledge and skills of primary eye-care workers in the four districts of the South Omo Zone, Ethiopia.

During this study, different mid-level healthcare workers were found to provide primary eye-care services in the four districts of the South Omo Zone, Ethiopia. The source of eye-care diagnosis and treatment for the majority, 47 (45.6%), of the respondents was their pre-service training. More than half (55.3%) of the study respondents reported having never received any training in primary eye-care while providing basic eye-care services. In terms of service provision, the majority (57.3%) provide primary eye-care services to less than 10 patients each month, and only 8 (7.8%) of the respondents reported seeing an average of 50 or more patients per month.

The result of the knowledge assessment showed that only 27 (26.2%) of the study respondents correctly recognised the definition of blindness as the inability to see 3/60 in the best eye with the best possible correction, while the majority, 59 (57.3%), defined blindness as loss of light perception. Only 36 (35%) of the respondents correctly identified

at least three of the five (60%) risk factors for Trachoma and 33 (32%) participants correctly acknowledged at least four of the six signs and symptoms of Trachoma in the study area. Most of the study respondents correctly identified the WHO-endorsed Trachoma elimination strategy.

Cataracts and Glaucoma were correctly identified by 57.3% and 39.8% of study respondents as causes of loss of vision without pain. Only 24 (23.3%) of the respondents identified at least four of the six common risk factors for cataracts in the study area. Of the respondents, 89 (86.4%) correctly identified Vitamin A deficiency as the leading cause of night blindness.

Skill assessment showed that only 32% of the study respondents correctly identified the instrument required to evert the upper eyelid. Sixty-one (59.2%) respondents correctly recognised epilation forceps as an instrument to remove an inverted eyelash. Additionally, 56 (54.4%) mid-level health workers found that providing primary eye-care services detected the instrument needed to remove foreign bodies from the eye. Almost three-quarters of the respondents, 76 (73.8%) correctly detected the procedure to follow during an acid burn to the eye. The vast majority (91.3%) pinpointed the acceptable procedure of irrigating with water or removing with a cotton bud. A massive, 84 (81.6%) branded six metres as the correct distance to measure visual acuity. Only 29 (28.2%) of the study respondents correctly knew ocular conditions which they could skip when taking a detailed history.

In summary, the knowledge and skill evaluation conducted in the four districts of the South Omo Zone in Ethiopia found that the majority of the study respondents did not have sufficient knowledge and skills to provide primary eye-care services. The mean score of the knowledge and skill assessment respondents was 13.63 of 22 selected variables with a standard deviation of 3.03. Of the study respondents, less than half (48.5%) had intermediate-level (good) knowledge and skills required from primary eye-care workers. The multivariate association revealed that receiving additional training (P-value - 0.005), serving more patients per month (P-value <0.001), and having a first degree (P-value - <0.001) had a significant statistical association with having intermediate knowledge and primary eye-care.

Hence, those who serve more than fifty patients per month were 25.44 [AOR 25.44; 95% CI: 4.06–159.45] times more likely to have the correct primary eye-care knowledge and skill than those who serve 1 to 10 patients per month. Similarly, those who received supplementary training were 100.5 [AOR 100.49; 95% CI: 3.96–2,551.58] times more likely to have the correct knowledge and skill of primary eye-care than those who learnt from professional colleagues. Those with a first degree were 23.92 [AOR 23.92; 95 % CI 4.88–117.23] times more likely to have intermediate knowledge and skill in primary eye-care services than those with a diploma.

7.2.3.2 Overview of primary eye-care assessment (checklist)

A checklist was used in Phase III of the study to respond to the fourth objective of the study: assess the readiness of primary eye-care units in equipment, infrastructure, and service delivery in the Southern Omo Zone, Ethiopia.

The result of the infrastructure, equipment, and service delivery assessment conducted in four districts of the South Omo area, Ethiopia, showed that only 11 (34.4%) of the primary eye-care units had separate rooms for detection and counselling. Less than one-fifth, 6 (18.8%) of the primary eye-care units had a separate room for the provision of Trachomatous Trichiasis surgery. In summary, only 39.53% of primary eye-care units were found to have the minimum infrastructure standard to provide primary eye-care services.

The assessment also revealed that only 10 (31.25%) primary eye-care units had the minimum number of instruments, consumables, and equipment needed to provide primary eye-care services. Evaluation of service delivery found that less than a third, 27.23% of units meet the standard of primary eye-care service delivery. The overall result of the evaluation of infrastructure, instruments, consumables, and equipment and service delivery assessment held in the four districts of the South Omo Zone, Ethiopia, showed that only a third, 32.63% of primary eye-care units were ready to provide service as required by the minimum requirement standard.

7.2.4 Overview of data integration, model development, and validation

The final step of the study was data integration, model development, and validation. This phase responded to the last objective of the study: develop and validate a primary eye-care model to support the optimal provision of eye-care services.

Accordingly, the results of the qualitative and quantitative studies were amalgamated and an integrated community-based primary eye-care model was developed and validated. The result of data integration showed that primary eye-care services were not well integrated into the primary health care system in the study area. The poor infrastructure for eye health and the shortage of service providers, equipment, and supplies were identified in both Phases of the study. The presence of poor eye health infrastructure, knowledge, and skill gaps in service providers, in addition to the awareness gap in the community, contributed to the low use of primary eye-care services and the reported inequity in the study area. Geographic factors and direct and indirect costs were also associated with the quality of the service provider and the standard of the primary eye-care units.

Following data integration, an integrated community-based PEC model is developed. In this phase, the study levels went through the empirical and model development. During the phase of model development, the study identified primary eye-care workers as agents of change, adults 40 years and older as recipients of primary eye-care services, primary health care units as the context for the provision of health care services, multisectoral collaboration, community engagement, integration, management support, and capacity building as a procedure, determinants in the provision of PEC: organisational readiness, service provider readiness, community readiness, and good governance as a dynamics, and the optimal provision of PEC services contributing to the reduction of avoidable blindness and low vision as the terminus.

Finally, the model was validated by PEC experts and researchers using the standard criteria cited in Chinn and Kramer (2011:204): simplicity, generality, importance, clarity, and accessibility.

7.3 CONCLUSION

The result of the study showed that the use of primary eye-care services in the four districts of the Southern Omo Zone of Ethiopia was low. For the low use of primary eye-care services, different factors were explored and described. From a community perspective, the lack of world-class service, the presence of disrespectful service providers, inadequate information, and lack of escorts were the main factors related to service. Language barrier, seasonality of service use, and provider lack of commitment were presented as factors related to service providers for low utilisation.

The long waiting time, the distance to travel, and the financial implications were service access-related factors presented as community experiences of the low use of primary eye-care services in the four districts of the South Omo Zone, Ethiopia. Participants in the FGD identified awareness and quality gaps as a barrier to primary eye-care services. The quality gap was caused by inefficient eye-care services, unspecialised service providers, and inequity in service. Similarly, the awareness gap was explained by a lack of information, fear of surgery, and the use of indigenous knowledge.

To improve the poor use of primary eye-care services, service users suggested two areas of improvement: service and use. To achieve better services, the expansion, attention, and deployment of more service providers was suggested. Finally, to improve the use of primary eye-care services in the study area, participants suggested using accommodative primary eye-care units, creating awareness, and expanding outreach services.

In-depth individual face-to-face interviews with primary eye-care workers identified different barriers to primary eye-care services. Consequently, seasonal service provision, integrated outreach service preferences, and work overload were reported as barriers to the use of primary eye-care services. From the service access point of view, three factors were described that affect primary eye-care services: community time preference, geographic inaccessibility, and direct and indirect costs of treatment.

The preference of the community for the mode of delivery of the service was also identified as a reason for the low use of primary eye-care services in the study area. The lack of comprehensive eye-care services, the need for foreign service providers, and the community's preference for free service were reported as static clinic-related factors that

affect the use of primary eye-care services. Variables of age and disability, inconvenient service provision sites, and wrongly-held by the beliefs community were also presented as outreach-related factors for the low use of primary eye-care services in the four districts of the South Omo Zone.

Barriers to primary eye-care services identified by service providers were classified into awareness gap, service gap, and leadership and management gap. The awareness gap includes the information gap, the dearth of the eye health seeker behaviour in the community, and the use of indigenous knowledge. Service-related gaps recognised in this study were poor eye health infrastructure, lack of equipment and supplies, and shortage of trained workforce. The leadership and management gap incorporated barriers such as loose relationships, lack of management support, and insufficient clean water.

To improve the poor provision and use of primary eye-care services, participants in in-depth individual face-to-face interviews identified three areas of improvement: administration, service, and use. They suggested administrative improvements in service integration, service expansion, and attention to eye-care services. To achieve better service, the participants suggested training for service providers, standardisation of primary eye-care units, and provision of supplies and equipment. Finally, to improve the use of primary eye-care services in the study area, the provision of need-based eye-care services, awareness creation, and advocacy was suggested.

The result of the knowledge and skill assessment showed that most of the study respondents did not have the sufficient knowledge and skills to provide primary eye-care services. The mean score of the study respondents was 13.63 of 22 selected variables with a standard deviation of 3.03. Of the mid-level healthcare workers who were found to provide primary eye-care services, less than half were found to have intermediate level (good) knowledge and skills required of primary eye-care workers. The multivariate association revealed that receiving additional training (P-value - 0.005), serving more patients per month (P-value <0.001), and having a first degree (P-value - <0.001) had a significant statistical association with having intermediate knowledge and skills of primary eye-care.

The result of the evaluation of infrastructure, equipment, and service delivery showed that fewer than half of primary eye-care units have the minimum infrastructure standard. Only

a third had the minimum number of instruments, consumables, and equipment needed to provide primary eye-care services, and hence met the standard of primary eye-care service delivery. In total, only a third of primary eye-care units were prepared to provide service according to the minimum requirement standard.

In summary, primary eye-care services were not well integrated into primary health care services in the study area. Both service provision and utilisation were found to be low. On the other hand, a critical shortage is observed in infrastructure, equipment, service delivery, and knowledge and skills of service providers. To fill the gap and optimise the provision of PEC services, the study developed an integrated PEC model that has six components. The main objective of the model is to support the optimal provision of PEC services to Ethiopians. This will increase the use of services and reduce the burden of avoidable blindness and low vision in the country. This, in turn, will help to improve the quality of life of the community. The model will serve as baseline data for other researchers to develop a model in situations with high burdens and low utilisation.

The model considered primary eye-care workers as agents of change, adults 40 years and older as recipients, primary health care units as the context for the provision of health care services, multisectoral collaboration, community engagement, integration, management support, and capacity building as a procedure, determinants in the provision of PEC: organisational readiness, service provider readiness, community readiness and good governance as a dynamics, and optimal provision of PEC services contributing to the reduction of avoidable blindness and low vision as the terminus. The model was evaluated by PEC experts and found to meet the standard model evaluation criterions.

7.4 RECOMMENDATIONS

Grounded in the results of the study discussed in Chapters 4, 5, and 6, the following recommendations were forwarded to primary eye-care workers, The District Health Office, the Zonal Health Department, eye-care NGOs, the Ministry of Health, and the transport authority to improve the provision and use of primary eye-care services.

7.4.1 Recommendations for the Ethiopian Federal Ministry of Ethiopia

- The Ministry of Health should ensure the uniformity of primary eye-care services throughout the country, which guarantees the provision of world-class service to every citizen.
- The Ministry of Health should advocate for eye health care at all levels.
- The Ethiopian Federal Ministry of Health should ensure the equity of primary eye-care services.
- The Ministry of Health should pay attention to eye-care services in general.
- The Ministry of Health should prepare and advocate National Multi-Sectoral Collaboration Strategic Guidelines for PEC.

7.4.2 Recommendations for the transport authority

- Having quality eye-care services at a reachable distance is a basic right of all citizens. The authority should ensure that access to villages and primary eye-care units is established and conducive for patients with ocular problems.

7.4.3 Recommendation to eye-care NGOs

- NGOs should provide adequate technical support to optimally provide primary eye-care services in the country.
- NGOs should support the training and development of career paths for primary eye-care workers.
- NGOs should support the establishment and expansion of primary eye-care units, especially in areas of hard reach.
- NGOs should support the implementation of a strong and workable eye-care-specific monitoring and evaluation system.

7.4.4 Recommendations for the Zonal Health Department

- As an immediate leading organisation, the Zonal Health Department should create an encouraging environment and a management system for the provision of uninterrupted primary eye-care services in all districts.

- The Zonal Health Department should deploy an adequate number of trained primary eye-care service providers to alleviate the suffering of service users due to a shortage of trained workforce.
- The Zonal Health Department should expand and integrate primary eye-care services for the best benefit of the community.
- The Zonal Health Department should make routine eye-care-specific monitoring and evaluation visits to districts and primary eye-care units.
- The Zonal Health Department should maintain the infrastructure, instruments, equipment, and service delivery standards of the primary eye-care units in all districts.

7.4.5 Recommendations for the District Health Offices

- The district health office should ensure the quality of the primary eye-care service provided.
- As a vital part of the primary health care unit, eye-care units should be conducive to service users, and the district health office should avail accommodative units for all groups of service users.
- The district health office should address the poorest and most marginalised members.
- The district health office should fill the instrument, equipment, and supply shortages to increase utilisation.
- The district health office should fill the knowledge and skill gap of primary eye-care workers by organising basic and refresher training.
- The district health office should conduct routine eye-care-specific monitoring and evaluation visits and follow-ups to primary eye-care units.
- The district health office should create a favourable working environment that advocates for the integration of primary eye-care-primary health care.

7.4.6 Recommendations for primary eye-care workers

To improve the low provision and use of primary eye-care services in the study area, the following recommendations were made to primary eye-care workers.

- Primary eye-care workers should involve the community throughout the course of the provision of primary eye-care services.
- It is the responsibility of healthcare workers to be professional and ethical. Primary eye-care workers should be ethical, caring, and respectful.
- Primary eye-care workers should provide standard and community-focused eye-care services.
- The primary eye-care workers should create awareness and provide adequate eye health information to the larger group.
- Primary eye-care workers should strengthen the follow-up of routine eye-care services.
- The primary eye-care workers should always provide quality eye-care services for the needy.
- Primary eye-care workers should update themselves with the latest developments in the field.

7.4.7 Recommendations for further studies

- The findings of this study presented the use of primary eye-care services, the challenges and barriers to primary eye-care services, the knowledge and skills of service providers, and the readiness of primary eye-care units in the four districts of the South Omo Zone, Ethiopia. Researchers should conduct more studies on this topic in other parts of the country to provide better PEC services to Ethiopians.
- The national eye-care strategic plan and its implementation, quality of primary eye-care service delivery, level of patient satisfaction, referral linkage of primary eye-care units, and its contribution to the reduction of blindness need further studies. Such studies will complete the circle of primary eye-care service provision.

7.5 CONTRIBUTION OF THE STUDY

- This study applied an exploratory sequential mixed method study design and explored and described the primary eye-care service provision in the four districts of the South Omo Zone. Very few studies have been conducted in the country on primary eye-care service provision, and most of them used quantitative research methods to describe the study topic. This study bridged the gap by applying both

qualitative and quantitative methods to investigate the provision of primary eye-care services from all corners and presented a complete picture.

- The findings of this study greatly contribute to policy makers, decision makers, implementers, and all stakeholders in the field. This study explored and described primary eye-care services applying four different data collection methods with four different groups. The experience of the community, the provider, and the service presented new knowledge and areas of attention for optimal provision of primary eye-care services.
- Most importantly, a new model was developed and validated to support the optimal provision of eye-care services to Ethiopians by integrating the study findings. The developed model was new to the country and will greatly contribute to improving service provision and use, resulting in a reduced burden of avoidable blindness and low vision. That will in turn contribute a great deal to improving quality of life.
- Finally, the findings of this study will serve as a basis for further studies in the field.

7.6 LIMITATION OF THE STUDY

- This study was carried out in four districts of the South Omo Zone in Ethiopia, which is one of the remotest areas of the country. The findings of this study may not be generalised to primary eye-care services in other parts of the country. However, the methodological procedure followed was presented to support the replicability of the study.
- Due to the low number of primary eye-care units in the study area, the sample size used to assess primary eye-care units was small. This may affect the generalisation of the readiness of primary eye-care units in the South Omo Zone, Ethiopia.
- Few studies were carried out in the country on the provision and use of primary eye-care services. It was difficult to access the literature in the field and the researcher faced a challenge in formulating the study and drawing a discussion. Due to that, the discussion of the study is based on findings from the sub-Saharan region and other LMICs.

7.7 CONCLUDING REMARKS

This study explored and described the primary eye-care service provision in four districts of the South Omo Zone, Ethiopia. This study applied an exploratory sequential mixed-method study design. Qualitative data was collected using focus group discussions and in-depth individual face-to-face interviews. Quantitative data was collected using a self-administered questionnaire and checklist. The study participants were adults, 40 years and older, who used primary eye-care services, trained, and certified primary eye-care workers, mid-level health care workers who provided eye-care services in public primary eye-care units, and primary eye-care units providing service for at least 6 months. The findings of this study will greatly contribute to policy makers, decision makers, and all stakeholders in the field, as discussed in Section 7.5.

The main findings of this study are that the use of primary eye-care services in the four districts of the Southern Omo Zone of Ethiopia was low. For the low use of primary eye-care services, different barriers were explored and described. The result of the knowledge and skill assessment showed that most of the study participants did not have adequate knowledge and skills to provide primary eye-care services. Of the mid-level healthcare workers who were found to provide primary eye-care services, less than half, 50 (48.5%) were found to have intermediate level (good) knowledge and skills required of primary eye-care workers. The receipt of additional training, serving more patients, and having a first degree were found to have a significant statistical association with intermediate (good) knowledge and skills in primary eye-care.

The result of the evaluation of infrastructure, instruments, consumables, and equipment and the evaluation and service delivery carried out in the four districts of the South Omo area of Ethiopia showed that only 32.63% of the primary eye-care units were prepared to provide service according to the minimum national standard. An integrated community-based primary eye-care model was developed to support the optimal provision of eye-care services to Ethiopians.

Finally, based on the findings, recommendations were forwarded to primary eye-care workers, the district health office, the ZHD, NGOs, the Ministry of Health, and transport authorities to improve the provision and use of PEC services. The findings of this study will be published in a reputable journal.

LIST OF REFERENCES

- Abdul Rahman, AA, Rabi, MM & Alhassan, MP. 2015. Knowledge and practice of primary eye-care among primary healthcare workers in northern Nigeria. *Tropical Medicine and International Health* 20(6):766-772.
- Abrol, S & Kumar, KC. 2021. Primary Eye-care Model in India. *Community Eye Health Journal South Asia* 34(113):15-16.
- Aghaji, A, Burchett, H, Hameed, S, Webster J. & Gilbert, C. 2020. The technical feasibility of integrating primary eye care into primary health care systems in Nigerian condition: Protocol for a mixed methods cross-sectional study. *JMIR Research Protocols* 9(10):1-12.
- Aghaji, A, Burchett, H, Mathenge, W, Faal, HB, Umeh, R, Ezepue, F, Isuiyaki, S, Kyari, F, Wiawe, Foster, A & Gilbert CE. 2021. Technical capacities needed to implement the WHO's primary eye care package for Africa: Results of a Delphi process. *BMJ Open* 11(3):1-15.
- Aghaji, A, Burchett, H, Oguego, N, Hameed, S & Gilbert, C. 2021a. Primary health care facility readiness to implement primary eye care in Nigeria: Rquipment, infrastructure, service delivery, and health management information systems. *BMC Health Services Research* 21(1360):1-11.
- Aghaji, A, Burchett, H, Oguego, N, Hameed, S & Gilbert, C. 2021b. Human resource and governance challenges in the delivery of primary eye care: a mixed-method feasibility study in Nigeria. *BMC Health Services Research* 21(1321):1-14.
- Aghaji, A & Gilbert, C. 2021. Policies for primary eye health care in Nigeria: A Case Study. *Community Eye Health Journal* 34(113):82-83.
- Aghaji A, Gilbert C, Ihebuzor, N & Faal, H. 2018. Strengths, challenges, and opportunities of implementing primary eye care in Nigeria. *BMJ Global Health* 3(10):1- 5.

Akuffo, K, Sewpaul R, Dukhi, N, Asare, A, Kumah, D, Addo, E, Agyei-Manu, E & Reddy, P. 2020. Eye care utilization pattern in South Africa: results from SANHANES-1. *BMC Health Services Research* 20(756):1-12.

Akwataghibe, N, Samaranayake, D, Lemiere, C & Dieleman, M. 2013. Assessing health workers' revenues and coping strategies in Nigeria – a mixed methods study. *BMC Health Services Research* 13(1):387.

Al-Aswad Lama, A, Rakitina, E. 2023. Transformation of eye care through innovations. *Asia-Pacific Journal of Ophthalmology* 12(1):1-3.

Alemayehu, M & Meskele, M. 2017. Health care decision making autonomy of women from rural districts of Southern Ethiopia: A community-based cross-sectional study. *International Journal of Women's Health* 9:213-221.

Ames, H, Glenton, C & Lewin, S. 2019. Purposive sampling in a qualitative evidence synthesis: A worked example from a synthesis on parental perceptions of vaccination communication. *BMC Medical Research Methodology* 19(1):1-9.

Amin, MEK, Nørgaard, LS, Cavaco, AM, Witry, MJ, Hillman, L, Cernasev, A & Desselle, SP. 2020. Establishing trustworthiness and authenticity in qualitative pharmacy research. *Research in Social and Administrative Pharmacy* 16(10):1472-1482.

Amritanand A, Paul, P, Jasper, S, Prasanna, S, Kumar, V & Abraham, V. 2018. Incorporating primary eye care into primary health care: Piloting a perceived visual disability questionnaire-based model in rural Southern India – An observational study. *Indian Journal of Ophthalmology* 66(7):657-662.

Apuke, OD. 2017. Quantitative research methods a synopsis approach. *Arabian Journal of Business and Management Review* 6(10):1-8.

Arifin, SRM. 2018. Ethical considerations in qualitative study. *International Journal of Care Scholars* 1(2):30-33.

Asenahabi, BM. 2019. Basics of research design: A guide to selecting appropriate research design. *International Journal of Contemporary Applied Research* 6(5):76-89.

Audu, M. 2020. *Primary health care In Nigeria: 42 years after Alma Ata declaration. Sydani Initiative for international development*. Research gate (accessed 6 January 2023).

Babbie, E. 2013. *The practice of social research*. 3rd edition. Singapore: Cengage Learning.

Babbie, E. 2016. *The practice of social research*. 4th edition. Singapore: Cengage Learning.

Badrinath, S. 2020. The Sankara Nethralaya Community Model – technology and evidence-based comprehensive quality eye care equally to all. *Indian Journal of Ophthalmology* 68(2):288-290.

Bailey, C, Blake, C, Schriver, M, Cubaka, VK, Thomas, T & Martin, HA. 2016. A systematic review of supportive supervision as a strategy to improve primary healthcare services in sub-Saharan Africa. *International Journal of Gynecology Obstetrics* 132(1):117-125.

Beins, BC & McCarthy, MA. 2012. *Research methods and statistics*. New York: United States of America: Pearson Education.

Bennett, PN, Wang, W, Moore, M & Nagle, C. 2017. Care partner: A concept analysis. *Nursing Outlook* 65(2):184-194.

Bhoosnurmath, K. 2017. Hospital-based community eye health programme: A model for elimination of avoidable blindness on a sustainable basis. *Community Eye Health Journal*. 30(98):12-15.

Blanchet, K & Finger, RP. 2015. A need for more equity in the prevention of blindness. *Ophthalmic Epidemiology* 22(5):293-294.

Booth, A, Sutton, A, Clowes, M & James, MM. 2022. *Systematic approach to a successful literature review*. 3rd edition. London: Sage.

Boru, T. 2018. *Research design and methodology*. PhD thesis. Pretoria: University of South Africa.

Bourne, RR. 2021. Causes of blindness and vision impairment in 2020 trends over 30 years, and prevalence of avoidable blindness about VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study. *Lancet Global Health* 9:144-160.

Bourne, R. 2021. Trends in prevalence of blindness and distance and near vision impairment over 30 years: An analysis for the Global Burden of Disease Study. *Lancet Global Health* 9:130-143.

Bouso, RS, Poles, K & Monteiro da Cruz, DL. 2013. Nursing concepts and theories. *Theoretical study, Rev ESC Enferm USP* 48(1):141-145.

Bowling, A. 2014. *Methods in health: Investigating health and health services*. 4th edition. Maidenhead. Berkshire: Open University Press.

Bright, T, Kuper, H, Macleod, D, Musendo, D, Irunga, P & Yip, JLY. 2018. The population needs for primary eye care in Rwanda: A national survey. *PLoS ONE* 3(5):1-15.

Brink, H, Van der Walt, CV & Van Rensburg, GH. 2014. *Fundamentals of research methodology for healthcare professionals*. Cape Town: Juta.

Brink, H, Van der Walt, CV & Van Rensburg, GH. 2018. *Fundamental of research methodology for health care professionals*. 4th edition. Cape Town: Juta.

Burn, H, Hamm, L, Black, J, Burnett, A, Harwood, M, Burton, M, Evans, J & Ramke, J. 2021. Eye care delivery models to improve access to eye care for Indigenous peoples in high-income countries: A scoping review. *BMJ Global Health* 6:1-23

Burn, H, Puri, L, Roshan, A, Singh, SK & Burton, MK. 2020. Primary eye care in Eastern Nepal. *Ophthalmic Epidemiology* 27(3):165-176.

Burns, N & Grove, SK. 2017. *The practice of nursing research*. 6th edition. St Louis: Elsevier.

Byamukama, E & Courtright, P. 2010. Knowledge, skills, and productivity in primary eye care among health workers in Tanzania: Need for reassessment of expectations? *International Health* 2:247-252.

Cambridge Dictionary. 2023a. Sv “optimal”.

From: <https://dictionary.cambridge.org/dictionary/english/optimal> (accessed 03 November 2023).

Cambridge Dictionary. 2023b. Sv “provision”.

From: <https://dictionary.cambridge.org/dictionary/english/provision> (accessed 03 November 2023).

Cambridge Dictionary. 2023c. Sv “community-based”.

From: [https://dictionary.cambridge.org/dictionary/english/community based](https://dictionary.cambridge.org/dictionary/english/community%20based) (accessed 03 November 2023).

Cambridge Dictionary. 2023d. Sv “integrated”.

From: <https://dictionary.cambridge.org/dictionary/english/integrated> (accessed 03 November 2023).

Central Statistical Agency. 2019. *Population projections for Ethiopia 2007-2037*. Addis Ababa, Ethiopia: CSA.

Chadalavada, HP, Marmamula, S, Yanamala, NK & Khanna, RC. 2023. “Eye care on-call” – home-based eye care delivery model – reflections on one year of experience. *Indian Journal of Ophthalmology* 71(1):306-307

Chinn, PL & Kramer, MK. 2011. *Integrated theory and knowledge development in nursing*. 8th edition. St-Louis, MO: Mosby Elsevier.

Chinn, PL & Kramer, MK. 2012. *Integrated theory and knowledge development in nursing*. 9th edition. St Louis, MO: Elsevier-Mosby.

Cicinelli, MV, Marmamula, S & Khanna, RC. 2020. Comprehensive eye care – issues, challenges, and way forward. *Indian Journal of Ophthalmology* 68(2):316-323.

Collins English Thesaurus. 2023a. Sv “optimal”.

From: <https://www.collinsdictionary.com/dictionary/english-thesaurus/Optimal> (accessed 03 November 2023).

Collins English Thesaurus. 2023b. Sv “provision”.

From: <https://www.collinsdictionary.com/dictionary/english-thesaurus/provision> (accessed 03 November 2023).

Cooper, C, Booth, A, Varley-Campbell, J, Britten, N & Garside, R. 2018. Defining the process of literature searching in systematic reviews: A literature review of guidance and supporting studies. *BMC Medical Research Methodology* 1(85):1-14

Council for International Organizations of Medical Science (CIOMS). 2016. *International guidelines for health-related research involving human*. 4th edition. Switzerland, Geneva: CIMOS.

Creamer, EG. 2017. *An introduction to fully integrated mixed methods research*. Los Angeles: Sage.

Creamer, EG. 2018. *An Introduction to fully integrated mixed methods research*. Los Angeles: Sage.

Creswell, JW. 2014. *Research design: Qualitative, quantitative, and mixed methods approach*. 4th edition. Thousand Oaks, California: Sage.

Creswell, JW & Creswell, JD. 2018. *Research design: Qualitative, quantitative, and mixed methods approach*. 3rd edition. California: Sage.

Creswell, JW & Hirose, M. 2019. Mixed methods and survey research in family medicine and community health. *Family Medicine and Community Health* 287(2):24-128.

Creswell, JW & Plano-Clark, VL. 2018. *Designing and conducting mixed methods research*. 3rd edition. Thousand Oaks, CA: Sage.

Creswell, JW & Poth, CN. 2018. *Qualitative inquiry and research design choosing among five approaches*. 4th edition. Thousand Oaks, CA: Sage.

Das, T. 2020. Reaching the last mile in eye care. *Indian Journal of Ophthalmology* 68(1):1-5.

Das, T, Keeffe, J, Sivaprasad, S & Rao, GN. 2020. Capacity building for universal eye health coverage in Southeast Asia beyond 2020. *Eye* 34:1262-1270.

Davis, JK, Mengersen, Bennett, S & Mazerolle, L. 2014. Viewing systematic reviews and meta-analysis in social research through different lenses. *Springer Plus* 3:1-511.

Denzin, NK & Lincoln, YS (ed). 2018. *The SAGE handbook of qualitative research*. 5th edition. Los Angeles: Sage.

Dickoff, J, James, P & Wiedenbach, E. 1968. Theory in a practice discipline. Part 1: Practice-oriented theory. *Nursing Research* 17(5):415-435.

Dube, A & Rakhudu, MA. 2021. A preceptorship model to facilitate clinical nursing education in health training institutions in Botswana. *Curationis* 44(1):1-9.

Ebeigbe, J & Oveneri-Ogbomo, G. 2014. Barriers to utilization of eye care services in rural communities in Edo State, Nigeria. *Borno Medical Journal* 11(2):98-104.

Elfil, M & Negida, A. 2017. Sampling methods in clinical research: An educational review. *Emergency* 5(1):1-5.

Ethiopian Ministry of Health. 2016. *National Strategic Action Plan for Eye Health 2016-2020*. Addis Ababa: Ministry of Health

Evans, KR & Hudson, SV. 2014. Engaging the community to improve nutrition and physical activity among the housing of worship. *CDC Preventing Chronic Disease Public Health Research, Practice and Policy* 11(130270):1-8.

Farghaly, A. 2018. Comparing and contrasting quantitative and qualitative research approaches in education: The peculiar situation of medical education. *Education in Medicine Journal* 10(1):3-9.

FDRE, Ministry of Health see Ministry of Health see Federal Democratic Republic of Ethiopia, Ministry of Health.

Federal Democratic Republic of Ethiopia, Ministry of Health. 2014. *National research ethic review guideline*. 5th edition. Addis Ababa: Ministry of Science and Technology.

Federal Democratic Republic of Ethiopia, Ministry of Health. 2020. *Second Health Sector Transformational Plan (2ND HSTP) 2020/2021-2024/2025*. Addis Ababa, Ethiopia. MOH.

Ferede, AT, Alemu, DS, Gudeta, AD, Alemu, HW & Melese, MA. 2020. Visual Impairment among Primary School Children in Gondar Town, Northwest Ethiopia. *Hindawi Journal of Ophthalmology*:1-6.

Flannery, M. 2016. Common perspectives in qualitative research. *Oncology Nursing Forum* 43(4):517-518.

Flick, U. 2014. *An introduction to qualitative research*. 5th edition. Los Angeles: Sage.

Foreman, J, Xie, J & Keel, S. 2018. Utilization of eye health-care services in Australia: The national eye health survey. *Clinical and Experimental Ophthalmology* 46:213-221.

Forrest, SL, Mercado, CL, Engmann, CM, Stacey, AW, Hariharan, L, Khan, S & Cabrera, MT. 2023. Does the current global health agenda lack vision? *Global Health Science and Practice* 11(1):1-7.

Garrard, J. 2022. *Health Science literature review made easy: The Matrix method*. 6th edition. London: Sage.

Gentles, SJ, Charles, C, Ploeg, J & McKibbin, KA. 2015. Sampling in qualitative research: Insights from an overview of the methods literature. *The Qualitative Report* 20(11):1772-1789.

Gericke, C, Kurowski, C, Ranson, M & Mills, A. 2005. Intervention complexity: A conceptual framework to inform priority-setting in health. *2005 Bulletin World Health Organisation* 83(4):285-293.

Gilbert, C, Faal, H, Allen, L & Burton, M. 2021. What is primary eye health care? *Community Eye Health Journal* 34(113):70-72.

Gnyawali, S, Bhattarai, D & Upadhyay, MP. 2012. Utilization of primary eye health services by people from a rural community in Nepal *Journal of Ophthalmology* 4:96-101.

Goodman, MS & Thompson, VS (eds). 2018. *Public health research methods for partnerships and practice*. New York: Taylor and Francis Group/CRC Press.

Graham, R. 2017. Facing the crisis in human resources for eye health in sub-Saharan Africa. *Community Eye Health* 30(100) 85-87.

Grant, C & Osanloo, A. 2014. Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your house. *Administrative Issues Journal* 4(2):12-27.

Gray, JR, Grove, SK & Sutherland, S. 2017. *The practice of nursing research. Appraisal, synthesis, and generation of evidence*. 8th edition. St. Louis: Elsevier.

Gurung, R & Oli, R. 2021. Primary eye care in Nepal: Current situation and recommendations for integration. *Community Eye Health Journal South Asia* 34(113):13-14.

Hailu, Y, Tekilegiorgis, A & Aga, A. 2010. Know-how of primary eye care among health extension workers (HEWs) in Southern Ethiopia. *Ethiopian Journal of Health Development* 23(2):127-132.

Hennink, M & Kaiser, BN. 2021. Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science and Medicine*:1-10.

Hiukka, P. 2023. Optometrists as primary eye care providers and their role as clinical eye health assessors in Finland. *Oulu University of Applied Science*:1-104

Hussain, AHM, Hussain, L, Roy, A, Roy, T, Islam, R, Hussain, MA & Ahmed, M. 2022. Assessment of eye health services of Bangladesh using eye care assessment tools. *International Journal of Research in Medical Science* 10(2):322-330.

Igwenagu, C. 2016. *Fundamentals of research methodology and data collection*. Research Gate. Lambert Academic Publishing (accessed 4 May 2022).

Ilechie, AA, Otchere, H, Darko-Takyi, C & Halladay, AC. 2013. Access to and utilization of eye care services in Ghana. *International Journal of Health Research* 6(3):7-14.

International Agency for the Prevention of Blindness. 2014. *IAPB Africa Human Resources for Eye Health Strategic Plan 2014–2023*:1-24.

International Agency for the Prevention of Blindness. 2023. *Vision Atlas*.
From: <http://www.atlas.iapborg/> (accessed 23 January 2023).

Jason, LA & Glenwick, DS (eds). 2016. *Handbook of methodological approaches to community-based research: Qualitative, quantitative and mixed methods*. New York: Oxford University Press.

Jesson, J, Matheson, L & Lacey, FM. 2018. *Doing your literature review: traditional and systematic techniques*. 1st edition. Los Angeles: Sage.

Johnson, RB & Christensen, L. 2014. *Educational research quantitative, qualitative and mixed approaches*. 5th edition. Los Angeles: Sage.

Jolley, E, Mafwiri, M, Hunter, J & Schmidt, E. 2017. Integration of eye health into primary care services in Tanzania: A qualitative investigation of experiences in two districts. *BMC Health Services Research* 17(823):1-12.

Kadam, Y. 2023. Integrating primary health care with primary eye care boon or bane. *IHOPE Journal of Ophthalmology* 2(1):14-16.

Kalu, FA & Bwalya, JC. 2017. What makes qualitative research good research? An exploratory analysis of critical elements. *International Journal of Social Science Research* 5(2):51.

Kalua, K, Gichangi, M, Barassa, E, Eliah, E, Lewallen, S & Courtright, P. 2014. Skills of general health workers in primary eye care in Kenya, Malawi, and Tanzania. *Human Resources for Health* 12(1):1-9.

Kawulich, B & Chilisa, B. 2015. *Selecting a research approach: Paradigm, methodology, and methods*. Research Gate (accessed 5 July 2022).

Keel, S, Evans, JR & Block, S. 2020. Strengthening the integration of eye care into the health system: a methodology for the development of the WHO package of eye care interventions. *BMJ Open Ophthalmology* 5(1):1-5.

Kelagher, M, Ferdinand, A & Taylor, H. 2012. Access to eye health services among Indigenous Australians: An area level analysis. *BMC Ophthalmology* 12:51.

Khan, MJ. 2000. Bangladesh model of eye care (modular eye care (MEC)) *Community Eye Health* 13(34):24-25.

Khanna, RC, Sabherwal, S, Sil, A, Gowth, M, Dole, K, Kuyyadiyil, S & Chase, H. 2020. Primary eye care in India – The vision centre model. *Indian Journal of Ophthalmology* 68 (2):333-339.

Kivunja, C & Kuyini, AB. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education* 6(5):26-41.

Kokolakis, S. 2017. Privacy attitudes and privacy behavior: A review of current research on the privacy paradox phenomenon. *Computers and Security* 64:122-134.

Kothari, CR & Garg, G. 2019. *Research methodology: Methods and technique*. 4th edition. Delhi India: New Age International Publication.

Kovai, V, Rao, G & Holden, B. 2012. Key factors determining success of primary eye care through vision centres in rural India: Patients' perspectives. *Indian Journal of Ophthalmology* 60(5):487-491.

Kumar, R. 2011. *Research Methodology. A step-by-step guide for beginners*. 3rd edition. Los Angeles: Sage

Kumar, R. 2014. *Research methodology: A step-by-step guide for beginners*. 4th edition. Los Angeles: Sage.

Leavy, P. 2022. *Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches*. New York: Guilford.

Lilian, RR, Railton, J, Schaftenaar, E, Mabitsi, M, Grobbelaar, CJ, Khosa, NS, Maluleke, BH, Struthers, HE, McIntyre, J & Peters, RPH. 2018. Strengthening primary eye care in South Africa: An assessment of services and prospective evaluation of a health systems support package. *PLoS ONE* 13(5):1-16.

Mabey, D, Antwi-Boasiako, S, Moloa, C, Mmuari, V, Hennelly, M & Zondervan, M. 2019. Capacity building for ophthalmic nursing in Ghana, Botswana, and Tanzania. *Eye News* 26(4):2-5

Mafwiri, MM, Jolley, E, Hunter, J, Gilbert, CE & Schmidt, E. 2016. Mixed methods evaluation of a primary eye care training programme for primary health workers in Morogoro Tanzania. *BMC Nursing* 15:41.

Majid, U. 2018. Research fundamentals: Study design, population, and sample size. *Undergraduate Research in Natural and Clinical Science and Technology Journal* 2:1-7. From: <https://www.urncst.com/index.php/urncst/article/view/16> (accessed 18 August 2022).

Malik, ANJ, Mafwiri, M & Gilbert, C. 2018. Integrating primary eye care into global child health policies. *Archives of Disease in Childhood* 103(2):176-180.

Manti, S & Licari, A. 2018. How to obtain informed consent for research. *Breathe* 14(2):145-152.

McCrudden, MT & McTigue, EM. 2019. Implementing integration in an explanatory sequential mixed methods study of belief bias about climate change with high school students. *Journal of Mixed Method Research* 13(3):381-400.

From: <https://doi.org/10.1177/1558689818762576> (accessed 12 November 2023).

McEwen, M & Wills, E. 2011. *Theoretical basis for nursing*. 3rd edition. Los Angeles: Sage.

Med, HKR, Macleod, D, Bastawrous, A, Wanjala, E, Gichangi, M & Burton, MJ. 2019. Utilization of Secondary Eye Care Services in Western Kenya. *International Journal of Environmental Research and Public Health* 1 (3371):1-16.

Merriam, SB & Tisdell, EJ. 2016. *Qualitative research: A guide to design and implementation*. 4th edition. San Fransisco: CA Jossey-Bass.

Misra, V, Vashist, P, Malhotra, S & Gupta, SK. 2015. Models for primary eye care services in India. *Indian Journal of Community Medicine* 40(2):79-84.

Mohajan, H.K. 2018. Qualitative Research Methodology in Social science and related subjects. *Journal of economic development, environment, and people*. 7(1):23-48.

Morka, ED, Yibekal, BT & Tegegne, MM. 2020. Eye care service utilization and associated factors among older adults in Hawassa city, South Ethiopia. *PLoS ONE* 15(4):1-15.

Motloba, PD. 2019. Non-maleficence disremembered moral obligation. *South African Dental Journal* 74(1):40-42.

Moyegbone, JE, Nwose, EU, Nwanjei, SD, Agege, EA, Odoko JO & Igumbor, EO. 2020. Integration of eye care into primary healthcare tier in Nigeria health system: A case for Delta State. *Journal of Clinical Medical Reviews and Reports* 2(6):1-6.

Mueller, A., Keel, S & Cieza, A. 2021. Primary eye care: WHO perspective. *Community Eye Health Journal* 3(113):88.

Müller, A, Murenzi, J & Mathenge, W. 2010. Primary eye care in Rwanda: gender of service providers and other factors associated with effective service delivery. *Tropical Medicine and International Health* 15:529-533.

Murray, CJS. 2010. Collaborative community-based care for South African children orphaned by HIV/AIDS. *Journal of Pediatric Nursing* 15(1):88-92.

Murthy, G & Shamanna, BR. 2022. Engaging communities in planning and delivering eye care services. *Community Eye Health* 35(115):3-4.

Narayanan, A & Ramani, KK. 2018. Effectiveness of interventions in improving compliance to spectacle wear and referral in school vision screening. *Clinical and Experimental Optometry* 101:752-757.

Nguyen, TTL. 2019. Selection of research paradigms in English language teaching: personal reflections and future directions in the second Annual International Conference on Language and Literature. *KnE Social Sciences*:1-19.

Nikpoor, N, Hansen, ED, Oliva, MS, Tabin, G & Ruit, S. 2018. Elimination of preventable blindness: can success in Nepal be replicated in Africa? *Innovation and Entrepreneurship in Health* 5(1):27-39.

Ntsoane, MD, Oduntan, OA & Mpolokeng, BL. 2012. The utilization of public eye care services by the rural community residents in the Capricorn district, Limpopo Province, South Africa. *African Journal of Primary Health Care and Family Medicine* 4(1):1- 7.

Nyumba, TO, Wilson, K, Derrick, CJ & Mukherjee, N. 2017. The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and Evolution* 9(1):20-32.

Olokoba, LB, Durowade, KA, Adepoju, FG & Olokoba, AP. 2020. Assessment of patient waiting and service times in the ophthalmology clinic of a public tertiary hospital in Nigeria. *Ghana Medical Journal* 54(4):231-237.

Pardede, P. 2019. *Mixed method research design in EFL*: 230-243. Research Gate. From: <https://www.researchgate.net> (accessed 5 June 2022).

Park, YS, Heo, H, Ye, BJ, Suh, YW, Kim SH, Park, SH, Lim, KH, Lee, SJ, Park, SH & Baek, SH. 2017. Prevalence and factors associated with the use of eye care services in South Korea: Korea National Health and Nutrition Examination Survey 2010–2012. *Korean Journal of Ophthalmology* 31(1):58-70.

Patten, ML & Newhart, M. 2017. *Understanding research methods: An overview of the essentials*.

From: https://www.researchgate.net/profile/Michelle-Newhart/publication/321154617_Understanding_research_methods_An_overview_of_the_essentials_tenth_edition/links/5fb40af8a6fdcc9ae05e5e1d/Understanding-research-methods-An-overview-of-the-essentials-tenth-edition.pdf (accessed 8 June 2022).

Paul, J & Crido, AR. 2020. The art of writing a literature review: What do we know and what do we need to know? *International Business Review* 29 (4):1-2.

Polit, DF & Beck, CT. 2017. *Nursing research: Generating and assessing evidence for nursing practice*. 10th edition. Philadelphia: Wolters Kluwer.

Polit, DF & Beck, CT. 2018. *Essentials of nursing research: Appraising evidence for nursing practice*. 9th edition. Los Angeles: Sage.

Pratap, A. 2019. *Research design and its types: Exploratory, descriptive, and causal* [Blog post].

From: <https://notesmatic.com/2018/07/research-design-and-its-types-exploratory-descriptive-and-causal/> (accessed 12 February 2023).

Pulido, JS, Flaxel, CJ, Adelman, RO, Hyman, L, Folk, JC & Olsen, T. 2016. Comprehensive adult medical eye evaluation. *Ophthalmology* 13(1):209-236.

Qureshi, B, Mansur, B, Al-Rajhi, A, Lansingh, V, Eckert, K, Hassan, K, Ravilla, T, Muhit, M, Khanna, R & Ismat, C. 2012. Best practice eye care models. *Indian Journal of Ophthalmology* 60(5):351-357.

Rahi, S. 2017. Research design and methods: A systematic review of research paradigms, sampling issues, and instruments development. *International Journal of Economics and Management Sciences* 6(2):1-5.

Rao, GN, Khanna, RC, Athota, SM, Rajshekar, V & Rani, PK. 2012. Integrated model of primary and secondary eye care for underserved rural areas: The LV Prasad Eye Institute experience. *Indian Journal of Ophthalmology*. 60:396-400.

Ravilla, T. 2021. Primary eye care through vision center—key to universal eye health. *Community Eye Health Journal South Asia* 34(111):9-10.

Ravindran, V. 2019. Data analysis in qualitative research. *Indian Journal of Continuing Nursing Education* 20(1):40-45.

Rehman, N & Sharif, H 2021. Awareness regarding primary eye care among primary healthcare workers of Pakistan: A way to revitalize health for all! *Pakistan Journal of Ophthalmology* 37(2):161-167.

Rosenstein, LD. 2019. *Research design and analysis: A primer for the non-statistician*. New Jersey USA: John Wiley and Sons.

Ross-Man, GB & Rallis, SF. 2017. *An Introduction to qualitative research: Learning in the field*. 4th edition. Los Angeles: Sage.

Sabherwal, S, Sood, I, Chauhan, N & Das Gupta, S. 2022. Community engagement as a tool for improving efficiency of primary eye care delivery: Case studies from two different models. *Indian Journal of Public Health Research and Development* 13(1):1-3.

Senyonjo, L, Lindfield, R & Mahmoud, A. 2014. Ocular morbidity and health-seeking behaviour in Kwara state, Nigeria: Implications for delivery of eye care services. *PLoS One* 9:e104128.

Setia, MS. 2016. Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology* 61(3):261-264.

Shannon-Baker, P. 2015. Making paradigms meaningful in mixed methods research. *Journal of Mixed Methods Research* 10(4):1-16.

Shaw, M. 2016. How to administer eye drops and eye ointment. *Nursing Standard* 30(39):34-36.

Silverman, D. 2013. *Doing qualitative research*. 4th edition. Los Angeles: Sage.

Singh, S. 2023. Prevention of blindness week 2023: Themes, history, facts, and Quotes. [Internet]. (accessed 8 May 2023).

Snyder, H. 2019. Literature review as a research methodology: An overview and guideline. *Journal of Business Research* 104:333-339.

Solomon, SD, Shoge, RY, Ervin, AM, Contreras, M, Harewood, J, Aguwa, UT & Olivier, MG. 2022. Improving access to eye care: A systematic review of the literature. *Ophthalmology* 129(10):e114-e126.

South Omo Zone Health Department. 2023. *Annual Health Sector Performance Report*. Jinka: South Omo Zone Health Department.

Stenfors, T, Kajamaa, A & Bennett, D. 2020. How to assess the quality of qualitative research. *The Clinical Teacher* 17(6):596-599.

Surrati, AM, Almuwarree, SM, Mohammad, RA, Almatrafi, SA, Murshid, SA, Khayat, LI, & Al-Habboubi, HF. 2022. Parents' Awareness and Perception of Children's Eye Diseases in Madinah, Saudi Arabia: A cross-sectional study. *Cureus* 14(2):1.

Tariq, M, Kawish, AB, Wajahat M, Tariq, A & Butt, T. 2022. Knowledge, attitude, and practices towards eye care among primary healthcare workers in District Chakwal. *International Journal of Natural Medicine and Health Sciences (IJNMS)* 1(4):13-18.

Terrell, S. 2016. *Writing a proposal for your Dissertation: Guidelines and examples*. New York: Guilford Press.

Teshome, JG, Soboka, TT, Salamanca, O & Calise, A. 2021. Evaluating eye health care services progress towards VISION 2020. Goals in Gurage Zone, Ethiopia. *Research Square*:1-15.

Thomas, D, Weegen, L, Walendzik, A, Wasem, J; Jahn, R. 2011. Comparative analysis of delivery of primary eye care in three European countries, *IBES Diskussionsbeitrag*. Universität Duisburg-Essen, Institut für Betriebswirtschaft und Volkswirtschaft (IBES), Essen:189. Page 8 in the chapter???

Thomaszewski, LE, Zarestky, J & Gonzalez, E. 2020. Planning qualitative research: Design and decision making for new researchers. *International Journal of Qualitative Methods* 19:1-7.

Thulasiraj, R. 2022. Primary eye care – key to universal eye health. *Indian Journal of Ophthalmology* 70(5):1448-1449.

Topp, SM, Abimbola, S, Joshi, R & Negin J. 2017. How to assess and prepare health systems in low-and middle-income countries for integration of services – a systematic review. *Health Policy Plan* 33(2):298-312.

Umaefulam, V & Premkumar K. 2020. Impact of mobile health in diabetic retinopathy awareness and eye care behaviour among Indigenous women. *Mhealth* 6:14.

UNISA. 2016. *Policy on research ethics*. Pretoria: UNISA.

Vision for Africa. 2014. *Human resources for Eye Health Strategic Plan: 2014-2023*. IAPB Africa.

Walker, LO & Avant, KC. 2013. *Strategies for theory construction in nursing*. 5th edition. UK, Harlow: Pearson Education.

Walliman, N. 2015. Research methods: The basics. *Health Policy* 119:1145-1152.

Williams-McBean, CT. 2019. The value of a qualitative pilot study in a multi-phase mixed methods research. *The Qualitative Report* 24(5):1055-1064.

WHO see World Health Organization.

WHO and UNICEF see World Health Organization and the United Nations Children's Fund (UNICEF).

World Health Organization. 2000. *Preventing blindness in children: Report of a WHO/IAPB scientific meeting*. WHO/PBL/0077. Geneva: WHO.

World Health Organization. 2010a. *Increasing access to health workers in remote and rural areas through improved retention: Global policy recommendations*. Geneva: WHO.

World Health Organization. 2010b. *Integrated community-based interventions*. Geneva: WHO.

World Health Organization. 2012. *Report of the expert group meeting to assess and validate a package for eye health interventions at the primary level for the African region*. Geneva: WHO.

World Health Organization. 2013a. *Trichiasis surgery for Trachoma*. WHO Library catalogue:1-79. Geneva: WHO.

World Health Organization. 2013b. *Universal eye health: A Global Action Plan 2014-2019*. Geneva: WHO.

World Health Organization. 2013c. *State of health financing in the African region*. Geneva: WHO.

World Health Organization. 2018a. *Primary eye care training manual: A course to strengthen the capacity of health personnel to manage eye patients at primary-level health facilities in the African Region*. Geneva: WHO.

World Health Organization. 2018b. *Primary eye care training manual course to strengthen the capacity of health personnel to manage eye patients at primary-level health facilities in the African region*. Geneva: WHO.

World Health Organization. 2019a. *World report on vision*.

From: <https://apps.who.int/iris/handle/10665/328717> (accessed 13 February 20132)

World Health Organization. 2019b. *Ethical considerations for health policy and systems research*.

From: <https://apps.who.int/iris/bitstream/handle/10665/330033/9789241516921-eng.pdf> (accessed 21 January 2023).

World Health Organization. 2022a. *Action plan for integrated people-centred eye care in South-East Asia 2022–2030*. New Delhi: World Health Organization, Regional Office for South-East Asia.

World Health Organization. 2022b. *World health statistics 2022: Monitoring health for the SDGs, sustainable development goals*. Geneva: WHO:1-131.

World Health Organization. 2022c. *World health statistics*. Geneva: WHO:1-177.

World Health Organization. 2022d. *Eye care indicator menu (ECIM): A tool for monitoring strategies and actions for eye care provision*. Geneva: WHO:1-56.

World Health Organization and the United Nations Children's Fund (UNICEF). 2020. *Operational framework for primary health care: transforming vision into action*. Geneva: WHO:1-132.

Xulu-Kasaba, Z, Mashige, K & Naidoo, K. 2021. Knowledge, attitudes, and practice of eye health among public sector eye health workers in South Africa. *International Journal of Environmental Research and Public Health* 18(12513):1-12.

Yasmin, S & Schmidt, E. 2022. Primary eye care: opportunities for health system strengthening and improved access to services. *International Health* 14(1):i37-i40.

Yin, KR. 2016. *Qualitative research from start to finish*. 2nd edition. New York, USA: Guilford Press.

Yip, JL, Bright, T, Ford, S, Mathenge, W & Faal, H. 2018. Process evaluation of a national primary eye care programme in Rwanda. *BMC Health Services Research* 18(1):950.


INTERNET SOURCE

Physical map of the South Omo Zone, Ethiopia.

From: https://www.researchgate.net/figure/Location-map-of-South-Omo-Zone_fig2_335423033 (accessed 9 September 2023).

ANNEXURES

Annexure A: Ethical clearance certificate from UNISA

UNISA 
university
of south africa

COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

17 May 2023

Dear Mr Temesgen Wolde Kentayiso

NHREC Registration # :
Rec-240816-052
CREC Reference # :
58528660_CREC_CHS_2023

Decision:
Ethics Approval from 17 May 2023 to
17 May 2024

Researcher(s): Name: Mr. T. M. Kentayiso
Contact details: 58528660@mylife.unisa.ac.za
Supervisor(s): Name: Dr. N. L. Nkoane
Contact details: nkoanni@unisa.ac.za

Title: Development of a model to support Primary Eye Care service provision in rural South Omo zone, Ethiopia

Degree Purpose: PHD

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval is granted for one year.

The **low risk application** was reviewed by College of Human Sciences Research Ethics Committee, in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the

confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.

5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date (**17 May 2024**). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

*The reference number **58528660_CREC_CHS_2023** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature:



Prof. KB Khan
CHS Research Ethics Committee Chairperson
Email: khankb@unisa.ac.za
Tel: (012) 429 8210

Signature: PP



Prof ZZ Nkosi
Acting-Executive Dean: CHS
E-mail: nkosizz@unisa.ac.za
Tel: 012 429 6758

Annexure B: Support letter from UNISA Regional Coordination Office to the Southern Ethiopia Public Health Institute

UNISA 
university
of south africa

19 May, 2023
UNISA-ET/KA/ST/29/19-05-2023

SNNPR Public Health Institute Hawassa

Dear Madam/Sir,

The University of South Africa (UNISA) extends warm greetings. By this letter, we want to confirm that Mr. Temesgen Wolde Kentayisa (student number 58528660) is a PhD student in the Department of Health Studies at UNISA. Currently, he is about to go out for data collection on his doctoral research entitled "*Development of a model to support Primary Eye Care service provision in rural South Omo Zone, Ethiopia*".

This is therefore to kindly request your cooperation in assisting the student by giving him in-country ethics clearance. We would like to thank you in advance for all the assistance that you would provide to the student. Attached, please find the ethical clearance that the student has received from the Department.

Sincerely,



Dr. Tsige GebreMeskel Aberra
Director

**UNISA-ETHIOPIA CENTER
P.O.BOX:13836
ADDIS ABABA
TEL+251912191483**

Telephone: +251 11 435 2244 / +251 11 435 0076
Facsimile: +251 11 435 1242/43/44
Mobile: +251 912 191483
www.unisa.ac.za

Annexure C: Request to conduct the study

ANNEXURE 2: REQUEST FOR PERMISSION TO CONDUCT THE STUDY

2.1. Request letter to South Omo zone health department

Request for permission to conduct a study in four districts of the South Omo zone,
Ethiopia

Title - Development of a model to support Primary Eye Care service provision in rural South Omo zone, Ethiopia

Researcher – Temesgen Wolde Kentayiso

College of Human Science, Department of Health Studies

Address – Jinka, Southern Ethiopia

Telephone: +251 9 11 03 89 90

Email: 58528660@mylife.unisa.ac.za

Dear Mr. Abraham Ata, Head of the South Omo Zone Health Department

I, Temesgen Wolde, am researching with Dr. Naomi Lorrain Nkoane, Senior lecturer in the Department of health studies towards a Ph.D. at the University of South Africa. We are inviting you to participate in a study entitled "Development of a model to support Primary Eye Care service provision in rural South Omo zone, Ethiopia." We have funding from Unisa/ Orbis for conducting this study.

The study aims to develop a model to support Primary Eye Care (PEC) services by assessing PEC Service utilization and barriers and the Knowledge and skill of PEC service providers.

Your company has been selected because all districts providing Primary Eye Care Services in the South Omo zone are under your command.



The study will entail Focus Group discussions and in-depth interviews with purposively selected adults aged 40 years and above to assess Primary Eye Care service utilization and barriers, and individual assessment using a pre-tested questionnaire and checklist with Primary Eye Care Workers to assess their knowledge and skill. Based on the findings a model will be developed to support the zone's Primary Eye Care service provision

benefits of this study – the finding will support implementers, policy, and decision-makers in improving Primary Eye Care service to the community in need utmost.

Potential risks – this study has no direct potential risk to study participants. The respondents' human dignity, norms, and values will be respected during this study. The researcher will keep all information collected confidential and will use codes to keep the anonymity of the participants.

Confidentiality The researcher will maintain the confidentiality of the information of the participants and institutions throughout the study and will not disclose, not share the information with any other person. The researcher will maintain strict controls of all the materials associated with/ related to the study. Encrypted Passwords will be used for online materials and hard copies of documents will be kept with lock and key.

For any further information, you can reach the researcher Temesgen Wolde at +251 9 11 03 89 90 or 58528660@mylife.unisa.ac.za or fax +251 46 775 04 29

Should you have concerns about how the research will be conducted, you may contact, the supervisor, Dr. Naomi Lorrain Nkoane, Department of Health Studies, College of Human Sciences, Winnie Madizela Mandela Building 7-179, Tel: 012 429 6059. Email:nkoannl@unisa.ac.za

Contact the research ethics chairperson of the CREC, Prof KB Khan, khankb@unisa.ac.za, 012 429 6549 if you have any ethical concerns.

Yours sincerely







Temesgen Wolde Kentayiso, Researcher



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Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
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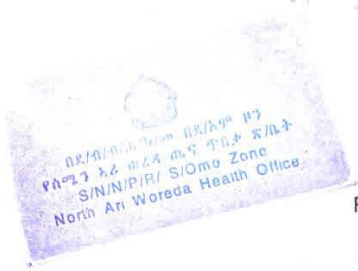
Annexure D: Permission letter from the South Omo Zone Health Department

 በደቡብ ብሄሮች ብሔረሰቦችና ሕዝቦች ክልላዊ መንግስት ጤና ቢሮ የደቡብ አም ዞን ጤና መምሪያ	 #TTC: 2063514204115 Ref. No ቀን 19/05/2023 Date
South Nations Nationalities and People's Regional State Health Bureau South Omo Zone Health Department	
To – Mr. Temesgen Wolde Kentayiso <u>Jinka, Southern Ethiopia</u>	
Subject – Permission to conduct research at four districts of the South Omo zone	
As cited above this is to grant you the to conduct your study in the selected four districts (South Ari, North Ari, Bena Tsemay, and Malle) of the South omo zone, Southern Ethiopia with the below-listed descriptions.	
Study title- Development of a model to support Primary Eye Care service provision in rural South Omo zone, Ethiopia.	
Researcher – Temesgen Wolde Kentayiso	
Supervisors – Dr. NL NKOANE and Dr. Kholofelo Matlhaba	
Ethical approval reference number – 58528660_CREC_CHS_2023	
Op on the receipt of your individual application for the grant of permission to conduct the study and approved ethics review committee letter from the University of South Africa. With this letter of a grant, you as a principal investigator are advised to follow the national and internationally accepted ethical procedures during the study period. Districts copied here are advised to grant the researcher to conduct the study and provide all the necessary support and follow-up.	
// No mother shall die giving birth//	
CC	  ታምራት አበሩ ገበየሁ Tamirat Assefa Gebeyehu መምሪያ ኃላፊ Department Head
<ul style="list-style-type: none">- Bena tsemay district health office- Malle district health office- South Ari district health office- North Ari district health office	
☒ 20 ■ {0467750006}{0467750300} (0467750944) (0467751319) Fax ☒ 0467750496 E-mail	
Jinka	

Annexure E: Permission letter from the South Africa District Health Office (the date is written in the Ethiopian calendar)



Annexure F: Permission letter from the North Ari District Health Office



Ref No. 20764/376/2015

Date June 12 - 2023

To – Mr. Temesgen Wolde Kentayiso

Jinka, Ethiopia

RE – Permission to conduct a study

As cited above you get permission to conduct your study entitled **“Development of a model to support Primary Eye Care service provision in rural south Omo zone, Ethiopia”** in five PECUs of North Ari districts.

Up on the receipt of ethical clearance from the University of South Africa with reference number 58528660_CREC_CHS_2023 and permission to conduct the study at our district from South Omo zone with a reference number MA 35/4204/15 dated 19/05/2023.

You are strongly advised to follow all applicable ethical procedures.

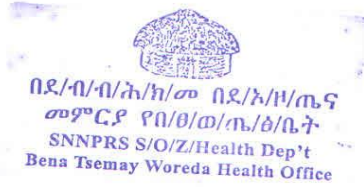
Best regards,



A handwritten signature in blue ink, appearing to read "Sisay Tilay Kene".

በ.ሃይ ገላይ ክኔ
Sisay Tilay Kene
የጤና ጥበቃ አ/ዐ.ተ. ቃለቶ
Head of Health Office

Annexure G: Permission letter from Bena Tsemay District Health Office



Ref No. 7007/1705/15
Date June 09 2023

To – Mr. Temesgen Wolde Kentayiso

Jinka, Ethiopia

Sub – Permission to conduct a study at four Primary Eye Care Units of the Bena tsemay district

As cited above you get permission to conduct your study at Kako, Keyafer, Shalla, and Alduba health centers under our jurisdiction upon the receipt of ethical clearance from the University of South Africa with reference number 58528660_CREC_CHS_2023 and permission to conduct the study at our district from South Omo zone with a reference number MA 35/4204/15 dated on 19/05/2023.

Individual primary eye care units copied here are advised to follow the data collection and report back up on the completion of the study.

Best regards,

Debiyo Danda

ገቢ/ጤና ሰ.ጠ.
የቦ/ፀ/ወ/ጤ/ፅ/ቤት

Bena Tsemay Woreda Health Office

CC.

- Kako PECU
- Keyafer PECU
- Alduba PECU
- Shalla PECU



Annexure H: Permission letter from the Malle District Health Office



Annexure I: Sample consent format (English)

ANNEXURE 6

6.3. CONSENT TO PARTICIPATE IN THE SELF-ADMINISTERED QUESTIONNAIRE

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits, and anticipated inconvenience of participation in the self-administered questionnaire.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunities to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be processed into a research report, journal publications, and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname..... (please print)

Participant Signature..... Date.....

Researcher's Name & Surname Temesgen Wolde Kentayiso (please print)

Researcher's signature..... Date.....



Annexure J: Sample consent format (Amharic version)



አባሪ 6.1

6.1. በትኩረት በሚደረግ የቡድን ውይይት ላይ ለመሳፍ የተደረገ ስምምነት

እኔ (አቶ/ወ/ሮ) ተጫና ኪንግባቦ ዕ-62 (የተሳታፊ ስም) በዚህ ጥናት ላይ ለመሳተፍ ፈቃዴን የጠየቀኝ ተመራማሪው ስለ ቡድን ውይይት አካሄድ፣ ሊኖሩ ስለሚችሉ ጥቅሞች እና በጥናቱ በመሳተፍ ሊያጋጥሙኝ ስለሚችሉ ሁኔታዎች እንዳስረዱኝ አረጋግጣለሁ።

በመረጃ መስጫ ወረቀቱ ላይ እንደተገለጸው አንብቤ (ተነበልኝ) ስለ ጥናቱ ተረድቻለሁ። ያልገቡኝን ነገሮች ለመጠየቅ በቂ ጊዜ አግኝቻለሁ እናም በጥናቱ ለመሳተፍ ዝግጁ ነኝ።

በዚህ ጥናት ላይ የሚኖረኝ ተሳትፎ በፈቃዴ ላይ የተመሰረተ እና በማንኛውም ጊዜ ያለ ምንም ቅጣት የመውጣት (የማቋረጥ) ነፃነት እንዳለኝ ተረድቻለሁ።

የዚህ ጥናት ግኝቶች በምርምር ዘገባ፣ በመፅሕፍት ህትመቶች እና ወይም ኮንፈረንሶች ላይ እንደሚቀርቡ አውቃለሁ። ተሳትፎዬ በሚሰጥር እንደሚጠበቅም አውቃለሁ።

በዚህ የቡድን ውይይት ላይ በሚኖረው የድምፅ ቅጂ እስማማለሁ።

የዚህንም የስምምነት ቅጂ ግልበጭ ተቀብያለሁ።

የተሳታፊው ሙሉ ስም ተጫና ኪንግባቦ ፊርማ

የተመራማሪው ሙሉ ስም TW Kentariso ፊርማ

educ-accurate



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Annexure K: Information sheet



ANNEXURE 5

5.1. REQUEST TO PARTICIPATE IN THE FOCUSED GROUP DISCUSSIONS (FGD)

Ethics clearance reference number: 58528660_CREC_CHS_2023

Research permission reference number (if applicable): MA 35 /4204 /15

June 20, 2023

Title: Development of a Model to Support Primary Eye Care Service Provision in Rural South Omo Zone, Ethiopia

Dear Prospective Participant

My name is Temesgen Wolde Kentayiso. I am researching with Dr. Naomi Lorrain Nkoane, Senior lecturer in the Department of Health Studies toward a Ph.D. at the University of South Africa. We are inviting you to participate in a study entitled Development of a Model to Support Primary Eye Care Service Provision in Rural South Omo Zone, Ethiopia. We have funding from Unisa/ Orbis for conducting this study.

WHAT IS THE PURPOSE OF THE STUDY?

The main purpose of this study is to develop a model to support Primary Eye Care (PEC) services by assessing PEC service utilization and barriers and the Knowledge and skill of PEC service providers.

WHY AM I BEING INVITED TO PARTICIPATE?

You are purposively chosen to be part of this study. The total population of the zone is the target population for this study.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

You will be going to have a Focused Group Discussion with a small group of people. You will be requested to explain your Primary Eye Care utilization trend, your perception of



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working on the study unless you permit other people to see the records. your anonymous data may be used for other purposes, such as a research report, journal articles, and/or conference proceedings.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a minimum period of five years in a locked cupboard/filing cabinet in the South Omo zone health department for future research or academic purposes; electronic information will be stored on a password-protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

There will not be any direct incentive to be provided for participating in the study. Being diagnosed by trained and certified mid-level eye health workers and knowing nearby treatment centers will be your incentive on top of the potential contribution of the study as part of the larger group.

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study has received written approval from the Research Ethics Review Committee of the *DSRC* Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Temesgen Wolde at +251 9 11 03 89 90 or 58528660@mylife.unisa.ac.za or fax +251 46 775 04 29. The findings are accessible at any time after the end of the study. Please do not use home telephone numbers. Departmental and/or mobile phone numbers are acceptable.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact Temesgen Wolde at +251 9 11 03 89 90 or 58528660@mylife.unisa.ac.za or fax +251 46 775 04 29.



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primary eye care service in your district, barriers affecting Primary eye care service provision, and challenges of primary eye care service delivery. We need you only once for the group discussion which will last a maximum of 45 minutes.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Your participation in this study is voluntary and you are under no obligation to consent to participation. If you decide to participate, you will be given this information sheet to keep and asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

This study aimed to study Primary Eye Care service utilization, barriers, knowledge, and skills of Eye Care service providers. A model will be developed based on the findings which will support the PEC service delivery in the area and assist PEC service implementers and policy and decision-makers in the field. You will be advised on treatment based on your current eye condition, which will be your benefit.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

There will be no negative consequences for participating in this study. The only thing we engage you with is a maximum of a 45-minute group discussion.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

Your name will not be recorded anywhere, and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be reviewed by people responsible for ensuring that research is done properly, including the transcriber, external coder, and Research Ethics Review Committee members. Otherwise, records that identify you will be available only to people



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Should you have concerns about how the research has been conducted, you may contact Dr. Naomi Lorrain Nkoane, Department of Health Studies, College of Human Sciences, Winnie Mandela Mandela Building 7-179, Tel: (012) 429 6059. Email nkoanni@unisa.ac.za

Contact the research ethics chairperson of the CREC, Prof KB Khan, at khankb@unisa.ac.za, (012) 429 8210 if you have any ethical concerns.

Thank you for taking the time to read this information sheet. If you are willing to participate in this study, kindly complete the consent form below.

Kind regards



Temesgen Wode Kentayiso

Researcher



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Annexure L: Focus group discussion guide

ANNEXURE 7

Data collection tool(s) – Focus group discussion

I. Qualitative Focus Group discussion guide

Study title - Development of a model to support Primary Eye Care service provision in rural South Omo zone, Ethiopia

Steps to follow

- Welcome the participants to the session
- Introduction of the principal investigator, data collection assistant, and participants
- Introduction of the topic, purpose, and objectives of the study
- Description of the time duration of the session (one to two hours) with a group of six to eight people
- Description of the researcher's intent to conduct four to eight FGDs until saturation with a similar group from the community
- Explain the confidentiality of the information collected

Guidelines/ Ground rules

- There is no right or wrong answer
- Give time for participants to raise any concerns at any time
- No side talk during the FGD
- Turn off/ silent cell phone
- Use any language which allows you to explain

The FGD questions

1. How do you experience the utilization of Primary Eye Care service provision in this Primary Eye Care Unit?
2. How do you feel about the service provision at the nearby Primary Eyecare Unit?
3. What are the main barriers to Primary Eye Care services in the nearby Primary Eye Care unit?
4. What are the common challenges in Primary eye care service delivery?
5. What key interventions shall be taken to improve the service?



Probing questions

1. What do you mean?
2. Tell Me more?
3. I do not understand
4. Can you please elaborate more?

Follow up questions

1. How do you perceive the current primary eye care service provision in this PECU?
2. What are the contributing factors to poor utilization of eye care services?
3. What shall be added to improve and expand the service?
4. What are the common gaps in the service provision?



URERC.16.04.29 - Decision template (V2) - Approve

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Annexure M: In-depth individual face-to-face interview guide

ANNEXURE 8

Data collection tool (S) in-depth interview

I. Qualitative In-depth interview guide

Study title - Development of a model to support Primary Eye Care service provision in rural South Omo zone, Ethiopia

Steps to follow

- Welcome the participant to the session
- Introduction of the principal investigator, data collection assistant, and participants
- Introduction of the topic, purpose, and objectives of the study
- Description of the time duration of the session (30 minutes to one hour)
- Explain the confidentiality of the information collected

Guidelines/ ground rule

- There is no right or wrong answer
- Give time for participants to raise any concerns in time
- Participants need to give consent and sign before the interview for participation and recording of the information to be collected
- Turn off/ silent cell phone
- Use any language which allows you to explain

The main interview questions

1. How do you describe the Primary eye care service provision at this (nearby) Primary Eyecare Unit?
2. How do you explain the community service utilization of Primary Eye care at this (nearby) primary eye care unit?
3. What are the main barriers to Primary Eye Care services at this (nearby) Primary Eye Care unit?



4. What are the commonly preferred modes of Primary Eye care service provision?
And why?
5. What are the common challenges in Primary eye care service provision?
6. What key interventions shall be taken to improve the service?

Probing questions

1. What do you mean?
2. Tell Me more?
3. I do not understand
4. Can you please elaborate more?

Follow up questions

1. How do you perceive the current primary eye care service provision in this PECU?
2. What are the contributing factors to poor utilization of eye care services?
3. What shall be done to improve the service?
4. What are the common gaps in the service provision?

Annexure N: Self-administered questionnaire

*Annexure 10: self-administered questionnaire to assess knowledge and skill of
Primary Eye Care Service Providers*

Section I – Socio-demographic and basic data (circle on the right answer)

- Age** A. 20 – 30 B. 31 – 40 C. > 40
- Sex** A. Male B. Female
- Marital status**
A. Single B. Married C. Divorced D. Other/ specify _____
- Profession**
A. General nurse B. IECWs/ Ophthalmic Nurse
C. Health Officer / B.Sc. nurse D. Public Nurse
E. Other (please specify) _____
- Educational level**
A. Diploma B. Degree C. Master's & higher
- How long have you worked in this unit as an Eye care professional?**
A. Less than a year B. 1 – 2 years C. 3 – 5 years
D. 5 – 8 years E. > 8 years
- Where did you learn basic knowledge and skills of eye care diagnosis and treatment?**
A. As part of my college/ university training C. On job training
B. Post-graduation supplementary training D. Professional colleagues
C. Other (please specify) _____
- How many times did you receive training (basic and refresher) on Primary care before/ after being employed as a Primary Eye Care Worker?**
A. Once B. Twice C. more than 3 times D. Never
- When did you receive your last basic (refresher) training on Primary care?**
A. Less than 6 months C. 1 – 2 years E. > 4 years
B. 6 months – a year D. 3 – 4 years
- Who supported your training?**
A. Government B. NGO (specify) _____ C. Self
- 11. What is the average number of patients visiting this Primary Eyecare Unit in a month?**



- A. 1- 10 B. 11 – 30 C. 30 – 50 D. Above 50

Section II – Knowledge assessment

Instruction: Circle all correct answers to the questions

1. Which of the following is the right definition of blindness?

A. loss of light perception B. Unable to see in front.
 C. unable to count fingers at 3 Meters with the best eye D. I don't know.
2. Which of the following is/ are the cause/s of blindness in children?

A. Trachoma B. Measles C. Trauma D. Vitamin A deficiency
 E. Traditional Medicine F. Other
3. What does white pupillary reflect show?

A. Night blindness B. Cataract C. Glaucoma D. I don't know.
4. What do infectious misdirected (interned) eyelashes indicate?

A. Cataract B. Trachoma C. Conjunctivitis D. I don't know.
5. What is the leading cause of night blindness?

A. Mother in Malnutrition B. Vitamin A Deficiency C. A & B
 D. Other factors E. I don't know.
6. What is the treatment of conjunctivitis?

A. Medication B. Advice patient to maintain C. hygiene.
 D. Refer to hospital/ doctor E. I don't know.
7. Urgent referral is needed for,

A. Red eye with discharge B. Red eye with pain C. Red eye with itching
 D. Normal vision in both eyes E. Chemical injury to the eye
8. Provision of Primary Eye Care service is necessary to,

A. Bring quality eye care closer to the people.
 B. reduce patronage of untrained providers for eye care services.
 C. reduce the incidence of avoidable blindness at the grassroots.
 D. Prevent people from using harmful substances in the eye.
 E. Ensures early diagnosis and referral before a condition becomes serious.
9. The following causes loss of vision without pain

A. Corneal ulcer B. Penetrating injury C. Cataract

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D. Chemical injury E. Glaucoma

10. A 2-week-old baby presents with swollen eyes and pus discharge, which of the following will you do?

- A. Clean the eyes counsel and send home B. Start antibiotic eye drops immediately and refer.
C. Give steroid injection only.
D. Start antibiotic eye drops and refer after 3 days if no improvement.
E. Refer immediately to the native doctor as this is witchcraft.

11. Which of the following is/are risk factors for Trachoma?

- A. crowded living conditions B. poor sanitation C. Flies D. Age E. Sex

12. which of the following are the correct signs and symptoms of trachoma?

- A. Mild itching and irritation of the eyes and eyelids
B. Eye discharge containing mucus or pus C. Eyelid swelling.
D. Light sensitivity (photophobia) E. Eye pain
F. Eye redness G. Vision loss

13. which of the following are risk factors for cataracts?

- A. Age B. Diabetes C. Excessive exposure to sunlight. D. Smoking
E. Obesity F. High blood pressure

14. Which of the following Acronyms explains the WHO recommended Trachoma elimination strategy?

- A. FACE B. SAFE C. FASE D. I don't know

Section III –Skill Assessment

Instruction: Circle all correct answers to the questions

1. The following objects are used to evert the upper eyelid

- A. Screwdriver B. A wad of gauze C. Clean cotton bud
D. Hammer E. Toothpick

2. To remove or pull out a misdirected eyelash, you will require the following

- A. Scissors B. Sutures C. Epilation forceps
D. An ophthalmoscope E. A syringe

3. What can be used to remove foreign bodies from the eye?

- A. Fingernails B. Scissors C. Pen



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- D. Broom E. Cotton bud

4. In case of acid burn to the eye

- A. Apply antibiotic drops and send home B. Pad the eye and refer.
C. Give analgesic only D. Wash with plenty of water and refer.
E. Counsel them and tell them to be brave.

5. Irrigation can be done with

- A. Saline B. Lemon juice C. Clean water
D. Mineral E. Urine

6. Instilling eye drops to the eye; the caregiver performs the following task.

- A. Washes hands B. Instils the drop into the correct eye.
C. Wipes away excess drops D. Informs the patient about the task.

7. Acceptable methods of removing foreign bodies on the surface of the eye include.

- A. Irrigation with water B. Removing with a cotton bud.
C. Rubbing on the eye D. Picking it out with fingers.
E. Blowing it out of the eye with air from the mouth.

8. At what distances can Visual acuity be measured

- A. 3 centimeters B. 3 meters C. 6 meters D. 6 centimeters
E. 6 kilometers

9. In what condition do you skip detailed history taking for treatment

- A. Discharge in the eye B. Eye itching C. Chemical injury
D. Burns E. All the above

10. Basic skills needed from a trained eyecare professional at a health center

- A. Screening B. Medical treatment C. Surgical treatment
D. referral E. Health education & and health promotion

//Thank you so much//



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Annexure O: Checklist

Checklist for assessing PECUs readiness in equipment, infrastructure, and service delivery to provide PEC services.

1. Basic information about the primary eye care unit

1.1. PECU code no: _____

1.2. Target population:

A. 5,000–10,000 B. 10,000–25,000 C. >25,000

1.3. Number of trained PECWs in the unit:

A. One B. Two C. Three and more

1.4. Service year:

A. 6 months–1 year B. 1 year–2 years C. 2 years–5 years

D. > 5 years

2. Checklist adopted from (WHO 2018a)

No	Action and interaction	Yes	No
1.	Infrastructures		
1.1	Space to measure visual acuity		
1.2	Visual acuity chart		
1.3	Separate room for outpatient case detection & and counselling		
1.4	Separate room for TT surgery		
2.	Instruments, consumables, and equipment		
2.1	Sufficient TT sets (each kit containing instruments as per the standard list available)		
2.2	Magnifying loops		
2.3	Stethoscope		
2.4	BP apparatus		
2.5	Basic surgical equipment: stool, table, bins, tray, and light		
2.6	Zithromax tablet		
2.7	Tetracycline eye ointment		
2.8	Lidocaine 2% injectable (with and without adrenaline)		
2.9	Paracetamol tablet 500 mg		
2.10	Alcohol 90%		
2.11	Povidone Iodine solution 10%		
2.12	Sufficient gowns, masks, caps		

No	Action and interaction	Yes	No
2.13	Sterile drapes		
2.14	Sterile gauze 40X40		
2.15	Sterile gloves–size 7, 7.5, 8		
2.16	Syringes 5 CC+ needles, 21 G		
2.17	Suturing material + needles, 16 and 19 mm 3/8 circle cutting		
2.18	Adhesive tape		
2.19	Scalpel blades		
2.20	Sufficient torches/ batteries		
3.	Service delivery		
3.1	Record for OPD patients		
3.2	Record for outreach services		
3.3	Monthly primary eye care reports		
3.4	Supervision reports		
3.5	Performance and supervision feedback		
3.6	Review meeting		
3.7	Meeting minutes		

Notes

Annexure P: Model validation checklist

MODEL VALIDATION CHECKLIST

Dear Evaluator

please mark your grade for the attached integrated community-based primary eye-care model. You will find adequate information about the purpose, process, procedures, and steps followed during model development in the separate email attachment.

Assessment guide - put an **X** in bold in the space provided.

Criteria	Not acceptable	Needs major revision	Needs minor revision	Acceptable as described
Simplicity				
Clarity				
Generality				
Importance				
Accessibility				

Your remark

Annexure Q: Agreement with independent coder



ANNEXURE 4 CONFIDENTIALITY AGREEMENT ANNEXURE 4.1. INDEPENDENT CODER CONFIDENTIALITY AGREEMENT

This agreement is between:

Temesgen Wolde Kentayiso

and

Yisnawchew Denello
Independent coder name and surname

For Research Study: Development of a model to support Primary Eye Care service provision in rural South Omo zone, Ethiopia

I agree to:

1. Keep all the research information shared with me confidential. I will not discuss or share the research information with anyone other than with the Researcher.
2. Keep all research information secure while it is in my possession.
3. Return all research information to the Researcher when I have completed the research tasks.
4. Destroy all research information regarding this research project that is not returnable to the Researcher after consulting with the Researcher.
5. Comply with the instructions of the Researcher about requirements to physically and/or electronically secure records (including password protection, file/folder encryption, and/or use of secure electronic transfer of records through file sharing, use of virtual private networks, etc.).

Data Coder Name & Surname..... *Yisnawchew Denello* (please print)

Data Coder Signature..... *Yisnawchew Denello* Date.....

Researcher's Name & Surname..... TW KENTAYISO (please print)

Researcher's signature..... *TW Kentayiso* Date.....



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Annexure R: Agreement with the statistician



ANNEXURE 4.2: STATISTICIAN CONFIDENTIALITY AGREEMENT

This agreement is between:

Temesgen Wolde Kentayiso

and

Misson Shewangizaw

statistician name and surname

For Research Study: Development of a model to support Primary Eye Care service provision in rural South Omo zone, Ethiopia

I agree to:

1. Keep all the research information shared with me confidential. I will not discuss or share the research information with anyone other than with the Researcher.
2. Keep all research information secure while it is in my possession.
3. Return all research information to the Researcher when I have completed the research tasks.
4. Destroy all research information regarding this research project that is not returnable to the Researcher after consulting with the Researcher.
5. Comply with the instructions of the Researcher about requirements to physically and/or electronically secure records (including password protection, file/folder encryption, and/or use of secure electronic transfer of records through file sharing, use of virtual private networks, etc.).

Statistician Name & Surname Misson Shewangizaw (please print)

Statistician Signature [Signature] Date

Researcher's Name & Surname T.W. Kentayiso (please print)

Researcher's signature [Signature] Date



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Annexure S: Letter of statistical support

October 12, 2023

Memo of statistical support

To whom it may concern

Re: memo of acknowledgement for statistical support

This is to confirm that Temesgen Wolde Kentayiso, student number 58528660, requested statistical support during his PhD thesis work entitled "development of a Model to Support Primary Eye Care Service Provision in Rural South Omo, Ethiopia". Consequently, I, Misgun Shewangzaw, provided the statistical support. Support ranged from validation of the data collection tool, data entry, and analysis to the agreed statistical approach.

I have an MPH and am an adjunct professor at the Arbaminch University College of Medicine and Health Science. I had 34 publications public health-related publications. For any more information, please contact me at the following address.

Kind regards,



Misun Shewangizaw (assistant professor)

Arbaminch University, College of Medicine and Health Sciences

Secha Campus, Arbaminch, Southern Ethiopia

Tell - +251 9 16 85 27 06

Email – misgun.shewangizaw@yahoo.com

Annexure T: Certificate from the South Omo Zone Health Department for presenting the Model for Validation



Annexure U: Editor's letter



PostNet Suite #40
Private Bag X04
Mentlo Park 0102
Mobile: 060 530 1165
Email: noteworthy@myconnection.co.za /
honey@myconnection.co.za

20 January 2024

TO WHOM IT MAY CONCERN

This serves to confirm that the PhD thesis entitled: *Development of a model to support primary eye care service provision in rural South Omo Zone, Ethiopia*

By: **Temesgen Wolde KENTAYISO**, Department of Health Studies, UNISA.

has been professionally edited by one of our accredited English mother-tongue language editors. The accuracy of the content of the final work remains the authors' responsibility.

A handwritten signature in black ink, appearing to read 'Dr MC Steyn'.

Dr MC Steyn

Scribing, Proof-reading and Editing Services

Annexure V: Technical editor's letter

158 Mount Augusta Drive
Midlands
MIDSTREAM
8 February 2024

e-mail: piet.rinacoetzer@gmail.com

TO WHOM IT MAY CONCERN

STUDENT: TEMESGEN WOLDE KENTAYISO
STUDENT NUMBER: 58528660

DOCTOR OF PHILOSOPHY

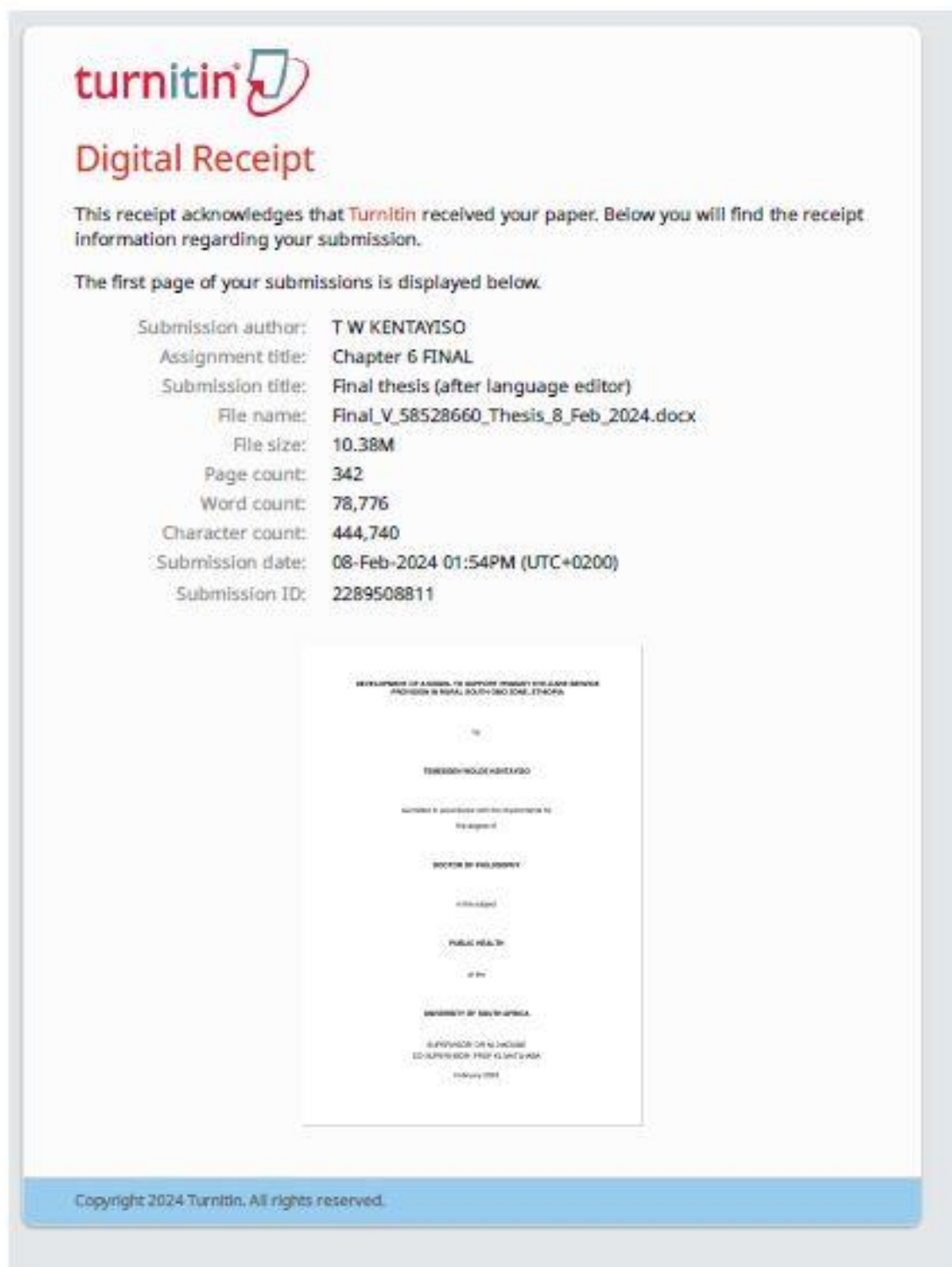
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This is to certify that the above thesis has been technically edited according to Tutorial Letter MNUALLL/301/0/2023 of the Department of Health Studies, Unisa.



Mrs EC Coetzer

Annexure W: Turnitin originality report



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by

T W KENTAYISO

Submitted in accordance with the requirements for

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DOCTOR OF PHILOSOPHY

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