

**ASSESSMENT OF KNOWLEDGE ABOUT GLAUCOMA AMONGST  
PATIENTS ATTENDING AN EYE CLINIC IN ABUJA, NIGERIA**

by

**CHRISTOPHER IFEANYI ONUNKWOR**

submitted in fulfilment of the requirements

for the degree of

**MASTER OF PUBLIC HEALTH**

in the subject

**HEALTH STUDIES**

at the

**UNIVERSITY OF SOUTH AFRICA**

**SUPERVISOR: Dr LV MONARENG**

NOVEMBER 2010

**STUDENT NUMBER: 373-2671-6**

## **DECLARATION**

I declare that the study on **ASSESSMENT OF KNOWLEDGE ABOUT GLAUCOMA AMONGST PATIENTS ATTENDING AN EYE CLINIC IN ABUJA, NIGERIA** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any institution.

\_\_\_\_\_  
**SIGNATURE**  
**(Christopher Ifeanyi Onunkwor)**

\_\_\_\_\_  
**DATE**

# **ASSESSMENT OF KNOWLEDGE ABOUT GLAUCOMA AMONGST PATIENTS ATTENDING AN EYE CLINIC IN ABUJA, NIGERIA**

STUDENT NUMBER : 373-2671-6  
STUDENT : CHRISTOPHER IFEANYI ONUNKWOR  
DEGREE : MASTER OF PUBLIC HEALTH  
DEPARTMENT : HEALTH STUDIES, UNIVERSITY OF SOUTH AFRICA  
SUPERVISOR : DR LV MONARENG

## **ABSTRACT**

The purpose of the study was to assess the level of knowledge about glaucoma among the patients who attend the CBN staff eye clinic in Abuja. An exploratory, descriptive and cross-sectional study was conducted on adult CBN staff members and their eligible dependants. Data on demographics and knowledge of glaucoma were collected using a pre-tested structured questionnaire. One hundred and forty five respondents (100% return) participated in the study. Purposive sampling was done to recruit respondents. Of the total respondents', 74.5% (n=108) claimed they had heard about glaucoma but only 14.5% (n = 21) had knowledge about glaucoma. Glaucoma knowledge was found to be independent of age, sex, ethnicity, educational level and respondents' status within the CBN. Knowledge about glaucoma in this population is therefore according to the results, inadequate. Appropriate recommendations were made to improve glaucoma knowledge amongst patients who attend the clinic.

**Key words:** Assessment; clinic; eye; glaucoma; knowledge; patient.

## ACKNOWLEDGEMENTS

My sincere gratitude goes to all those who contributed directly or indirectly towards the successful completion of this study. I wish to specially appreciate and thank the following persons:

- The Almighty God for giving me the opportunity, courage and strength to conduct this study
- Dr LV Monareng, who was my supervisor, for the high level of commitment, respect, and assistance I enjoyed while working with her. I admire her intelligence and dedication
- The Management and staff of the Central Bank of Nigeria, for allowing me to undertake the study in their health facility
- Mr Ahmed Abubakar, the statistician who assisted me with the analysis of data
- All the participants who volunteered to participate in the study
- My dear wife, Mrs Stella Onunkwor and children Kosisochukwu, Tobechukwu and Obinna for their love, understanding and support
- My parents, Chief MO Onunkwor and Mrs VO Onunkwor for their encouragement and ceaseless prayers

## *Dedication*

*I dedicate this study to my parents, Michael and Veronica  
Onunkwor*

**CHAPTER 1**

<b>ORIENTATION TO THE STUDY .....</b>	<b>1</b>
1.1 INTRODUCTION .....	1
1.2 BACKGROUND INFORMATION ABOUT THE RESEARCH PROBLEM .....	1
1.2.1 The source of the research problem .....	2
1.3 RESEARCH PROBLEM .....	3
1.4 AIM OF THE STUDY .....	3
1.4.1 Research purpose .....	3
1.4.2 Research objectives .....	3
1.5 SIGNIFICANCE OF THE STUDY .....	4
1.6 DEFINITIONS OF KEY CONCEPTS .....	4
1.7 FOUNDATION OF THE STUDY .....	6
1.7.1 Theoretical framework .....	7
1.7.2 Assumptions .....	7
1.8 RESEARCH DESIGN AND METHODOLOGY .....	9
1.9 VALIDITY AND RELIABILITY .....	9
1.9.1 Validity .....	10
1.9.2 Reliability .....	10
1.10 ETHICAL CONSIDERATIONS .....	11
1.11 LAYOUT OF THE STUDY .....	12
1.12 CONCLUSION .....	12

**CHAPTER 2**

<b>LITERATURE REVIEW .....</b>	<b>13</b>
2.1 INTRODUCTION .....	13
2.2 THE NORMAL EYE .....	14
2.3 GLAUCOMA .....	15

Table of contents	Page
2.3.1	Epidemiology of glaucoma..... 16
2.3.2	Clinical features of glaucoma..... 17
2.3.3	Diagnosis of glaucoma ..... 19
2.3.3.1	Vision tests ..... 19
2.3.3.2	Tonometry..... 20
2.3.3.3	Ophthalmoscopy..... 20
2.3.3.4	Perimetry ..... 21
2.3.3.5	Gonioscopy..... 22
2.3.3.6	Slit-lamp examination ..... 22
2.3.3.7	Corneal thickness ..... 22
2.3.4	Treatment of glaucoma..... 22
2.4	GLAUCOMA AWARENESS/KNOWLEDGE ..... 24
2.5	DETERMINANTS OF GLAUCOMA KNOWLEDGE..... 25
2.6	THEORETICAL FOUNDATION ..... 26
2.6.1	The Health Belief Model applied to knowledge about glaucoma ..... 26
2.6.2	Individual perceptions ..... 28
2.6.3	Modifying factors..... 29
2.6.4	Likelihood of action ..... 29
2.7	CONCLUSION..... 31

## CHAPTER 3

<b>Research design and methodology.....</b>	<b>32</b>
3.1	INTRODUCTION ..... 32
3.2	RESEARCH DESIGN ..... 32
3.2.1	Research paradigm ..... 33
3.2.2.1	Exploratory..... 33
3.2.2.2	Descriptive..... 34
3.2.2.3	Cross-sectional ..... 34
3.3	RESEARCH METHODS ..... 35
3.3.1	Research study setting ..... 35
3.3.2	Population..... 36
3.3.3	Sampling and sample ..... 37
3.3.4	Sample size estimation..... 38
3.3.5	Data collection ..... 39

<b>Table of contents</b>		<b>Page</b>
3.3.5.1	Data collection instrument .....	40
3.3.5.2	Pre-test .....	44
3.3.5.3	Data collection process.....	44
3.4	VALIDITY AND RELIABILITY .....	45
3.4.1	Validity .....	45
3.4.2	Reliability .....	46
3.5	DATA ANALYSIS.....	47
3.6	ETHICAL CONSIDERATIONS .....	48
3.7	CONCLUSION.....	50

## CHAPTER 4

<b>Data presentation, analysis and interpretation.....</b>		<b>51</b>
4.1	INTRODUCTION .....	51
4.2	DATA ANALYSIS.....	51
4.2.1	Section A: General information .....	52
4.2.1.1	Gender .....	52
4.2.1.2	Respondents' age .....	53
4.2.1.3	Ethnic background .....	54
4.2.1.4	Clinic attendance of respondents.....	54
4.2.1.5	Marital status of respondents.....	55
4.2.1.6	Respondents' level of education .....	56
4.2.1.7	Status of the respondents .....	58
4.2.1.8	Previous eye examination and knowledge about glaucoma.....	58
4.2.1.9	Respondents' awareness of the term glaucoma .....	59
4.2.2	Section B: Assessment of glaucoma knowledge.....	60
4.3	CONCLUSION .....	66



Table of contents	Page
<b>CHAPTER 5</b>	
<b>FINDINGS, LIMITATIONS AND RECOMMENDATIONS .....</b>	<b>67</b>
5.1 INTRODUCTION .....	67
5.2 OBJECTIVES OF THE STUDY .....	67
5.3 SUMMARY OF FINDINGS .....	67
5.3.1 Demographic data .....	68
5.3.2 Respondents' knowledge of glaucoma .....	68
5.3.3 Determinants of glaucoma knowledge.....	68
5.4 SCOPE AND LIMITATION OF THE STUDY .....	69
5.5 RECOMMENDATIONS .....	70
5.6 CONCLUSION.....	74
LIST OF SOURCES .....	75

<b>List of tables</b>		<b>Page</b>
Table 1.1	Outline of the study .....	12
Table 3.1	CBN eye clinic patient attendance.....	36
Table 4.1	Respondents' gender (N=145) .....	52
Table 4.2	Gender and knowledge about glaucoma .....	52
Table 4.3	Respondent's age (N=145) .....	53
Table 4.4	Respondent's ethnic background (N=145) .....	54
Table 4.5	Respondents' clinic attendance (N=145).....	55
Table 4.6	Marital status of respondents (N=145) .....	55
Table 4.7	Knowledge about glaucoma and marital status .....	56
Table 4.8	Knowledge about glaucoma and respondents' educational level .....	57
Table 4.9	Knowledge of glaucoma and respondents' status .....	58
Table 4.10	Knowledge of glaucoma and history of previous eye examination in respondents' .....	59
Table 4.11	Respondents' awareness of glaucoma (N=145).....	59
Table 4.12	Respondents' knowledge about glaucoma (N=145).....	60
Table 4.13	Frequency distribution of glaucoma knowledge test scores .....	61
Table 4.14	Comparison of current study results with previous studies.....	63

List of figures	Page
Figure 2.1 Anatomy of the eye.....	14
Figure 2.2 Aqueous humour production and flow.....	15
Figure 2.3 Normal optic disc .....	20
Figure 2.4 Optic disc changes in glaucoma .....	21
Figure 2.5 Health Belief Model.....	27
Figure 4.1 Frequency polygon of glaucoma knowledge test scores.....	62

## List of abbreviations

---

BES	Baltimore Eye Survey
CBN	Central Bank of Nigeria
FCT	Federal Capital Territory
GRF	Glaucoma Research Foundation
HBM	Health Belief Model
HIV	Human Immune deficiency Virus
HSREC	Health Studies Research and Ethics Committee
IOP	Intraocular pressure
POAG	Primary Open Angle Glaucoma
SPSS	Statistical Package for Social Sciences
Unisa	University of South Africa
USA	United States of America
WHO	World Health Organization

## List of Appendices

---

- |            |   |
|------------|---|
| Appendix A | Ethical clearance certificate from the Department of Health Studies Research and Ethics Committee |
| Appendix B | Permission requested to conduct the study   |
| Appendix C | Permission obtained from the management of Central Bank of Nigeria                                |
| Appendix D | Informed consent  |
| Appendix E | Questionnaire   |
| Appendix F | Mark sheet  |
| Appendix G | Criteria for formulation of multiple choice questions   |
| Appendix H | Statistical report  |

# CHAPTER 1

## ORIENTATION TO THE STUDY

### 1.1 INTRODUCTION

Glaucoma is a major public health problem and is one of the leading causes of blindness worldwide. Although the number of the people affected by primary open angle glaucoma varies in different reports, it is estimated that there will be 60.5 million people with glaucoma worldwide by 2010 increasing to 79.6 million people in 2020 (Quigley & Broman 2006:262). One of the most prevalent forms is primary open angle glaucoma (POAG) accounting for up to 74.0% of all glaucomas (Quigley & Broman 2006:262). POAG has a serious impact on the quality of life of a large number of people around the world (Alward 2000:429).

Glaucoma is the second most common cause of blindness after cataract in Nigeria and approximately 980 000 Nigerians are blind due to it (Abdul, Sivasubramaniam, Murthy, Gilbert, Abubakar, Ezelum & Rabiou 2009:4114). Glaucoma is a slowly progressive disease and because it presents with few noticeable symptoms, about half of affected individuals are unaware that they have the disease (Tielsh, Sommer, Katz, Royall, Quigley & Javitt 1991:369-374).

Glaucoma in Africans may present late, with up to 50% of cases already blind in one eye at presentation (Cook 2009:126). Under normal circumstances people should seek treatment early in the course of the disease so as to prevent further vision loss as well as to preserve the quality of life (Gasch, Wang & Pasquale 2000:303-8). However, the motivation to do so seem to be most likely related to the knowledge of glaucoma risk factors, signs and symptoms and an understanding of the natural history of the disease.

### 1.2 BACKGROUND INFORMATION ABOUT THE RESEARCH PROBLEM

Glaucoma is the second leading cause of blindness worldwide (Quigley & Broman 2006:266) and because most cases are asymptomatic, many affected individuals are unaware that they have the disease leading to avoidable blindness. Having knowledge

about glaucoma and its risk factors will most likely motivate patients to present themselves early for screening and treatment. Most of the patients present late for medical attention when the eye condition is already advanced which may be due to lack of knowledge about glaucoma.

This is an area of concern as there may be a possible gap in the patients knowledge base needed to make decisions and to seek medical help early. Research is conducted to generate essential knowledge to address the practice concern, with the ultimate goal of providing evidence- or research-based clinical care (Burns & Grove 2005:749).

### **1.2.1 The source of the research problem**

The researcher recently started running an eye clinic at the Central Bank of Nigeria (CBN) health care facility in Abuja and observed that most of the patients suffering from glaucoma that consult are already in the advanced stages of glaucoma with some of them already blind in one eye. A review of the clinic records from January to December 2006 revealed that a significant proportion of eye clinic attendance (8.9%) was attributed to patients diagnosed with glaucoma. Some of the questions that came to mind included: why do these glaucoma patients come to the clinic so late for consultation when damage on the eye/s has occurred already? What is responsible for this relatively high prevalence of glaucoma among the clinic attendees? How knowledgeable are the patients attending the eye clinic about glaucoma? What are the contributory factors for late presentation of glaucoma? All these questions motivated the researcher to undertake the study.

There is evidence that a large proportion of glaucoma patients present to the hospital with significant visual loss (Cook 2009:126; Grant & Burke 1982:991). According to Grant and Burke (1982:996), one-third of the patients who had become blind from glaucoma in their survey had done so before they sought medical attention. This situation is more significant for patients of African ancestry and it is estimated that an African-Caribbean patient is four and a half times more likely to present with advanced visual loss than a white patient of the same sex, age and intraocular pressure (Fraser, Bunce & Wormald 1999:24). Many anecdotal reports show a very high rate of open angle glaucoma in West Africa, although precise epidemiological data are lacking.

Glaucoma is a devastating eye disease and is a leading cause of irreversible blindness. It has been described as a human tragedy and has a negative impact on the quality of life of those affected by the disease (Egbert 2002:131). Unfortunately, POAG is almost without symptoms until the latest stages of the disease. It is likely that patients will only present for adequate screening and possible treatment if they are aware that they are at risk.

### **1.3 RESEARCH PROBLEM**

A significant proportion (8.9%) of the CBN staff eye clinic attendance is attributable to glaucoma, with many of the patients already in the advanced stages of the disease. The long term consequence is that many patients in this population will become needlessly blind if adequate measures are not put in place. In order to reverse this trend, there is the need to determine the extent of glaucoma knowledge in the population.

The research question therefore is: What is the level of knowledge about glaucoma amongst patients who attend the CBN staff eye clinic?

### **1.4 AIM OF THE STUDY**

The aim of the study was to assess the level of knowledge about glaucoma amongst the patients that attend the CBN staff eye clinic in Abuja.

#### **1.4.1 Research purpose**

The purpose of the study was to explore, assess and describe the level of knowledge about glaucoma among the patients who attend the CBN staff eye clinic in Abuja.

#### **1.4.2 Research objectives**

The research objectives of the study were to

- explore and describe the level of glaucoma knowledge amongst patients who attended the CBN staff eye clinic in Abuja



- create awareness about glaucoma by designing a pamphlet with information about glaucoma for patients who attend the eye clinic
- make recommendations about how eye care service providers can educate and empower patients who come to the eye clinic with knowledge about glaucoma

## **1.5 SIGNIFICANCE OF THE STUDY**

Obtaining information about the level of glaucoma knowledge and associated factors in the population will help in making recommendations regarding the development of appropriate health education strategies to empower patients about the needed knowledge about glaucoma. Findings from the study will be used to design a glaucoma information pamphlet as well as conduct glaucoma awareness campaigns. The findings will also be used as advocacy for the planning and development of relevant health policy.

Information from the findings communicated through health talks or media will influence patients, especially those with risk factors for the disease to seek regular and periodic ophthalmic care thus, ensuring early detection and proper management especially of glaucoma.

## **1.6 DEFINITIONS OF KEY CONCEPTS**

The conceptual and operational definition of concepts as used in this study is provided as follows:

### **Assessment**

An opinion or a judgment about somebody or something that has been thought about very carefully. The act of judging or forming an opinion about somebody or something. It can also mean an amount that has been calculated and that must be paid (*Oxford Advanced Learners Dictionary 2006:75*).

In this study, assessment refers to exploring and describing the level of knowledge that eye patients have about glaucoma.

## **Clinic**

Several definitions exist and include, a building or part of a hospital where people can go for special medical treatment or advice, a period of time during which doctors give special medical advice, a private hospital or one that treats health problems of a particular kind, a building where visiting patients can get medical treatment; a building shared by a group of doctors and nurses who work together (*Oxford Advanced Learners Dictionary* 2006:264).

In this study, clinic refers to the CBN medical facility and eye clinic which is that part of the medical facility where patients obtain specialist care for their eye related health problems.

## **Eye**

The term *eye* refers to a part of the body which is either of the two organs on the face that one sees with. It is the ability to see and also refers to a particular way of seeing something. It is the hole in the end of a needle that one puts the thread through and a small thin piece of metal curved round, that a small hook fits into, used for fastening clothes. As a verb, to *eye* somebody or something means to look at somebody or something carefully, especially because one wants something or is suspicious of something (*Oxford Advanced Learners Dictionary* 2006:519). Freshwater and Maslin-Prothero (2005:223) define *eye* as the organ of vision located in the eye socket of the skull.

In this study, *eye* refers to either of the two organs on the face that enables us to see clearly where one goes or what one does.

## **Glaucoma**

Glaucoma is a progressive optic neuropathy with characteristic changes in the optic nerve head and corresponding loss of visual field. It represents a final common pathway for a number of conditions, for most of which raised intraocular pressure is the most important risk factor. It is the second to cataract leading cause of blindness worldwide (Denniston & Murray 2006:270).

In this study, glaucoma refers to damage to the optic nerve of the eye due to high intraocular pressure on patients who attend the CBN staff eye clinic.

## **Knowledge**

The *Oxford Advanced Learners Dictionary* (2006:821) refers to knowledge as the information, understanding and skills that one gains through education or experience. Knowledge refers to the facts, feelings, or experiences known by a person or group of people. It is awareness, consciousness, or familiarity gained by experience or learning. It is the state of knowing or specific knowledge about a subject (*Collins English Dictionary* 2007:900).

In this study, knowledge refers to the extent to which patients who consult at the eye clinic know about glaucoma and how this knowledge influences their timing of seeking medical help.

## **Patient**

The term *patient* refers to a person who is receiving medical treatment especially in a hospital, or a person who receives treatment from a particular doctor. It also means, being able to wait for a long time or accept annoying behaviour or enduring trying circumstances without becoming angry (*Oxford Advanced Learners Dictionary* 2006:1068).

In this study, patient refers to a person who has eye related health problems and which requires medical care and attends the CBN eye clinic in Abuja.

## **1.7 FOUNDATION OF THE STUDY**

Theories and conceptual models in research attempt to make research findings meaningful and generalisable. They stimulate research and extension of knowledge by providing both direction and impetus. Theories and conceptual models form the foundation or springboard for advancing knowledge and accumulation of evidence for practice (Polit & Beck 2008:144-145). Theory in a study can be in the form of a theoretical or conceptual framework.

### **1.7.1 Theoretical framework**

The study is based on the theoretical or conceptual constructs of the Health Belief Model (Strecher & Rosenstock 1997). This model adapted from the behavioural sciences is one of the most widely recognised frameworks of health behaviour and may be applied to health seeking behaviour for glaucoma patients. The model explains how a person perceives the threat of glaucoma, and consequent loss of vision from glaucoma, and how the need for early consultation is viewed. The three constructs of the model are individual perceptions about susceptibility to disease, modifying factors and variables affecting the likelihood that a person will take action to change behaviour based on perceived benefits and barriers.

### **1.7.2 Assumptions**

Assumptions are basic principles that are assumed to be true based on logic and reason, without proof or verification (Mouton & Marais 1994:11; Polit & Beck 2008:14-15). Assumptions are often embedded in thinking and behaviour, and uncovering them requires introspection (Burns & Grove 2005:39). Sources of assumptions include universally accepted truths such as theories, previous research and clinical practice. In research studies, assumptions are embedded in the philosophical base, study design and interpretation of findings (Burns & Grove 2007:37). The recognition of assumptions by the researcher is strength and not a weakness (Burns & Grove 2005:39). A positivist assumption says that there is a reality in every situation which exists with or without verification (Polit & Beck 2008:14). There is a logical way in which patients understand diseases. The assumption is that what is not known is the actual description of the knowledge of patients about glaucoma - what it is, how far does it go, what does it cover and to what extent. Assumptions influence the logic of the study, and the recognition of assumptions leads to more rigorous study development. To this end ontological, epistemological and methodological assumptions were posited in this study.

*Ontological assumptions*, according to Mouton and Marais (1994:11-12), refer to the study of being or reality. The ontological assumptions regarding reality underlying this study are that

- people take health related actions on the basis of cognitive information

- adequate knowledge about a phenomena lowers anxiety about that phenomena
- different people process data obtained through memory and senses and transform it into reality according to each one's world

*Epistemological assumptions* are statements that embody the ideal of science, namely the quest for knowledge and truth (Mouton & Marais 1994:14-15). In this regard, the epistemological assumptions underlying this study are as follows:

- asking questions can elicit an understanding of the level of knowledge that patients have about glaucoma
- the constructs of the Health Belief Model (Strecher & Rosenstock 1997 page/s) can provide a theoretical structure through which the empirical data on the phenomena of interest can be reduced and organised
- although it is difficult to ascertain when the truth has been attained, it is, however, necessary to strive for reality as close as possible to the real thing
- theories and models deductively generated from data are likely to offer insight, enhance understanding, and provide a meaningful guide to action, particularly for doctors in order to reduce the high prevalence of morbidity and blindness due to glaucoma

*Methodological assumptions*, according to Mouton and Marais (1994:15-16), concern what may be called the how of research, in other words, how should research be planned, structured and executed to comply with the criteria of science. It refers to the logic of implementing scientific methods in the study of reality. Methodological assumptions regarding this study are that

- quantitative research is most often associated with precise measurement of phenomena and quantifications, often involving controlling designs (Polit & Beck 2008:763)
- quantitative studies allow for generalisability of the results
- quantitative research employs deductive reasoning which moves from the general premise to a particular situation or conclusion (Burns & Grove 2007:17)
- explorative and descriptive research designs aim at portraying and exploring people's views and knowledge of a particular phenomenon accurately
- quantitative studies are based on theoretical or conceptual frameworks

Burns and Grove (2007:37) conclude that assumptions are embedded (unrecognised) in thinking and behaviour, and uncovering these assumptions requires introspection and a strong knowledge base in the particular field of study.

## **1.8 RESEARCH DESIGN AND METHODOLOGY**

Quantitative research is a formal, objective and systematic process in which numerical data is used to obtain information about the world, usually under conditions of considerable control (Burns & Grove 2007:17-18). A quantitative, explorative and descriptive study was conducted to assess the level of knowledge about glaucoma amongst the patients that attend the CBN staff eye clinic in Abuja.

The population for the study included both male and female adult patients who have attended the staff eye clinic. The researcher used convenience sampling to select the sample for the study. Data was collected using a structured questionnaire, with the help of two volunteers who were trained in the data collection process, and was collected over a five day period. Face and content validity was ensured. The specific criteria on the formulation of multiple choice questions was utilised to establish reliability of the items used. Data was analysed with the help of a statistician using descriptive and inferential statistics. Descriptive statistics was used to organise, describe and synthesise the data generated in order to facilitate insight about knowledge on glaucoma. Inferential statistics was used to test the relationship between knowledge of glaucoma and demographic factors such as age, gender, education level, social status and previous diagnosis with glaucoma. Univariate chi-square and Fischer's exact tests were used for data analysis. A two-tailed 'p' value of less than 0.05 was considered statistically significant.

The details of the research design and methodology are discussed in chapter 3.

## **1.9 VALIDITY AND RELIABILITY**

This section briefly explains measures that were observed to enhance the validity and reliability of the data collection instrument, as well as the external validity of the study.

### **1.9.1 Validity**

Validity of the data collection instrument refers to the extent that it measures what it is intended to measure. In other words, a valid instrument actually measures the concept it is supposed to measure accurately (Stommel & Wills 2004:222). The validity of a study according to Burns and Grove (2005:214) is a measure of the truth or accuracy of a claim and is an important concern throughout the research process. Validity provides a major basis for making decisions about which findings are sufficiently valid to add to the evidence base for patient care (Burns & Grove 2005:214). Four types of validity that affect the rigor of a quantitative study include statistical conclusion validity, internal validity; construct validity and external validity (Polit & Beck 2008:307).

In this study content, face, construct, internal and external validity were ensured. External validity was concerned with the extent to which study findings can be generalised beyond the sample used in the study (Burns & Grove 2005:218). It was therefore enhanced by ensuring an adequate sample size. A pre-testing of the data collecting instrument was also conducted in order to refine and enhance its validity.

### **1.9.2 Reliability**

The reliability of a data collection instrument refers to its accuracy or precision and is concerned with the consistency of the measurement technique. It takes into account such characteristics as dependability, consistency, accuracy and comparability (Burns & Grove 2007:364-365). It is the relative absence of unsystematic, random measurement error (Stommel & Wills 2004:209).

In this study, reliability was firstly ensured by applying specific criteria (see appendix G) on the formulation of multiple choice questions in terms of stem, distracters and content. The criteria applies in instances of formulating multiple choice questions, multi-response questions, matching questions, sentence completion and alternative responses (true/false) questions (Billings & Halstead 2009:25). Secondly, a pre-test, utilising patients with similar characteristics to the study sample, was conducted to determine clarity of the items, questions and consistency of responses.

## 1.10 ETHICAL CONSIDERATIONS

Ethics focuses on concepts and principles of how human beings do and should think and behave. In a research context, ethics is concerned with the moral concepts and principles that underpin socially recognised and sanctioned professional and legal obligations (Stommel & Wills 2004:373).

Ethical considerations in this study refers to protecting the rights of the respondents and the institutions in which the research is done, as well as maintaining scientific integrity based on the Declaration of Helsinki of 1964 (Burns & Grove 2005:181-206).

The researcher adequately covered research ethics by applying the following:

- **Protecting the rights of the participants was ensured by** obtaining informed consent, maintaining confidentiality and anonymity, privacy, as well as respect of the dignity of respondents. They were informed of their right to withdraw from the study at any time when they felt uncomfortable
- **Protecting the rights of the institution:** Approval of the ethical standards committee of UNISA was sought for before conducting the study. Written permission to conduct the study was obtained from the management of the CBN Abuja health facility before conducting the study
- **Scientific integrity of the study:** This was secured through an honest conduct, reporting and publication of the study. The author did not fabricate data or falsify research materials or processes. Plagiarism was avoided by appropriate citation of other peoples' ideas, research processes and procedures, results and conclusions (Burns & Grove 2005:746).

The scope and limitation of the study is indicated in chapter 5.

## 1.11 LAYOUT OF THE STUDY

This dissertation consisted of five chapters as depicted in table 1.



**Table 1.1 Outline of the study**

<b>Chapter</b>	<b>Title</b>	<b>Content description</b>
1	Orientation of the study	Overview of the research problem, purpose, significance of the study, research design and methodology, methods of ensuring validity and reliability and ethical considerations
2	Literature review	An in depth review of the literature related to the topic under investigation to give the researcher an overview on what is published or discussed in the empirical literature about the phenomenon
3	Research design and methodology	The overall plan and research procedures such as population and sampling technique, choice of sample size, data collection and data analysis method, ensuring validity and reliability and ethical considerations for addressing the research question and objectives
4	Data presentation, analysis and interpretations	Presentation, analysis and interpretation of the research findings
5	Discussions, limitations and recommendations	Discussions, conclusions and recommendations based on the research findings

## **1.12 CONCLUSION**

In this chapter a brief outline of the steps that have been taken to conduct this study is presented. An introduction of the background to the research problem in relation to the high prevalence of glaucoma at the CBN staff eye clinic was presented. The research purpose and objectives, definition of key concepts and the significance of the study to clinical practice and impact on the quality of eye care was highlighted. The theoretical foundation of the study and assumptions were indicated. The research design, methodology, validity and reliability and ethical considerations were also briefly introduced.

Chapter 2 presents a discussion on the literature review.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 INTRODUCTION

A literature review is an organised written presentation of what has been published on a topic by scholars (Burns & Grove 2007:93). Stommel and Wills (2004:339) define a literature review as a written summary and evaluation of the information gleaned from literature searches. The purpose of the review is to convey to the reader what is currently known regarding the topic of interest (Burns & Grove 2007:93).

According to De Vos, Strydom, Fouche and Delport (2005:127), a literature review refers to a scrutiny or examination of all relevant sources of information on a phenomenon under study. A literature review is accomplished by a thorough and critical review of the existing studies (World Health Organization [WHO] 2001:148).

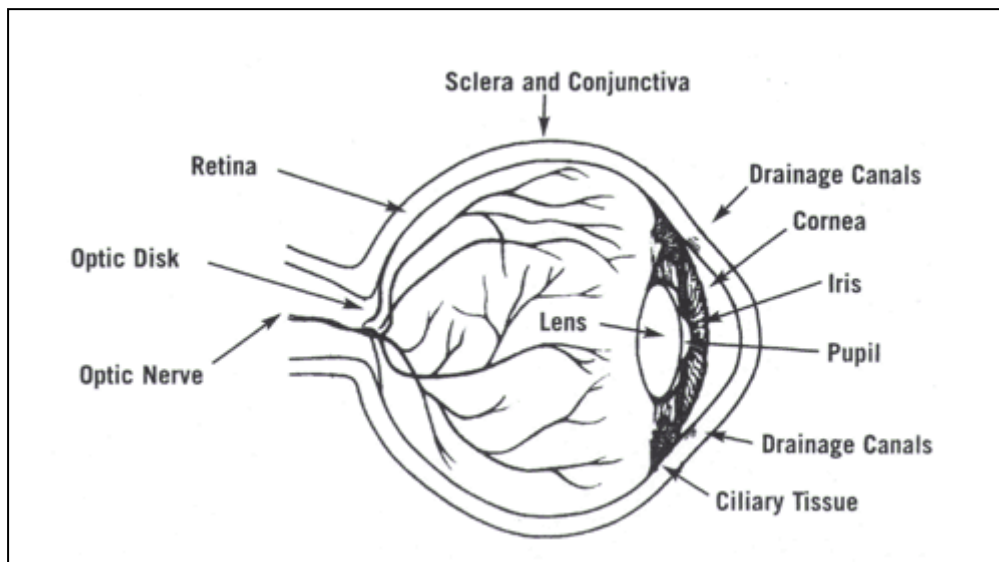
Mouton (2001:87) states that a review of existing literature is important to

- ensure that previous studies are not duplicated
- discover the most recent and authoritative theory on the subject
- find out the most widely accepted empirical findings in the field of study
- identify available instrumentation that has proven validity and reliability

Literature review in this study was conducted on the epidemiology, clinical features and treatment of glaucoma. Focus was also on previous studies on glaucoma awareness and/or knowledge as well as the health belief model which was the conceptual framework for this study. The review revealed the existing knowledge about these concepts and how they are related, research undertaken on these concepts, and instruments used in the study of these concepts.

## 2.2 THE NORMAL EYE

A tough white covering called the sclera protects the eye. Some part of the white sclera can be seen in the front of the eye and a clear, delicate membrane called the conjunctiva covers the sclera (Glaucoma Research Foundation 2009). Figure 2.1 presents the important features of an eye.



**Figure 2.1 Anatomy of the eye**

(Glaucoma Research Foundation 2009)

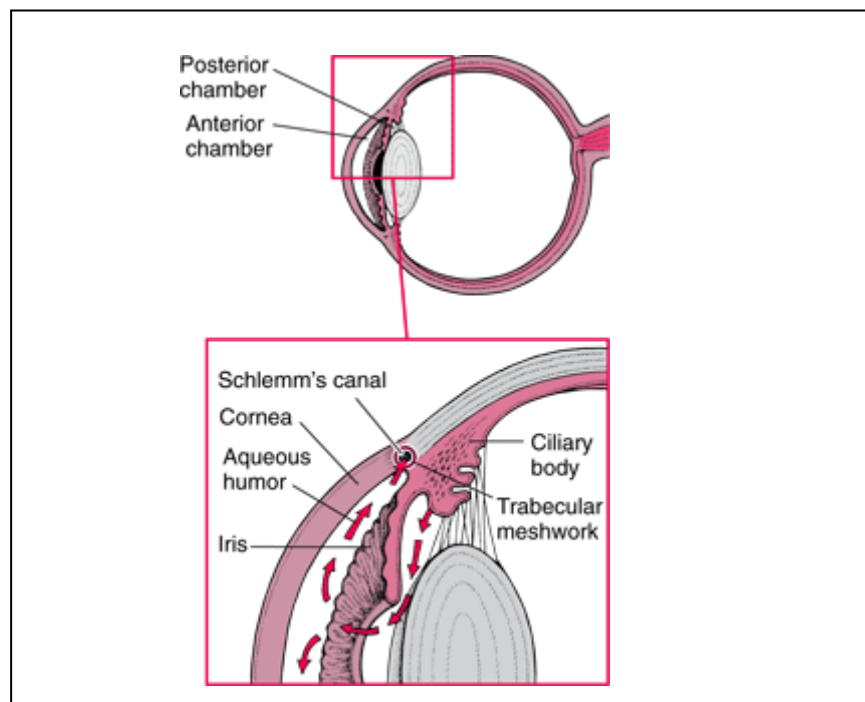
At the front of the eye is the cornea. The cornea is the clear part of the eye's protective covering and it allows light to enter the eye. The iris is the colored part of the eye that shrinks and expands so the pupil can let just the right amount of light into the eye. The light is directed by the pupil to the lens. The lens focuses the light onto the retina (inside the lining of the eye). Nerve fibers in the retina carry images to the brain through the optic nerve (Glaucoma Research Foundation 2009).

The front part of the eye is filled with a clear fluid called intraocular fluid or aqueous humor which is made by the ciliary body. This fluid flows out through the pupil and is then absorbed into the bloodstream through the eye's drainage system. The drainage system is a meshwork of drainage canals around the outer edge of the iris. Proper drainage helps keep eye pressure at a normal level. The production, flow, and drainage of this fluid is an active continuous process that is needed for the health of the eye (Glaucoma Research Foundation 2009).

The inner pressure of the eye known as intraocular pressure (IOP) depends upon the amount of fluid in the eye. If the eye's drainage system is working properly, the fluid can drain out and prevent a build-up. Likewise, if the eye's fluid system is working properly, then the right amount of fluid will be produced for a healthy eye. IOP can vary at different times of the day, but it normally stays within a range that the eye can handle (Glaucoma Research Foundation 2009).

### 2.3 GLAUCOMA

The glaucomas are a group of eye disorders characterised by progressive optic nerve damage at least partly due to increased IOP (The Merck manual of diagnosis and therapy 2006:903). They are categorised as open-angle or closed-angle (angle-closure). The "angle" refers to the angle formed by the junction of the iris and cornea at the periphery of the anterior chamber (see figure 2.2), and this is where >96% of the aqueous humor leaves the eye. Glaucomas are further sub-divided into primary glaucomas (cause of outflow resistance or angle closure is unknown) and secondary glaucomas (outflow resistance results from another disorder), accounting for more than 20 adult types (The Merck manual of diagnosis and therapy 2006:903).



**Figure 2.2 Aqueous humour production and flow**  
(The Merck manual of diagnosis and therapy 2006:906)

Primary open-angle glaucoma is a syndrome of optic nerve damage associated with an open anterior chamber angle and an elevated or sometimes average IOP (The Merck manual of diagnosis and therapy 2006:906). The majority of people with glaucoma worldwide have primary open-angle glaucoma (Quigley & Broman 2006). It is also the most common glaucoma amongst Africans (Cook 2009:124). Thus, much of the discussion in this study focused on primary open-angle glaucoma.

Angle-closure glaucoma is glaucoma associated with a closed anterior chamber angle, which may be chronic or rarely acute (The Merck manual of diagnosis and therapy 2006:909). This type of glaucoma is more common in Asians and in women (Quigley & Broman 2006).

### **2.3.1 Epidemiology of glaucoma**

Glaucoma is the second leading cause of blindness worldwide if undetected or untreated (Quigley 1996:389; Quigley & Broman 2006:262) and it is estimated that there will be 60.5 million people with the primary glaucomas in 2010 (Quigley & Broman 2006:262).

Most Africans in many parts of the world such as North America and Europe are disproportionately affected by primary open angle glaucoma. It is also the most common in Africa. Large population-based studies such as the Barbados Eye Study showed that 1 in 11 Afro-Caribbeans over the age of 50 years and 1 in 6 over the age of 70 years have open angle glaucoma (Leske, Connell, Schachat & Hyman 1994:295).

The prevalence of glaucoma in East, Central and Southern Africa can be conservatively estimated to be 10,000 people for every 1 million population which may be higher in West Africa (Cook 2009:124). Glaucoma in Nigeria is the second most common cause of blindness after cataract and approximately 980,000 Nigerians are blind from glaucoma (Abdul et al 2009:4114).

In 2002, 37 million individuals were blind worldwide, with glaucoma accounting for 12.3% of these individuals. Bilateral blindness from glaucoma is projected to affect 8.4 million people worldwide by 2010 and greater than 11 million in 2020 (Quigley & Broman 2006:262).

### *Risk Factors for open – angle glaucoma*

Elevated intraocular pressure is an important risk factor for open – angle glaucoma (American Academy of Ophthalmology 2008:85). Large, population based epidemiologic studies have revealed a mean IOP of 15.5 mm Hg, with a standard deviation of 2.6 mm Hg. This led to the definition of “normal IOP” as approximately 10 – 21 mm Hg. Other risk factors for POAG other than IOP include race, advanced age and positive family history (American Academy of Ophthalmology 2008:85). The Baltimore Eye Survey (Tielsh et.al 1991:369-374) found the prevalence of glaucoma to increase dramatically with age, particularly among blacks, exceeding 11% in those aged 80 years or older. Black race is another important risk factor. Prevalence of POAG is 3 to 4 times greater in blacks than in others. Blindness from glaucoma is at least 4 times more common in blacks than in whites (Tielsh et al 1991:369). The Baltimore Eye Survey (Tielsh et al 1991:369-374) found that the relative risk of having POAG is increased about 3.7-fold for individuals who have a sibling with POAG, thus highlighting the role of a positive family history. Omoti and Edema (2007:79) in a study in Benin, Nigeria report risk factors for open angle glaucoma to include increased age, African ethnicity, family history of glaucoma, increased IOP, myopia and decreased corneal thickness. Some other possible risk factors for glaucoma include diabetes, hypertension, eye injury or surgery, history of steroid use, migraine headaches, sleep-related breathing disorders and male gender (The Eye Digest 2009).

*Risk factors for angle closure glaucoma* include Inuit and Asian ethnicity, hyperopia, female sex, shallow anterior chamber, short axial length, small corneal diameter, steep corneal curvature, shallow limbal chamber depth and thick, relatively anteriorly positioned lens (Amerasinghe & Aung 2008:31; Foster 2002:50;).

### **2.3.2 Clinical features of glaucoma**

In the early stages of the disease there may be no symptoms, however if the pressure remains too high for too long, the extra pressure can damage the optic nerve and result in vision loss (Glaucoma Research Foundation 2009). In other words, there is usually a painless and symptomless progression towards blindness.

In primary open-angle glaucoma, early symptoms are uncommon. The patient usually becomes aware of visual field loss only when optic nerve atrophy is quite marked. The typical asymmetric deficits contribute to delay in recognition or seeking medical help (The Merck manual of diagnosis and therapy 2006:906). Rarely the patient has eye aches and coloured haloes appear around bright objects due to transient corneal oedema and this occurs if the IOP is very high (Denniston & Murray 2006:276). Symptoms and signs vary with the type of glaucoma, but the defining characteristic is optic nerve damage as evidenced by an abnormal optic disc and certain types of visual deficits (The Merck manual of diagnosis and therapy 2006:905).

In most types of glaucoma, the eye's drainage system becomes clogged so the intraocular fluid cannot drain. As the fluid builds up, it causes pressure to build up within the eye. High pressure damages the sensitive optic nerve and results in vision loss (Glaucoma Research Foundation 2009). There are millions of nerve fibers that run from the retina to the optic nerve. These fibers meet at the optic disc. As fluid pressure within the eye increases, it damages these sensitive nerve fibers and they begin to die. As they die, the disc begins to hollow and pushes the optic nerve into a cupped or curved shape (see figures 2.2 and 2.3).

Examination findings usually include an unobstructed open angle on gonioscopy and characteristic optic nerve appearance and visual field defects. IOP may be normal or high but is almost always higher in the eye with more optic nerve damage (The Merck manual of diagnosis and therapy 2006:906). The IOP is greater than 21 mmHg; often with high diurnal variability. Disc changes include, cup-disc asymmetry, high cup-disc for disc size, vertical elongation of cup, neuro-retinal rim notch/thinning, disc haemorrhage, vessel bayoneting/ nasal displacement, and peripapillary atrophy (Denniston & Murray 2006:276).

Visual field defects include

- focal defects respecting the horizontal meridian including nasal step, baring of the blind spot, arcuate defects and altitudinal defects
- generalised depression (Denniston & Murray 2006:276)

### **2.3.3 Diagnosis of glaucoma**

Early detection, through regular and complete eye examination is the key to protecting one's vision from damage caused by glaucoma. Examinations include vision tests, an evaluation of the optic nerve (ophthalmoscopy), measurement of the eye pressure (tonometry), a test of the eye's drainage angle (gonioscopy), and an assessment of the visual field of each eye (perimetry). Information from these examinations is compared at regular intervals to determine if glaucoma damage has progressed over time.

#### **2.3.3.1 Vision tests**

Vision tests check many different functions of the eye. The tests measure the ability to see details at near and far distances and evaluate one's ability to see different colors (Healthwise 2009).

**Visual acuity tests** are the most common tests used to evaluate vision. They measure the eye's ability to see details at near and far distances. The tests usually involve reading letters or looking at symbols of different sizes on an eye chart. Usually, each eye is tested by itself. And then both eyes may be tested together, with and without corrective lenses (Healthwise 2009).

**Refraction** is a test that measures the eyes' need for corrective lenses (refractive error). It is usually done after a visual acuity test. Refractive errors, such as nearsightedness (myopia) or farsightedness (hyperopia), occur when light rays entering the eye can't focus exactly on the nerve layer or retina at the back of the eye. This causes blurred vision. Refraction is done as a routine part of an eye examination for people who already wear glasses or contact lenses, but it will also be done if the results of the other visual acuity tests show that your eyesight is below normal and can be corrected by glasses (Healthwise 2009).

**Color vision tests** check the ability to distinguish colors. It is used to screen for color blindness in people with suspected retinal or optic nerve disease or who have a family history of color blindness. The color vision test is also used to screen applicants for jobs in fields where color perception is essential, such as law enforcement, the military, or



electronics. Color vision tests only detect a problem. Further testing is needed to identify what is causing the problem (Healthwise 2009).

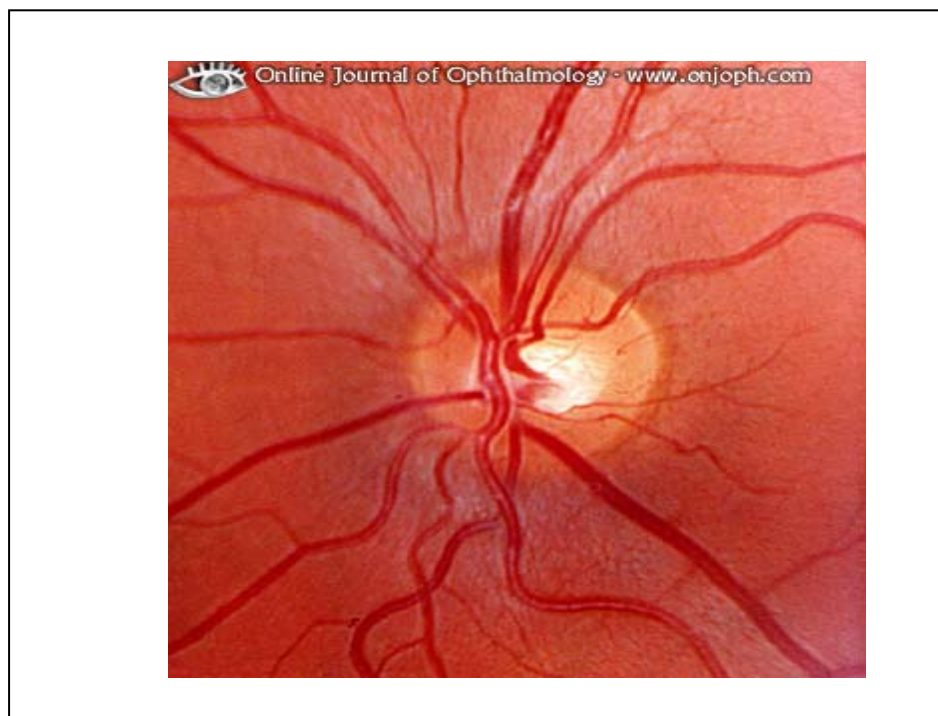
### **2.3.3.2 Tonometry**

The tonometry test measures the inner pressure of the eye. Usually anaesthetic drops are used to numb the eye. The doctor or technician will then use a special device known as a tonometer to measure the eye's pressure. Normal intraocular pressure is usually between 10 and 21 millimeters of mercury (mm Hg). People with glaucoma sometimes have above-normal IOP (WebMD 2008a).

### **2.3.3.3 Ophthalmoscopy**

Ophthalmoscopy is used to examine the inside of the eye, especially the optic nerve. In glaucoma, it is used to examine the area where the optic nerve leaves the eye (optic disc). Damage to the optic nerve related to glaucoma can be diagnosed by ophthalmoscopy.

Figures 2.3 and 2.4 represent the ophthalmoscopic views of a normal optic disc and a glaucomatous optic disc respectively.



**Figure 2.3 Normal optic discs**

(The Merck manuals online medical library 2008)

The optic nerve is normally a slightly vertically elongated circle (disc) with a centrally located depression (cup). Figure 2.4 presents the optic disc changes usually seen in patients with glaucoma.



**Figure 2.4 Optic disc changes in glaucoma**

(The Merck manuals online medical library 2008)

Signs of moderate glaucoma include thinning of the neuroretinal rim with an increased cup-to-disc ratio, vertical elongation of the cup, pitting or notching of the rim, and wedge-shaped dark areas that reflect retinal nerve fiber layer damage (The Merck manuals online medical library 2008).

If the pressure in the eye is not in the normal range, or if the optic nerve looks unusual, then some special glaucoma tests will be required. These tests include the following:

#### **2.3.3.4 Perimetry**

The perimetry test is also called a visual field test. Visual field testing, also called perimetry testing, can detect loss of side vision referred to as peripheral vision and central vision that may indicate damage to the optic nerve caused by glaucoma. This is the best test for evaluating damage caused by open-angle glaucoma. Perimetry testing is also usually done as part of follow-up exams for glaucoma. Perimetry testing is

expensive and time-consuming and thus is not used as a regular screening test or performed as often as other tests for glaucoma (Healthwise 2008a).

#### **2.3.3.5 Gonioscopy**

Gonioscopy is a painless eye test that checks if the angle where the iris meets the cornea is open or closed, showing if either open angle or closed angle glaucoma is present. Gonioscopy uses a special lens to examine the drainage angles of the eyes. It is a very common test in the initial evaluation of suspected glaucoma (Healthwise 2008a).

#### **2.3.3.6 Slit-lamp examination**

The slit lamp exam is used to get a magnified view of all parts of the eye. Gonioscopy and tonometry can be done as part of a slit lamp exam.

#### **2.3.3.7 Corneal thickness**

Ultrasound pachymeter is used to measure the thickness of the clear front surface of the eye which is the cornea. Cornea thickness, along with intraocular pressure, helps to determine one's risk of developing glaucoma (Healthwise 2008a).

### **2.3.4 Treatment of glaucoma**

Vision lost as a result of glaucoma cannot be recovered. The goal of treatment therefore is to prevent further optic nerve and visual field damage by lowering the IOP (The Merck manuals online medical library 2006:907). Initial treatment is usually drug therapy, proceeding to laser therapy and then incisional surgery if the target IOP is not met. Surgery may be the initial treatment if IOP is extremely high (The Merck manuals online medical library 2006:907).

An approach to the medical treatment of glaucoma is outlined below (Denniston & Murray 2006:277):

- counsel the patient: on the nature and natural history of the condition, drug compliance and probability of life time treatment
- define target IOP: usually less than 20% reduction; target IOP should be lower if there is already advanced damage or if the disease continues to progress
- select drug: first line drugs will include prostaglandin agonists e.g. latanoprost eye drops, or beta blockers e.g. timolol eye drops
- review treatment: example after 6 weeks of drug use
- decide if further treatment is necessary

Surgery for primary open angle glaucoma includes laser trabeculoplasty, a guarded filtration procedure known as trabeculectomy, and possibly tube shunts or cilio-destructive procedures (The Merck manuals online medical library 2006:907).

### **Eye care and treatment**

It is important to have one's eyes examined regularly. The eyes should be tested:

- before age 40, every two to four years
- from age 40 to age 54, every one to three years
- from age 55 to 64, every one to two years
- after age 65, every six to 12 months (Glaucoma Research Foundation 2009)

Anyone with high risk factors for glaucoma, should be tested every year or two after age 35. After glaucoma is diagnosed, eye exams including tonometry and ophthalmoscopy should be carried out on a more frequent basis to monitor the disease. Perimetry testing is usually done once a year after open-angle glaucoma is diagnosed.

Treatment for glaucoma focuses on preserving eyesight by slowing the damage to the nerve located in the back of the eye where the optic nerve is located. Currently, most treatment for glaucoma is directed at lowering the pressure in the eyes. Optic nerve damage can occur at any level of eye pressure, even within the normal range. Lowering the IOP often can help protect the optic nerve from further damage (Healthwise 2008b).

Treatment options include medicines, laser treatments, and surgery. In Nigeria, treatment usually begins with medicines. When treatment with medicines does not

successfully lower pressure in the eyes, laser or surgery treatments need to be considered. But in some instances it may be appropriate to use laser or surgical treatments first, particularly in moderate to severe cases (Healthwise 2008b). The surgical goal would be to drain the intraocular fluid by expanding the existing drainage area or by creating a new outlet for the fluids to drain through.

## **2.4 GLAUCOMA AWARENESS/KNOWLEDGE**

Glaucoma is a leading cause of irreversible blindness in the world, and because it is a slowly progressive disease, often with few noticeable symptoms, about one-third to one-half of affected individuals is unaware they have the disease (Grant & Burke 1982:991; Tielsh et al 1991:369). In developing countries, glaucoma is generally undiagnosed until blindness has occurred in at least one eye, thus causing significant problems in the quality of life of patients (Ashaye 2003:70).

Several studies have examined awareness and/or knowledge about glaucoma in general clinic or population based samples (Altangerel, Nallamshetty, Uhler, Fontanarosa, Steinmann, Almodin, Chen & Henderer 2009:66; Dandona, Dandona, John, McCarty & Rao 2001:96; Krishnaiah, Kovai, Srinivas, Shamanna, Rao & Thomas 2005:205; Sathyamangalam, Paul, Ronnie, Baskaran, Hemamalini, Raj, Augustian, Prema, & Vijaya 2009:355). Studies conducted in developed societies such as Canada, United States of America (USA) and China indicate high levels (>70%) of awareness about glaucoma (Altangerel et al 2009:66; Gasch, Wang, & Pasquale 2000:303; Lau, Lee, Fan, Lau & Michon 2002:1080) and low levels of glaucoma knowledge ranging from 8% to 30% (Altangerel et al 2009:66; Lau et al 2002:1080; Pfeiffer et al 2002:458).

In developing countries such as India, very low levels of glaucoma awareness and knowledge have been reported and most of these studies have been conducted in India (Sathyamangalam et al 2009; Dandona et al 2001; Krishnaiah et al 2005). Population based studies on awareness of glaucoma from rural areas (Krishnaiah et al 2005) and urban areas of India (Dandona et al 2001) have shown that awareness is poor among rural communities.

Very few studies have been reported about glaucoma awareness in West Africa. A study carried out by Adegbehingbe and Bisiriyu (2008:240) among hospital workers in

Nigeria indicate moderately low levels of knowledge and understanding of glaucoma even amongst hospital workers. In general, most of these studies have concluded that further education and screening are necessary to promote early diagnosis and treatment of glaucoma.

Many of the studies on glaucoma awareness carried out in developing countries did not show clear evidence of definitions of “awareness” and “knowledge” (Adegbehingbe & Bisiriyu 2008:240; Dandona et al 2001:96; Krishnaiah et al 2005:205; Sathyamangalam et al 2009:355). Awareness was defined as ‘having heard of glaucoma’, while knowledge was defined as ‘when the participant had some understanding of glaucoma’, for instance, “it is high pressure in the eye”, “it is a disease where the nerve of the eye becomes weak”, or “it is damage to the nerve of the eye due to high pressure”.

In similar studies carried out in the USA (Altangerel et al 2009:67; Gasch et al 2000:305) , glaucoma awareness was also defined as ‘having heard about glaucoma’. However definitions for glaucoma knowledge varied, some restricting it to only an accurate definition of glaucoma (Altangerel et al 2009:67), while others included knowledge of signs and symptoms, patho-physiology and treatment (Lau et al 2009:1082). In all, direct comparison of these studies may be difficult because of the definitions used.

Majority of the cited previous studies on glaucoma awareness made use of structured open ended questionnaires (Dandona et al 2001:97; Krishnaiah et al 2005:206; Lau et al 2002:1081; Mansouri, Orgul, Meier-Gibbons & Mermoud 2006:102; Pfeiffer, Krieglstein, & Wellek 2002:459; Sathyamangalam et al 2009:356), with most of them reporting varying degrees of instrument validation. Of note however, is the study carried out by Sathyamangalam et al (2009:360) which made use of a questionnaire with ensured validity and reliability. Their study questionnaire was validated against the Hong Kong study questionnaire (Lau et al 2002) and there were similarities noted between the responses to questions such as ‘have you ever heard of the eye condition glaucoma?’

## **2.5 DETERMINANTS OF GLAUCOMA KNOWLEDGE**

Several factors in the literature have been reported to be associated with lack of knowledge about eye diseases in general and glaucoma in particular. For example,

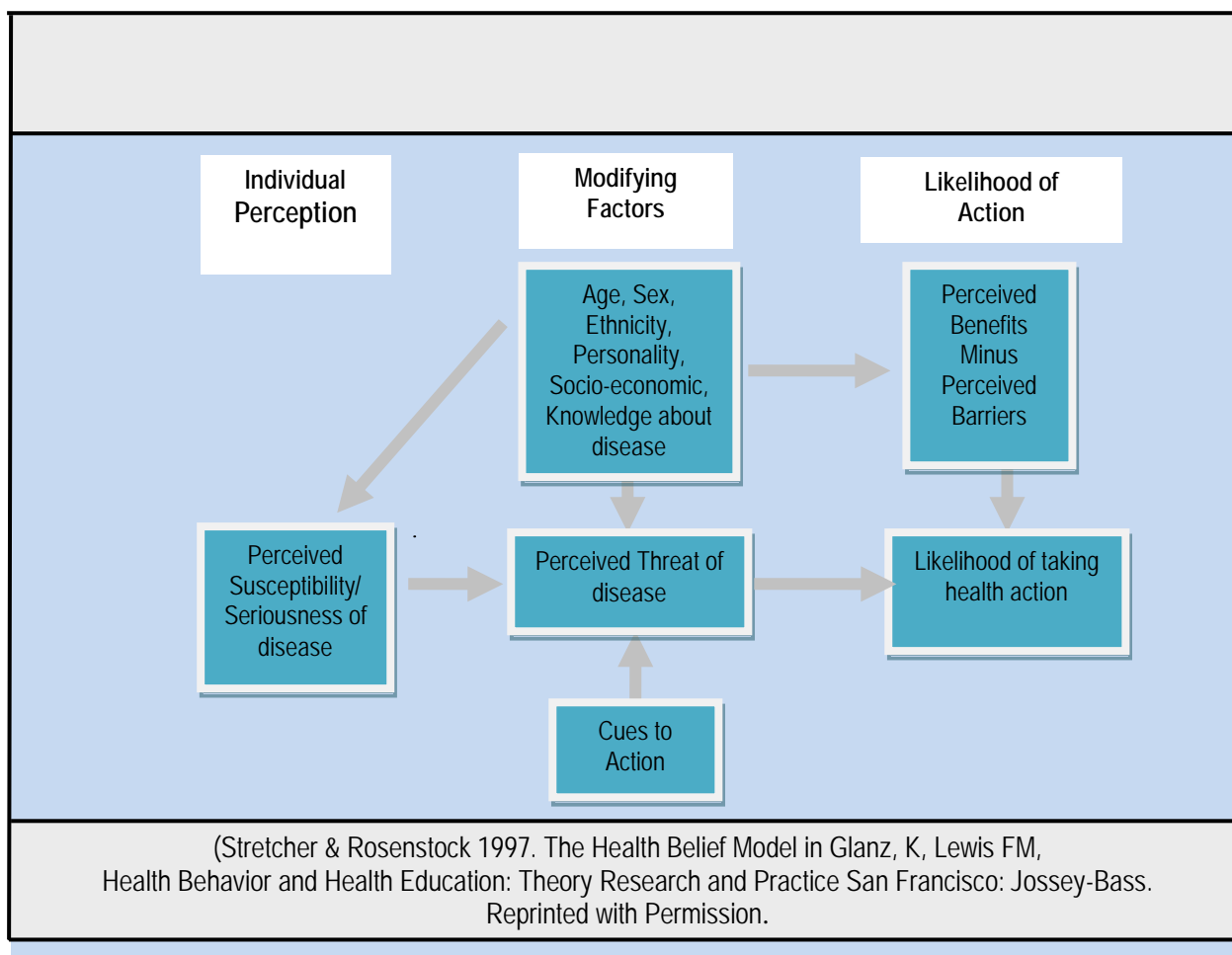
people with below primary level of education are more likely to be unaware about glaucoma (Dandona et al 2001:96; Gasch et al 2000:303; Lau et al 2002:1080; Sathyamangalam et al 2009:355). In a general eye clinic study carried out in the US, factors influencing lack of knowledge about glaucoma include African American race, Hispanic ethnicity and less than a college education (Gasch et al 2000:303). In the same study, respondents with a history of myopia, glaucoma in a first-degree relative and respondents who reported having a dilated eye examination were less likely to be unaware of glaucoma than those who did not have these attributes.

## **2.6 THEORETICAL FOUNDATION**

The Health Belief Model (HBM) is by far the most commonly used theory in health education and health promotion (Glanz, Rimer & Lewis 2002:31). It was developed in the 1950's by Rosenstock (1974) as a way to explain why medical screening programs offered by the USA Public Health Service, particularly for tuberculosis, were not very successful (Hochbaum 1958). The model is intended to predict which individuals would or would not use such preventive measures as screening for early diagnosis. However, the model was modified to include components such as individual perceptions, modifying factors and variables likely to affect the initiating action (Kozier & Erb 2008:274). The underlying concept of the original HBM is that behaviour is determined by personal beliefs or perceptions about a disease and the strategies available to decrease its occurrence (Hochbaum 1958).

### **2.6.1 The Health Belief Model applied to knowledge about glaucoma**

This model adapted from the behavioural sciences is one of the most widely recognised frameworks of health behaviour and may be applied to health-seeking behaviour about glaucoma. The model explains how a person perceives the threat of glaucoma, and consequent loss of vision from glaucoma, and how the need for early consultation is viewed. All the elements of the HBM are schematically presented in figure 2.5.



**Figure 2.5 Health Belief Model**

(Hayden 2009:34)

There are four perceptions that serve as the main constructs of the model: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers. Each of these perceptions, either individually or in combination can be used to explain health behaviour. Recently, some other constructs have been added to the HBM. The model has therefore been expanded to include aspects such as cues to action, motivating factors and self-efficacy as exhibited on figure 2.5 and explained in the ensuing discussions (Hayden 2009:31).

### 2.6.2 Individual perceptions

This component of the health belief model includes the following constructs.



## **Perceived susceptibility**

Personal risk or susceptibility is one of the more powerful perceptions in prompting people to adopt healthier behaviours. The greater the perceived risk, the greater the likelihood of engaging in behaviours to decrease the risk. This is what prompts homosexual men to be vaccinated against hepatitis B (De Wit, Vet, Schutten & Van Steenberg 2005:795) and to use condoms in an effort to decrease susceptibility to HIV infection (Belcher, Sternberg, Wolotski, Halkitis & Hoff 2005:79). People with high risk factors for glaucoma, for example family history of glaucoma, may likely present themselves to the hospital or clinic early for screening and treatment.

## **Perceived seriousness**

This construct speaks to an individual's belief about the seriousness or severity of a disease. This is often based on medical information or knowledge but may also come from the beliefs a person has about the difficulties a disease would create or the effects it would have on his or her life in general (Hayden 2009:31). Knowledge that untreated glaucoma will result in blindness may make patients seek early treatment.

## **Perceived threat**

When the perception of susceptibility is combined with seriousness, it results in perceived threat (Stretcher & Rosenstock 1997). If the perception of threat is to a serious disease like glaucoma for which there is a real risk, behaviour often changes.

### **2.6.3 Modifying Factors**

Factors that can modify a persons' perception include the following:

#### **Demographic variables**

Variables such as age, sex, race and ethnicity can modify a persons' perception (Kozier & Erb 2008:274). For example, an infant does not perceive the importance of a healthy diet or the importance of regular eye checkups.

## **Sociopsychologic variables**

Social pressure from peers or other reference groups (e.g., vocational groups), personality or social class may encourage preventive behaviours (Kozier & Erb 2008:274).

## **Structural variables**

These are variables presumed to influence behaviour such as knowledge about the disease or prior contact with the disease (Kozier & Erb 2008:274).

## **Cues to action**

Cues can be either internal or external. Internal cues include feelings of fatigue or thoughts about the condition of an ill person who is close. External cues include mass media campaigns, reminder postcard from a physician and newspaper articles (Kozier & Erb 2008:275).

### **2.6.4 Likelihood of action**

This depends on the perceived benefits of the action minus the perceived barriers to the action (Kozier & Erb 2008:275).

## **Perceived benefits of the action**

This is a person's opinion of the value or usefulness of a new behaviour in decreasing the risk of developing a disease. People tend to adopt healthier behaviours when they believe the new behaviour will decrease their chances of developing a disease (Hayden 2009:32). Examples include refraining from smoking to prevent lung cancer, eating nutritious foods or avoiding snacks to maintain weight (Kozier & Erb 2008:275), and presenting to hospital early for screening and treatment in order to prevent blindness.

## **Perceived barriers to action**

This is a person's evaluation of the obstacles in the way of one adopting a new behaviour. Of all the constructs, perceived barriers are the most significant in determining behaviour change (Janz & Becker 1984). In order for a new behaviour to be adopted, a person needs to believe that the benefits of the new behaviour outweigh the consequences of continuing with the old behaviour (Center of Disease control & prevention 2004). This enables barriers to be overcome & the new behaviour to be adopted. Perceived barriers to action can include cost, inconvenience, unpleasantness, and life-style changes (Kozier & Erb 2008:274).

Pender (1987:50) includes two further considerations: the importance of health as perceived by the individual and perceived control.

*The importance of health to the person.* Behaviour indicating that health is perceived as something of value includes providing special foods and vitamins, having regular dental checkups, and participating in screening tests for cervical and testicular cancer, breast cancer, and cardiovascular disorders (Kozier & Erb 2008:275). Participating in screening tests for glaucoma as well as having regular eye checkups are behaviours indicating that health is perceived as something of value.

*Perceived control.* People who perceive that they have control over their own health are more likely to use preventive services than people who feel powerless (Kozier & Erb 2008:275). Control over health can relate to such behaviours as not smoking, using seat belts in automobiles and having regular eye checkups / treatment.

Doctors play a major role in helping clients implement healthy behaviours. They help clients monitor their health, impart knowledge about health and supply anticipatory guidance. Doctors can also reduce barriers to action for example by minimising inconvenience or discomfort and can support positive actions (Kozier & Erb 2008:275).

## **2.7 CONCLUSION**

This chapter discussed the literature review, which indicates that the subject of glaucoma knowledge has been widely researched. Glaucoma blindness is common,

especially in the developing world. Among the reasons for this high blindness of prevalence is late presentation to hospital of which poor knowledge about glaucoma is an important contributory factor. Many health workers also lack adequate knowledge about glaucoma.

Discussions began first by presenting various pictorial features of the normal eye. The epidemiology, clinical features, diagnosis and Glaucoma was discussed. The major fact of determinants of knowledge about glaucoma by communities was also briefly introduced as reported in literature. A description of the Health Belief model as the theoretical foundation of this study was given.

Chapter 3 describes the research methodology of this study.

## **CHAPTER 3**

### **RESEARCH DESIGN AND METHODOLOGY**

#### **3.1 INTRODUCTION**

This chapter describes the research design and methodology used to assess the level of knowledge about glaucoma amongst the patients that attend the CBN staff eye clinic in Abuja. Research methodology focuses on the process, tools and procedures utilised during the research process (Mouton 2001:55). The selection of the appropriate research design and methodology is the core of a research study and is probably the single most important decision the investigator has to make.

The selection of the research design and methodology for this study was guided by the desire to achieve the specific objectives which were to

- explore and describe the level of knowledge about glaucoma amongst patients who attended the CBN staff eye clinic in Abuja
- create awareness about glaucoma by designing a pamphlet with information about glaucoma for patients who attend the eye clinic
- make recommendations about how eye care service providers can educate and empower patients who come to the eye clinic with knowledge about glaucoma

#### **3.2 RESEARCH DESIGN**

This section describes the research paradigm as well as the study design. A research design is a blueprint for conducting the study that maximises control over factors that could interfere with the validity of the findings. It guides the researcher in planning and implementing the study in a way that is most likely to achieve the intended goal, objectives and answer to the research question (Burns & Grove 2005:211). Mouton (2001:55) defines a research design as a plan or blueprint of how one intends to conduct the research.

The research design used for this study was exploratory, descriptive and cross-sectional using the quantitative approach. These terms are described below.

### **3.2.1 Research paradigm**

Quantitative research refers to a formal, objective and systematic process to describe and test relationships and to examine cause-and-effect interactions between variables (Burns & Grove 2005:747). This approach was relevant as the researcher sought to explore and describe the knowledge of the respondents about glaucoma. The approach involved the systematic collection of quantifiable information about the respondents' knowledge on the phenomenon.

The study complied with the characteristics of **quantitative research** (Burns & Grove 2005:24 & 42), namely:

- It was focused on a limited number of pre-specified variables such as knowledge and glaucoma.
- A structured data collection instrument in a form of a questionnaire was used.
- Objectivity was enhanced by using a structured data collection instrument such as a questionnaire that comprised of pre-specified items with close ended questions.
- Control was imposed by means of pre-testing the instrument.
- Data analysis was carried out numerically using statistical procedures (descriptive and inferential statistics).

Quantitative research cannot however be used to study human experiences such as pain, caring and comfort as these human emotions are difficult to quantify (Burns & Grove 2005:24).

#### **3.2.2.1 Exploratory**

Exploratory research is explicitly designed to probe reality or investigate hunches so as to obtain preliminary evidence that can serve as a basis for more formal and future research (Stommel & Wills 2004:438). Neuman (2000:510) describes exploratory

research as “research into an area that has not been studied and in which a researcher wants to develop initial ideas and a more focused research question”.

In this study, the researcher aimed to explore and assess the respondents’ knowledge about glaucoma using a questionnaire to collect data from them. Investigating or exploring the factor of the knowledge level about the disease seems to be critical for the patients to seek treatment or consult for their eye problems.

### **3.2.2.2 Descriptive**

Descriptive research provides an accurate account of the characteristics of a particular individual, event, or group in real-life situations for the purpose of discovering new meaning, describing what exists, determining the frequency with which something occurs and categorising information (Burns & Grove 2005:734). Descriptive studies are observational studies which study the amount (frequency) and distribution whether by person, place and time of diseases or events within a population (Araoye 2004:55).

In this study, knowledge about glaucoma and important factors associated with this knowledge were described and documented.

### **3.2.2.3 Cross-sectional**

Cross-sectional designs are used to examine groups of subjects in various stages of development simultaneously with the intent of inferring trends over time (Burns & Grove 2005:732). Polit and Beck (2008:751) define it as a study design in which data are collected at one point in time. It is sometimes used to infer change over time when data are collected from different age or developmental groups. This cross-sectional study design calls for a single data collection point for all study participants (Stommel & Wills 2004:437). The WHO (2001:17) adds that cross-sectional studies provide a prevalent rate at a particular point in time referred to as point prevalence or over a period of time referred to as period prevalence.

In this study, data was collected from a sample of patients attending the CBN staff eye clinic and the prevalence of glaucoma knowledge in the population was determined.

### **3.3 RESEARCH METHODS**

Research methods refer to the systematic procedure for carrying out research (Araoye 2003:118). It is the logical process which is followed during the application of scientific methods and techniques when a particular phenomenon is investigated (Polit & Beck 2008:765).

This section briefly explains the study setting, population, the sampling and sampling technique, the approach to data collection, data analysis, validity and reliability as well as ethical considerations.

#### **3.3.1 Research study setting**

Study setting is defined by Polit and Beck (2008:766) as the physical location and conditions in which data collection takes place in a study. In this study, the CBN has a medical facility in Abuja that caters for all its' staff members as well as their eligible dependants. The clinic provides a variety of health services and programs which includes general out-patient services, antenatal services and family planning services, eye care services and laboratory services. Programmes that are offered are immunisation program and Human Immune deficiency Virus (HIV)/tuberculosis program. The eye clinic at present runs twice a week on Tuesdays and Thursdays. It has a consulting room, a mini theatre and patients' waiting room. An ophthalmologist, who is the researcher in this study, runs the clinic in conjunction with a staff nurse and a clinic attendant. All three are not dedicated to the eye clinic alone as they are also involved in other health services within the health facility. Services offered at the eye clinic include out-patient consultations, refractions, screening for chronic eye diseases as well as conducting minor out-patient surgical procedures. Patients who have complicated eye conditions and those that require advanced surgical procedures are referred to the National Hospital Abuja which is a tertiary health center. At present, twenty-five patients are seen on each clinic day based on appointment. Table 3.1 shows that attendance at the eye clinic averages 200 patients in a month.



**Table 3.1 CBN eye clinic patient attendance**

<b>DAY</b>	<b>NUMBER OF PATIENTS SEEN PER CLINIC DAY</b>	<b>NUMBER PER MONTH</b>
Tuesday	25	100
Thursday	25	100
<b>Total</b>		200

### **3.3.2 Population**

A population is a group of people who share common traits or attributes of interest to the researcher, from whom a sample will be drawn and to whom the findings will be generalised (Burns & Grove 2001:83). Burns and Grove (2005:746) define a population as all elements such as individuals, objects, events or substances that meet the sample criteria for inclusion in a study. A population is the entire aggregate of cases in which a researcher is interested and the elements which show the sample criteria for inclusion in the study (Burns & Grove 2007:549). It is sometimes referred to as a target population. A portion of a target population to which the researcher has reasonable access to is referred to as an accessible population (Burns & Grove 2005:727).

In this study, the population consisted of all persons served by the CBN clinic and includes all CBN staff members in Abuja as well as their eligible dependants.

The **eligibility criteria** for this study included:

- All male and female adult patients (18 – 60 years) that came to the out-patient unit of the clinic. Sixty years is the official retirement age of the CBN and therefore the results of this study do not pertain to an elderly (> 60) urban population.

Patients were excluded from the study if they had the following characteristics:

- Younger than 18 years of age.
- Previous diagnosis of glaucoma or ocular hypertension.
- History of intellectual impairment or dementia.

The above criteria defined the target population.

### 3.3.3 Sampling and sample

Sampling involves selecting a group of people, events, behaviour, or elements with which to conduct a study (Burns & Grove 2005:341). A sample is the selected group of people or elements included in a study (Burns & Grove 2005:341). According to Somekh and Lewin (2005:218), a sample is studied in order to understand the population from which it is drawn. A complete coverage of the population is seldom possible and even if it were possible, time and cost considerations usually make this a prohibitive undertaking. Sampling is the science and practice of selecting information from populations in a manner that allows defensive inferences to be drawn from those data (Saks & Allsop 2007:157). The use of samples may therefore result in more accurate information because with a sample, time, money and effort can be concentrated to produce better-quality research information (De Vos, Strydom, Fouche, & Delport 2002:199).

The method of sample selection (sampling technique) may be based on a probability or non-probability approach. A probability sample refers to the fact that every member of the population has a probability higher than zero of being selected for the sample (Burns & Grove 2005:346). In the non-probability sampling approach, not every member of the population has an opportunity of being selected into the sample. Several types of non-probability sampling designs exist and include convenience sampling, quota sampling, purposive sampling, network sampling and theoretical sampling (Araoye 2003:122; Burns & Grove 2005:350; Stommel & Wills 2004:301).

A **convenience (accidental) sampling technique** is a non-probability approach to selecting study respondents based on their easy accessibility to the researcher (Stommel & Wills 2004:436). Available respondents will simply be entered in the study until the desired sample size is reached (Burns & Grove 2005:727). This sampling technique is by far the most common approach in clinical studies (Stommel & Wills 2004:301). Although convenience sampling does involve using the most accessible respondents for a research study, often, there are no feasible alternatives, given the resource constraints that apply to most clinical research projects (Stommel & Wills 2004:301). This study employed *convenience sampling* as the sampling strategy.

Through the use of this method, respondents were included in the study because they happened to be at the right place at the right time. The choice of a convenience sampling technique for the study was appropriate because of the practical difficulty of obtaining a probability sample from the target population of interest.

### **Advantages**

Convenience sampling has several strengths (Burns & Grove 2005:351; Stommel & Wills 2004:301-302) as follows:

- It is often inexpensive and accessible.
- Requires less time.
- Can be used to conduct studies where there is no possibility of obtaining a probability sample.
- Provides a means of acquiring information in unexplored areas.
- Useful for descriptive and correlation studies.

### **Disadvantages**

Convenience sampling is considered a weak approach to sampling because it provides little opportunity to control for biases (Burns & Grove 2005:350). The main problem with convenience sampling is that members of such a sample may have some characteristics, often unrecognised, if not explicitly studied or thought about, that distinguishes them from the overall target population (Stommel & Wills 2004:301).

#### **3.3.4 Sample size estimation**

Somekh and Lewin (2005:218) refer to the sample size as the crucial factor rather than the relative size or proportion of the population sampled. Saks and Allsop (2007:158) state that the larger the sample size, the smaller the error will be in estimating the characteristics of the whole population, but the more it will cost to administer a survey and analyse the data. The sample size is dependent on the accuracy required and the possible variation of the population characteristics being investigated.

In this study, the formula for the sample size determination when study population is more than 10,000 (Araoye 2003:118) was used to estimate the sample size.

The desired sample size when population is more than 10,000 is calculated using the formula:

$$n = \frac{z^2 pq}{d^2}$$

where:

$z$  = the standard normal deviate set at 1.96, which corresponds with the 95% confidence interval.

$p$  = the proportion in the target population estimated to have knowledge about glaucoma. This was estimated to be 8.7% based on a similar study carried out in India (Sathyamangalam et al 2009:335) i.e.  $p = 0.09$ .

$$q = 1 - p = 1 - 0.09 = 0.91$$

$d$  = degree of accuracy desired usually set at 0.05

$$\text{Therefore, } n = \frac{(1.96)^2 (0.09) (0.91)}{(0.05)^2}$$

$$n = 125$$

### 3.3.5 Data collection

Data collection is the process of identifying respondents and the precise, systematic gathering of information relevant to the research purpose, the specific objectives or research question of a study (Burns & Grove 2007:536). Data was collected using a structured questionnaire (see appendix E) with multiple-choice questions to assess their knowledge about the disease (Polit & Beck 2008:414). The questions were based on the literature review and on the theoretical framework.

### **3.3.5.1 Data collection instrument**

A multiple-choice questionnaire with close-ended items was developed specifically for this study (see appendix E). The questionnaire was used to collect data related to knowledge. A mark sheet was also developed and included as appendix F.

A questionnaire is a printed self-report form designed to elicit information that can be obtained through written responses of the subject (Burns & Grove 2005:398). Questionnaires are documents containing questions and other types of items designed to solicit information appropriate to analysis. Questionnaires are used primarily in survey research (Babbie & Mouton 2001:646). In the use of questionnaires, Mouton (2001:100) states that researchers may either use existing instruments or develop a new one.

In this study, the researcher adapted existing instruments into a new questionnaire with 25 multiple-choice questions based on the research question, research objectives and literature review.

- **Questionnaire design**

A new questionnaire was formulated for this study using question items from previous studies (Lau et al 2002; Sathyamangalam et al 2009). Based on the relevance of the existing questionnaires, some question items in the tools were adapted for use in this study (Mouton 2001:102). The construction of a new questionnaire for this study was also guided by the reviewed sources on the subject (Araoye 2003:133). The questionnaire was developed only in the English language and simple short multiple-choice questions and statements were used to avoid confusion or difficulty to comprehend the questions (Babbie & Mouton 2001:237-238).

Multiple-choice questions were used in the questionnaire to explore glaucoma knowledge among the respondents. The answer categories were mutually exclusive, and special instructions were provided on how to choose correct options necessary for ease of understanding (Araoye 2003:134). In view of the fact that most of the respondents were literate, the instrument was developed as a self-administered questionnaire or assessment tool (Babbie & Mouton 2001:262).

The following criteria were followed in formulating the multiple-choice questions:

- The multiple-choice item consisted of an item stem (an introductory question) and three or more choices (possible answers to the question).

#### *Each stem*

- Was grammatically and stylistically correct.
- Was limited to one idea.
- Statements that excluded certain information (e.g. one starting with except) were emphasised. For example: Where the word except was used, except was underlined.
- No punctuation followed an incomplete statement. A question mark followed a question and a full stop a complete statement.

#### *Distractors*

- The format (sentences, words) were uniform.
- There were in most cases at least four (4) responses.
- All responses were logical and relevant.
- Responses that were obviously wrong were avoided.
- Distractors were selected carefully so that all of them sounded acceptable to respondents who did not have the necessary knowledge.
- Previous mistakes made by other respondents were incorporated
- Responses did not contain any clues.
- The responses followed grammatically from the statement.
- Responses were identified by numbers (e.g. 1, 2, 3, 4)
- No item called for the respondent's personal opinion.

#### *Content*

- The content was correct.
- Adequate instructions were correctly given.
- Spacing was correct.

The following criteria were followed in formulating the matching questions:

- Definition: This type of test comprised a list of statements and a list of answers that were matched according to the instructions. The left column contained the questions and the right column the answers.
- The instructions were grammatically and stylistically correct.
- Each text item was limited to one idea.

#### *Distractors*

- The terminology used in the question column did not provide clues to the answers.
- The response list was homogeneous.
- The two lists were arranged in logical order.
- The lists were not too long.

The multiple-choice item consisted of an item stem (an introductory question) and three or more choices (possible answers to the question).

#### *Each stem*

- Was grammatically and stylistically correct.
- Was limited to one idea.
- Statements that excluded certain information (e.g. one starting with except) were emphasised. For example: Where the word except was used, except was underlined.
- No punctuation followed an incomplete statement. A question mark followed a question and a full stop a complete statement.

#### *Distractors*

- The format (sentences, words) were uniform.
- There were in most cases at least four (4) responses.
- All responses were logical and relevant.

- Responses that were obviously wrong were avoided.
- Distracters were selected carefully so that all of them sounded acceptable to respondents who did not have the necessary knowledge.
- Previous mistakes made by other respondents were incorporated
- Responses did not contain any clues.
- The responses followed grammatically from the statement.
- Responses were identified by numbers (e.g. 1, 2, 3, and 4).
- No item called for the respondent's personal opinion.

### *Content*

- The content was correct.
- Adequate instructions were correctly given.
- Spacing was correct.

### *Criteria for the formulation of matching questions*

Definition: This type of test comprises a list of statements and a list of answers that should be matched according to the instructions. The left column usually contains the questions and the right column the answers.

The instructions were grammatically and stylistically correct.

Each text item was limited to one idea.

### *Distractors*

- The terminology used in the question column did not provide clues to the answers.
- The response list was homogeneous.
- The two lists were arranged in logical order.
- The lists were not be too long.



## *Content*

- The content was relevant to glaucoma.
  - Students were given accurate instructions.
  - Spacing was correct.
- 
- **Content of the questionnaire**

The questionnaire had two major sections namely section A on personal data and section B referred to questions related to content on glaucoma. Knowledge about glaucoma was assessed through a questionnaire structured in a multiple choice format. Prior to these sections was the preliminary part of the questionnaire which comprised of the introduction and instructions.

### **3.3.5.2 *Pre-test***

A pre-test or pilot study is a smaller version of a proposed study conducted in order to develop or refine the methodology, such as the treatment, instrument, or data collection process (Burns & Grove 2005:746). The research instrument was pre-tested on a small number of respondents who were comparable to the sample of correspondents but who were not part of the main study. This ensured that errors of whatever nature could be rectified immediately at little cost. After the necessary modifications had been made following the pre-test, the instrument was administered to the full sample.

In this study, the research instrument was pre-tested using five respondents at a private eye clinic within the Garki district and the respondents were excluded from the main study. Actual data were collected during the pre-testing and analysed carefully to ascertain whether or not they answered the multiple questions as expected. The result of the pre-testing was used to refine the research instrument before using it in the actual study.

### **3.3.5.3 *Data collection process***

A research assistant was carefully selected and properly trained for the data collection. The research assistant was trained in the handling of questionnaires, that is filling them

in, answering the multiple choice questions, distribution and collection. Ethical issues such as informed consent, confidentiality, anonymity and respect were emphasised. The informed written consent (see appendix D) was obtained from the respondents before completing the questionnaire (appendix E). A clear explanation about the study, its goal and benefit for patients in the settings was given. The researcher checked the completed instruments at the end of each day for omissions, incomplete answers, unclear statements or illegible writing. A total of 150 questionnaires were administered to the respondents. Data was collected for a period of two weeks. The questionnaires were collected immediately after completion and the research had a return rate of 96.7%.

### **3.4 VALIDITY AND RELIABILITY**

Validity and reliability are critical aspects in research since they affect all processes leading to the credibility of research findings. They are important criteria to evaluate a research instrument in terms of its adequacy and quality.

#### **3.4.1 Validity**

The validity of the data collection instrument refers to the extent that it measures what it is intended to measure. In other words, a valid instrument actually measures the concept it is supposed to measure accurately (Stommel & Wills 2004:222). Validity of the data collection instrument is enhanced by improving its content validity, construct validity and criterion-related validity amongst others (Polit & Beck 2008:457-463). According to Burns and Grove (2005:376), the validity of an instrument is a determination of the extent to which the instrument actually reflects the abstract construct being examined.

In this study, the validity of the questionnaire was assured by using questions from various instruments that had been used in other similar studies to formulate the multiple choice questions. The instruments were also subjected to evaluation and approval by the study supervisor. The service of a statistician was used to check if the structure of the instrument and the formulated items were in line with the objectives of the study.

*Face validity* is defined by Polit and Beck (2008:753) as the extent to which a measuring instrument looks as though it is measuring what it purports to measure. Polit and Beck (2008:458) explain that face validity means that an instrument empirically appears to measure what it is supposed to measure at face value. The perception of relevance of a measurement by the investigator is referred to as face validity (Araoye 2004:151).

In this study, face validity was ensured by careful selection of items to be included in the questionnaire. These items reflected the concept of knowledge about glaucoma. The help of local experts in the field of ophthalmology at the time of the study was sought for to establish face validity.

*Content validity* is defined as the degree to which the items in an instrument adequately represent the universe of content for the concept investigated (Polit & Beck 2008:750). In the measurement of a variable considered to be a composite one or has many components, appraising content validity is to examine whether all the component elements of the variable are measured (Araoye 2004:153). Content validity deals with the question of how representative or adequate the compiled multiple choice questions are for the construct being measured. This was ensured by consulting experienced ophthalmologists, study supervisor and the statistician. They read the content of the questionnaire and made their comments. Their suggestions were implemented where appropriate to make the content as valid as possible.

*External validity* is defined by Polit and Beck (2008:753) as the degree to which study results can be generalised to settings or samples other than the one studied. Araoye (2004:151) defines it as the generalisability of the study findings from a sample to the reference population. This has implications for selection of respondents, which should be representative of the study population.

In this clinic based study, one hundred and forty five (145) questionnaires were distributed. The sample had characteristics that represent the population of patients being investigated. The sample size was also reasonable to enhance generalisability of the results to other similar contexts.

### **3.4.2 Reliability**

The reliability of a measurement tool denotes the consistency of measures obtained in the use of a particular instrument and is an indication of the extent of random error in the measurement instrument method (Burns & Grove 2005:374). It is the relative absence of unsystematic, random measurement error (Stommel & Wills 2004:209). According to Burns and Grove (2005:374), a reliability coefficient of 0.80 is considered to be lowest acceptable value for a well developed psycho-social instrument, and 0.70 is sufficient for a newly developed psycho-social instrument.

The test-retest method, interrater reliability, Cronbach's alpha coefficient and other methods can be used to assess the reliability of a tool (Burns & Grove 2005:374-376). A pre-test, utilising patients with similar characteristics to the study sample, was conducted to determine clarity of the items, questions and consistency of responses.

### **3.5 DATA ANALYSIS**

Data analysis refers to 'techniques used to reduce, organise and give meaning to data' (Burns & Grove 2005:43). In quantitative studies, data analysis relies heavily on statistical analysis tools. Regardless of the types of data collected and the orientation of the researchers, data analysis always involves 2 steps: a summary of the results and an interpretation thereof (Stommel & Wills 2004:27).

Data preparation involves checking or logging the data into the computer. Data is also checked for accuracy and transformed. A database structure that integrates the various measures is developed and documented (Trochim 2006:101). With the help of a statistician, the Epi-Info computer program was used for data entry and the Statistical Package for Social Sciences (SPSS), version 13.0 was used for analysis. The B section of the questionnaire was multiple choice questions assessment tool and responses were analysed appropriately. A mark sheet was used to assess the responses and to obtain scores of each respondent.

Descriptive statistics, frequency tables and percentages were used in the data analysis and interpretation. Chi-square analysis, were used to test for relationships between knowledge of glaucoma and demographic factors. A two-tailed p-value of less than 0.05 was considered statistically significant.

### 3.6 ETHICAL CONSIDERATIONS

Ethics refer to the moral principles that control or influence a person's behaviour. It is the branch of philosophy that deals with moral principles (*Oxford Advanced Learners' Dictionary* 2006:498). In a research context, ethics is concerned with the moral concepts and principles that underpin socially recognised and sanctioned professional and legal obligations (Stommel & Wills 2004:373). Araoye (2003:13) states that ethical considerations should be made from the beginning of a project design and at various stages through to the end when information will be disseminated and even beyond.

Ethical considerations in this study refers to protecting the rights of the respondents and the institutions in which the research was done, as well as maintaining scientific integrity based on the Declaration of Helsinki of 1964 (Burns & Grove 2005:181-206).

The researcher covered research ethics adequately by applying the following principles:

#### **Protecting the rights of the respondents**

These rights included provision of informed consent, right to self determination, privacy, autonomy, anonymity and confidentiality, fair treatment, and right to protection from discomfort or harm (Burns & Grove 2005:181-206).

*Informed consent* is the prospective subject's agreement to participate in a study as a subject, which is reached after assimilation of essential information. It consists of four elements, disclosure of essential information; comprehension; competency, and voluntarism (Burns & Grove 2005:193). The respondents gave *informed consent* in writing (see appendix D).

*Self-determination* is based on the ethical principle of respect for persons (Burns & Grove 2005:181). All the respondents were treated as autonomous agents as each was informed about the proposed study and they were allowed to voluntarily choose to participate or not. They were also informed that they had the right to *withdraw from the study at any stage of the study*. Coercion, covert data collection and deception were all avoided.

*Privacy.* The opinions, health records and other private information of respondents' were protected.

*Anonymity and confidentiality.* The anonymity of the respondents' was ensured and the researcher's management of private information shared by the respondents' was confidential i.e. such information was not shared with others without authorisation of the respondents.

*Fair treatment* is based on the ethical principle of justice (Burns & Grove 2005:189). The selection of respondents' for the study was fair and without bias and the respondents were treated fairly.

*Protection from discomfort and harm* is based on the ethical principle of beneficence which holds that one should do good, and above all do no harm (Burns & Grove 2005:190). The author conducted the study in such a way that the respondents' were protected from discomfort or harm. Such discomfort can be physiological, emotional, social or economic in nature (Burns & Grove 2005:190). A benefit-risk ratio was determined on the basis of the maximised benefits and the minimised risks. Benefits of the study included increased awareness of glaucoma and its risk factors, early diagnosis and treatment and in the long run a reduction in the number of people that may go blind as a result of glaucoma. The potential risk of the study was minimal and was just mere inconvenience.

### **Protecting the rights of the institution**

Approval was sought and obtained in writing from the Department of Health Studies Research and Ethics Committee (HSREC) of the University of South Africa (UNISA). An ethical clearance certificate was obtained (see appendix A). Permission was obtained from the management of Central Bank of Nigeria, Abuja where the study was conducted (appendix C).

### **Scientific integrity of the study**

This was secured through honest conducting and reporting of the study. The researcher did not fabricate data or falsify research materials, procedures or processes undertaken

during the study. Plagiarism was avoided by appropriate citation of references alluded to, other peoples' ideas, research processes and procedures, results and conclusions (Burns & Grove 2005:746).

### **3.7 CONCLUSION**

This chapter described the research design and methodology which included discussions on population, sampling and sampling technique, data collection, validity and reliability of the instrument, data analysis and ethical considerations.

Chapter 4 discusses the data analysis and interpretation of the research findings.

## **CHAPTER 4**

### **DATA PRESENTATION, ANALYSIS AND INTERPRETATION**

#### **4.1 INTRODUCTION**

The study was a quantitative, exploratory, descriptive and cross-sectional investigation to assess the level of knowledge about glaucoma amongst the patients that attend the CBN staff eye clinic in Abuja.

The objectives of this study were to

- explore and describe the level of glaucoma knowledge amongst patients who attended the CBN staff eye clinic in Abuja
- create awareness about glaucoma by designing a pamphlet with information about glaucoma for patients who attend the eye clinic
- make recommendations about how eye care service providers can educate and empower patients who come to the eye clinic with knowledge about glaucoma

#### **4.2 DATA ANALYSIS**

The data was analysed using the SPSS program, version 13.0. Data was collected from 145 respondents who attended the CBN staff eye clinic over a two week period. Data was collected by means of a questionnaire consisting of two sections (sections A and B) with 46 items. Section A consists of analysis based on the general information and section B on the assessment of patient's knowledge about glaucoma. The analysed data was thus discussed accordingly.



**4.2.1 Section A: General information**

Section A of the questionnaire consisted of 11 questions covering general information about the respondents. This included aspects on gender, age, ethnic background, clinic attendance, marital status and education level. Also included in this section were questions about whether the respondent ever heard of glaucoma or ever received an eye examination. The results related to the biographic data were presented in order to have an overall picture of how these variables impacted on the knowledge level about glaucoma.

**4.2.1.1 Gender**

Of the respondents, 59.3% (n=86) were females and 40.7% (n=59) were males. Table 4.1 depicts the respondents' gender.

**Table 4.1 Respondents' gender (N=145)**

Gender	Frequency	Percentage
Females	86	59.3
Males	59	40.7
<b>Total</b>	<b>145</b>	<b>100.0</b>

**Table 4.2 Gender and knowledge about glaucoma**

Detail		Glaucoma knowledge		Total
		No	Yes	
Gender	Male	54	5	59
		91.5%	8.5%	100.0%
	Female	70	16	86
		81.4%	18.6%	100.0%
<b>Total</b>		<b>124</b>	<b>21</b>	<b>145</b>
		<b>85.5%</b>	<b>14.5%</b>	<b>100.0%</b>

About 8.5% (n=5) of male respondents and 18.6% (n=16) of female respondents were found to have knowledge of glaucoma in this study (table 4.2). Although the researcher observed a higher proportion of female respondents with knowledge about glaucoma, there was no statistically significant difference found between the 2 proportions ( $X^2=2.80$ ,  $df=1$ ,  $p=0.089$ ). This finding is similar to reports from previous studies (Sathyamangalam et al 2009:357; Altangerel et al 2009:68) which report no association between glaucoma knowledge and gender.

#### **4.2.1.2 Respondents' age**

The table below shows the age distribution of the respondents. The majority of the respondents (76.6%) were between the ages of 25 and 54.

**Table 4.3 Respondent's age (N=145)**

<b>Age-group</b>	<b>Frequency</b>	<b>Percent</b>
Less than 25yrs	25	17.2
25-34	24	16.6
35-44	39	26.9
45-54	48	33.1
55-64	8	5.5
65-74	1	0.7
<b>Total</b>	<b>145</b>	<b>100.0</b>

#### **Age and knowledge about glaucoma**

In this study, there were no associations found between knowledge about glaucoma and age. This finding agrees with studies carried out in India and the USA (Altangerel et al 2009:68; Sathyamangalam et al 2009:357). Some studies on glaucoma awareness however report increased odds for glaucoma awareness with increasing age (Dandona et al 2001:96; Sathyamangalam et al 2009:357).

#### 4.2.1.3 Ethnic background

The respondents were made up of 28 different ethnic groups. There are three major ethnic groups in Nigeria namely, Hausa, Igbo and Yoruba which all together accounted for 66.2% (n=96) of the total respondents.

**Table 4.4 Respondent's ethnic background (N=145)**

Ethnicity	Frequency	Percent	Valid percent
Hausa	29	20.0	20.3
Igbo	44	30.3	30.8
Yoruba	23	15.9	16.1
Others	47	32.4	32.9
Total for valid	143	98.6	100.0
Total	145	100.0	

The group referred to as 'others' in table 4.4 comprise about 25 different minority tribes in Nigeria. A total of 17 patients who did not specify their ethnic background were also included in this group.

#### **Ethnicity and knowledge about glaucoma**

In this study, there were no associations found between knowledge about glaucoma and ethnicity. This finding agrees with studies carried out in India and the USA (Altangerel et al 2009:68; Sathyamangalam et al 2009:357).

#### 4.2.1.4 Clinic attendance of respondents

Of all the respondents, 21.4% (n=31) indicated that they were attending the clinic for the first time. About 75.86% (n=110) of the respondents had attended the eye clinic in the past at least once. There were 2.8% (n=4) of the respondents who did not answer the question.

**Table 4.5 Respondents' clinic attendance (N=145)**

Number of time in clinic	Frequency	Percent	Valid percent
First time	31	21.4	22.0
1 – 2 times	47	32.4	33.3
3 – 4 times	27	18.6	19.1
5 – 6 times	9	6.2	6.4
7 or more	27	18.6	19.1
Total for valid	141	97.2	100.0
Non-response	4	2.8	
<b>Total</b>	<b>145</b>	<b>100.0</b>	

**4.2.1.5 Marital status of respondents**

Of the respondents, 22.1% (n=32) indicated that they had never been married, 75.2% (n=109) indicated that they were married and 1.4% (n=2) were widowed. No response was received from 1.4% (n=2) of the respondents.

**Table 4.6 Marital status of respondents (N=145)**

Marital status	Frequency	Percent	Valid percent
Never married	32	22.1	22.4
Married	109	75.2	76.2
Widowed	2	1.4	1.4
Total for valid	143	98.6	100.0
Non-response	2	1.4	
<b>Total</b>	<b>145</b>	<b>100.0</b>	

## Marital status and knowledge about glaucoma

Glaucoma knowledge amongst respondents who had never been married was found to be significantly higher than in those who were married ( $p=0.049$ ). The widowed category was not part of the analysis because of the very small number (table 4.7).

**Table 4.7 Knowledge about glaucoma and marital status**

Details		Glaucoma knowledge		Total
		No	Yes	
Marital status	Never married	24	8	32
		75.0%	25.0%	100.0%
	Married	97	12	109
		89.0%	11.0%	100.0%
	Widowed	2	0	2
		100.0%	.0%	100.0%
Total		123	20	143
		86.0%	14.0%	100.0%

This association has not previously been reported in the literature to the best of the researcher's knowledge. It may be that the category 'never married' was made up of mostly very young respondents who in their course of education and social networking are often exposed to modern information technology such as the internet. Many of these young respondents are therefore exposed to large amounts of information as compared to older respondents who are slower in adopting these modern technologies. In this study however, no association was found between glaucoma knowledge and age. A large community based study will be required to validate this finding.

### 4.2.1.6 Respondents' level of education

Of the respondents, 40% ( $n=58$ ) indicated that they had a university first degree or its' equivalent, 32.4% ( $n=47$ ) had a post-graduate university education, 11% ( $n=16$ ) had a college diploma, 10.3% ( $n=15$ ) had a secondary education, 3.4% ( $n=5$ ) received only a primary education, 1.4% ( $n=2$ ) had no education and 1.4% ( $n=2$ ) of the respondents did

not answer the question. In all, about 93.8% of the respondents completed at least a secondary education.

### Educational level and knowledge about glaucoma

Table 4.8 below shows a table of glaucoma knowledge and level of education among the respondents.

**Table 4.8 Knowledge about glaucoma and respondents' educational level**

Details		Glaucoma knowledge		Total
		No	Yes	
Highest level of education	No schooling	2	0	2
		100.0%	.0%	100.0%
	Primary education	5	0	5
		100.0%	.0%	100.0%
	Secondary education	11	4	15
		73.3%	26.7%	100.0%
	College diploma	16	0	16
		100.0%	.0%	100.0%
	University, first degree	48	8	56
		85.7%	14.3%	100.0%
	Post graduate Qualification	40	7	47
		85.1%	14.9%	100.0%
	Other	1	1	2
		50.0%	50.0%	100.0%
<b>Total</b>		<b>123</b>	<b>20</b>	<b>143</b>
		<b>86.0%</b>	<b>14.0%</b>	<b>100.0%</b>

Due to the small sample sizes of some of the categories, analysis was restricted only to respondents with secondary education and above. There was no significant difference in glaucoma knowledge across the different educational levels ( $X^2=4.59$ ;  $df=3$ ;  $p=0.20$ ). This finding does not support previous studies in the published literature that glaucoma knowledge is associated with higher levels of education (Altangerel et al 2009:66; Lau et al 2002:1080; Sathyamangalam et al 2009:355). The study was conducted within the context of a corporate environment (Central Bank of Nigeria Staff Clinic) and thus the

very low numbers of respondents with only primary education and below. Perhaps if a study population with relatively higher rates of illiteracy were to be investigated, an association may be found between glaucoma knowledge and level of education.

**4.2.1.7 Status of the respondents**

Of the total respondents, 53.1% (n=77) were CBN staff members while 42.8% (n=62) were dependants of staff. About 4.1% (n=6) of the respondents did not specify their status.

**Respondents’ status and knowledge about glaucoma**

Knowledge of glaucoma was found to be independent of the respondents’ status within the CBN as shown in able 4.9 ( $X^2=0.89$ ;  $df=1$ ;  $p=0.35$ ).

**Table 4.9 Knowledge of glaucoma and respondents’ status**

Details		Glaucoma knowledge		Total
		No	Yes	
Status of respondent	Member of staff	63 82.9%	13 17.1%	76 100.0%
	Non-staff member	61 88.4%	8 11.6%	69 100.0%
Total		124 85.5%	21 14.5%	145 100.0%

**4.2.1.8 Previous eye examination and knowledge about glaucoma**

There was an association between knowledge of glaucoma and a history of previous eye examination. Respondents who reported having had a previous eye examination were found to be more likely to have knowledge of glaucoma than those who had never had an eye examination ( $p=0.04$ ). This finding to the best of our knowledge has not been reported previously in literature particularly in Nigeria.

**Table 4.10 Knowledge of glaucoma and history of previous eye examination in respondents'**

Details		Glaucoma knowledge		Total
		No	Yes	
Previous eye examination	Yes	105	21	126
		83.3%	16.7%	100.0%
	No	19	0	19
		100.0%	.0%	100.0%
Total		<b>124</b>	<b>21</b>	<b>145</b>
		<b>85.5%</b>	<b>14.5%</b>	<b>100.0%</b>

**4.2.1.9 Respondents' awareness of the term glaucoma**

Of all the respondents, 74.5% (n=108) indicated they had heard about the eye condition glaucoma while 25.5% (n=37) indicated they had never heard about glaucoma.

**Table 4.11 Respondents' awareness of glaucoma (N=145)**

Ever heard about glaucoma?	Frequency	Percent
Yes	108	74.5
No	37	25.5
<b>Total</b>	<b>145</b>	<b>100.0</b>

Previous studies in both the developing as well as western societies referred to glaucoma awareness as 'having heard about glaucoma'. In this study, awareness of glaucoma was high (74.5%) which does not agree with similar studies carried out in other third world countries such as India where levels of awareness were as low as 13.3%, 2.4% and 0.32% respectively (Dandona et al 2001; Krishnaiah et al 2005; Sathyamangalam et al 2009). This result however compares with studies carried out in developed societies such as Canada, USA and China which indicate high levels (>70%) of awareness about glaucoma (Altangerel et al 2009:66; Gasch et al 2000:303; Lau et al



2002:1080). This may be due to the high educational level as well as the urban nature of our study population.

**4.2.2 Section B: Assessment of glaucoma knowledge**

Section B of the questionnaire consists of 25 questions, covering various aspects of glaucoma knowledge. A respondent is said to have knowledge about glaucoma if he or she obtains a score of 50% or more in this section.

Table 4.12 shows the overall view of the outcome that only 14.5% (n=21) of the respondents had knowledge about glaucoma as they obtained a score of 50% and above. The rest of the respondents who constituted 85.5% (124) of the sample obtained a score below 50%.

**Table 4.12 Respondents’ knowledge about glaucoma (N=145)**

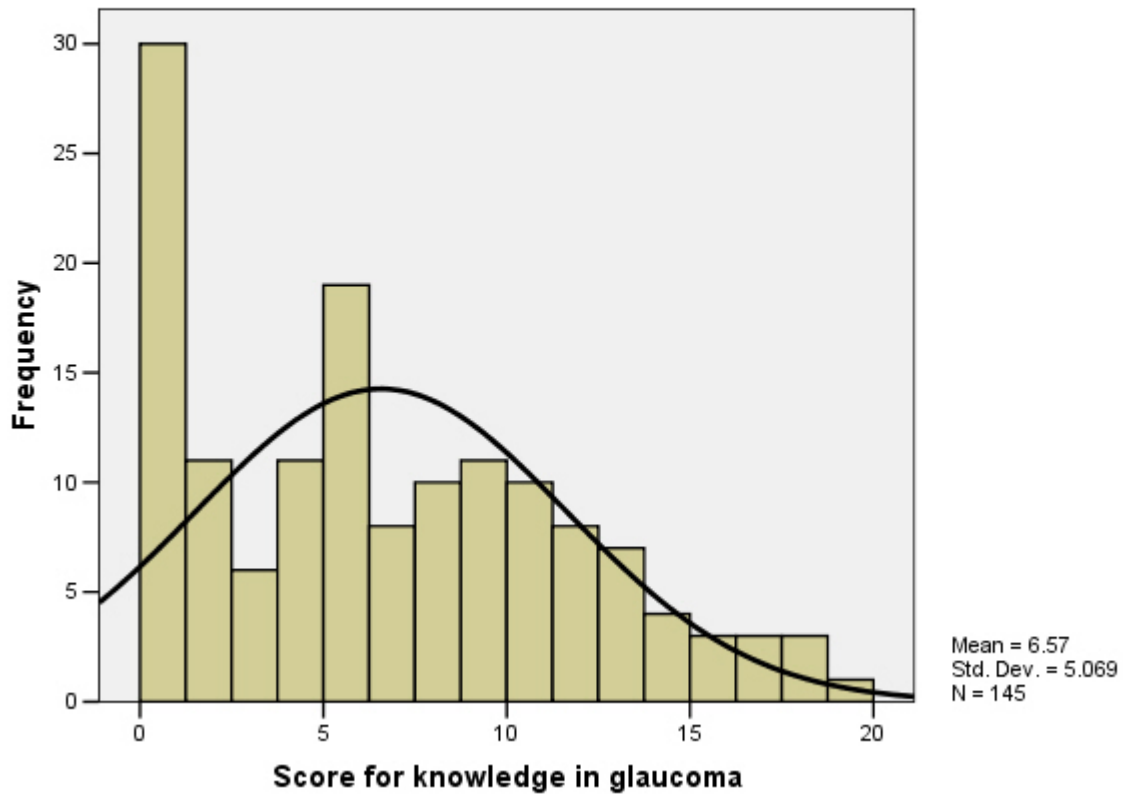
<b>Glaucoma knowledge</b>	<b>Frequency</b>	<b>Percent</b>
<b>Yes</b>	21	14.5
<b>No</b>	124	85.5
<b>Total</b>	<b>145</b>	<b>100.0</b>

Table 4.13 presents the distribution information on glaucoma knowledge test scores among the respondents. The table shows the test scores, frequency and percentages of the respondents. For instance, 21 respondents (14.5%) scored zero as they had all the multiple questions wrong which was the lowest score. They evidenced lack of knowledge about glaucoma, while only 1 respondent (0.7%) had a score of 19, which was the highest score. The table below has also been presented as a frequency polygon as shown in figure 4.1.

**Table 4.13** Frequency distribution of glaucoma knowledge test scores

<b>Score</b>	<b>Frequency</b>	<b>Percent</b>
<b>0</b>	21	14.5
<b>1</b>	9	6.2
<b>2</b>	11	7.6
<b>3</b>	6	4.1
<b>4</b>	11	7.6
<b>5</b>	8	5.5
<b>6</b>	11	7.6
<b>7</b>	8	5.5
<b>8</b>	10	6.9
<b>9</b>	11	7.6
<b>10</b>	5	3.4
<b>11</b>	5	3.4
<b>12</b>	8	5.5
<b>13</b>	7	4.8
<b>14</b>	4	2.8
<b>15</b>	1	0.7
<b>16</b>	2	1.4
<b>17</b>	3	2.1
<b>18</b>	3	2.1
<b>19</b>	1	0.7
<b>Total</b>	<b>n=145</b>	<b>100.0</b>

### Score for knowledge in glaucoma



**Figure 4.1** *Frequency polygon of glaucoma knowledge test scores*

The description of the analysis presented in this polygon is similar to that presented on table 4.13.

Published literature reveals a range of glaucoma knowledge levels which vary depending on the study population. Krishnaiah et al (2005) in their study of a rural population in Southern India reports a zero percent glaucoma knowledge level. Another study carried out in the United States reports the level of glaucoma knowledge as 29%. A comparison of the current study results with previous studies is shown in table 4.14.

**Table 4.14 Comparison of current study results with previous studies**

Author (year)	Country	Study population	Knowledge of glaucoma
<b>Onunkwor (current study)</b>	Nigeria	Urban, above 18 years of age	14.5%
<b>Sathyamangalam et al (2009)</b>	India	Urban, above 40 years of age	8.7%
<b>Dandona et al (2001)</b>	India	Urban, above 15 years of age	2%
<b>Krishnaiah et al (2005)</b>	India	Rural, above 15 years of age	0%
<b>Pfeiffer et al (2002)</b>	Germany	German population, 14 to 93 years	8.4%
<b>Altangerel et al (2009)</b>	United States	Community, 11 to 95 years of age	29%
<b>Lau et al (2002)</b>	China	Community, above 40 years of age	10.2%

Although the glaucoma knowledge level in this study is low (14.5%), our population seem to have better knowledge levels of glaucoma compared to other published studies with the exception of the United States study which was 29%. It is worthy of note however that the definitions for glaucoma knowledge varied, more so, some of the studies were population based, thus direct comparison of these studies may not be accurate. In a recent study carried out in the UK (Baker, Cousens & Murdoch 2010:653), between 71 and 93% of a group of respondents reported having heard of glaucoma. Of these, over 80% had some knowledge about glaucoma.

In this study, there were 108 (74.5%) respondents who claimed to have heard of the eye condition glaucoma (see table 4.11). Of these respondents however, only 19.4% had knowledge about glaucoma. This lower level of knowledge compared to the UK study may be due to the in-depth nature of our glaucoma knowledge assessment tool which probably made the questionnaire difficult for the respondents.

It is worthy of note in this study that the proportion of 108 respondents who claimed to have heard about glaucoma but did not actually have knowledge about it is significantly different from those who were found to have knowledge about glaucoma ( $X^2=8.413$ ,  $df=1$ ,  $p=0.004$ ).

There are very few published studies on assessment of knowledge about glaucoma in African settings. In Ethiopia, Tenkir, Solomon and Deribew (2010:17) assessed the level of glaucoma awareness among people attending an outreach ophthalmic service. Only 2.4% of their study population was aware of glaucoma. Another study conducted in Southwest Nigeria assessed knowledge about glaucoma among hospital workers (Adegbhingbe & Bisiriyu 2008:240-245). Expectedly, the level of glaucoma awareness was high (95.1%), however they reported that there were gaps in the knowledge and understanding of glaucoma especially among the non-medical staff.

In terms of the individual questions in section B of the questionnaire, some findings of note are highlighted below.

***Question 1: What is glaucoma?***

Of all the respondents, 31% (n=45) correctly answered this question, 23.4% (n=34) thought it to be a whitening which grows across the eye obscuring vision, while 33.1% (n=48) chose the 'I do not know' option. 10.3% (n=15) of the respondents thought it to be an eye infection and 2.1% (n=3) thought it to be excessive tearing from the eyes.

***Question 6: The normal eye pressure***

Only 7.6% of respondents (n=11) could correctly identify the normal eye pressure range of 10 to 21 mmHg. The majority of respondents (88.3%, n=128) chose the 'I do not know' option.

***Question 8: Untreated glaucoma***

About 66.2% (n=96) of respondents knew that untreated glaucoma leads to loss of vision making it the easiest question of all as this was the highest proportion recorded. 31% (n=45) of respondents chose the 'I do not know' option.

**Question 11: Duration of treatment of glaucoma**

Only 21.4% (n=31) of the respondents knew that treatment of glaucoma is usually for life. The majority of respondents (70.3%, n=102) chose the 'I do not know' option, while 2 respondents did not answer the question.

**Question 12: Which eye care professional can best diagnose and treat glaucoma?**

Of all the respondents, 54.5% (n=79) knew that an ophthalmologist is an eye care professional who can best diagnose and treat glaucoma. 11.7% (n=17) thought it to be an optician, 2.1% (n=3) thought it to be an optometrist, 31% (n=45) chose the 'I do not know' option, while 1 respondent did not answer this question.

**Question 15: The most common cause of blindness worldwide**

Only 16.6% (n=24) of the respondents knew that cataract is the most common cause of blindness worldwide. About 34.5% (n=50) thought it to be glaucoma, 13.1% (n=19) thought it to be eye infections, 0.7% (n=1) thought it to be refractive errors, and 35.2% (n=51) chose the 'I do not know' option.

**Question 16: Glaucoma is characterised by damage to the lens of the eye**

Only 6.9% (n=10) of respondents knew that the above statement was false. 50.3% (n=73) of the respondents thought the statement to be correct and 42.8 % (n=62) respondents chose the 'I do not know' option.

**Questions 17 and 18: Glaucoma and eye pressures**

About half of the respondents (51%, n=74) knew that glaucoma is usually associated with high eye pressures, while only 9% (n=13) knew that glaucoma can also be associated with low eye pressures.

### **Questions 21 to 25: Diagnostic tests for glaucoma**

These questions were the most difficult as an average of 93 respondents (64%) did not respond to them.

**In summary:** More females (59.3%; n=86) than males were included in the sample; they were mostly between 25 and 54 years of age (76.6%; n=111). They were mostly of the major ethnic groups in Nigeria, Hausa, Igbo and Yoruba (66.2%; n=96); they had visited the clinic at least once (75.9%; n=110) and were mostly married (75.2%; n=109). About 93.8% (n=136) of the respondents had at least a secondary school education; and the majority (74.5%; n=108) had heard about glaucoma.

About 14.5% (n=21) of respondents had knowledge about glaucoma. Glaucoma knowledge was found to be independent of age, sex, ethnicity, educational level and respondents' status within the CBN. Respondents who had never been married were more likely to have glaucoma knowledge than the married respondents ( $p=0.049$ ), and respondents' who previously had an eye examination were more likely to have knowledge about glaucoma than those who never had an eye examination ( $p=0.04$ ).

### **4.3 CONCLUSION**

This chapter discussed the data analysis and interpretation with the use of frequency percentages on tables, description and inferential statistics. Although gaps were identified that require further investigation, the results of the study reveal generally low levels of glaucoma knowledge amongst the patients attending the CBN staff clinic Abuja.

Chapter 5 concludes the study, discusses its limitations, and makes recommendations for practice, education and research.

## **CHAPTER 5**

### **FINDINGS, LIMITATIONS AND RECOMMENDATIONS**

#### **5.1 INTRODUCTION**

The focus of discussions in this chapter were on making conclusions and appropriate feasible recommendations for practice, education and further research based on the research question and objectives.

#### **5.2 OBJECTIVES OF THE STUDY**

The primary purpose of this study was to

- explore and describe the level of knowledge about glaucoma amongst patients that attended the CBN staff eye clinic
- create awareness about glaucoma by designing a pamphlet with information about glaucoma for patients who attended the eye clinic
- make recommendations about how eye care service providers can educate and empower patients who come to the eye clinic with knowledge about glaucoma

#### **5.3 SUMMARY OF FINDINGS**

A structured questionnaire was used in this study to collect data. The items on the questionnaire assessed the knowledge of respondents about various aspects of glaucoma including, definition, main symptoms, examination findings, relevant diagnostic investigations, treatment methods as well as prognosis.

The study revealed that 25.5% of the respondents had never heard of glaucoma. Of the 74.5% who had heard of glaucoma, only 14.5% of the respondents had knowledge of glaucoma. It was noted with concern that the majority of respondents (85.5%) had very little or no knowledge of glaucoma.



### **5.3.1 Demographic data**

In this study the findings reveal that more females (59.3%; n=86) than males were included in the sample. The respondents were mostly between the ages of 25 and 54 years of age (76.6%; n=111), which signified a group that is made up of young to middle aged working class respondents. This age group is particularly relevant because awareness campaigns about glaucoma, targeted towards them, can have significant impact on the incidence of glaucoma in a population. There are three major ethnic groups in Nigeria, Hausa, Igbo and Yoruba making up the majority (66.2%; n=96) of respondents. Seventy-five percent (n=110) of the respondents had visited the clinic at least once. In this study 75.2% (n=109) who consulted the eye clinic for health care indicated that they were married, while 22.1% (n=32) indicated that they had never been married. As expected in an urban population, the majority of respondents were literate, with 93.8% (n=136) of the respondents having completed a secondary school education.

### **5.3.2 Respondents' knowledge of glaucoma**

Glaucoma is a major public health problem and is one of the leading causes of irreversible blindness in developing nations. It is an insidious disease with no symptoms until the condition is advanced. Thus, patients will only visit a hospital for screening and treatment if they are sufficiently knowledgeable about the disease. In this study, the majority of respondents' (74.5%) claimed to have heard of glaucoma. Assessment of the respondents' knowledge of glaucoma revealed that it was however relatively poor (14.5%). Looking closely at the multiple choice questions, only 31% recognized a basic glaucoma definition, 50.3% incorrectly believed that glaucoma is characterized by a damage to the lens of the eye, 7.6% could identify the normal intra-ocular pressure range and 21.4% knew that treatment of glaucoma is for life. Most of the respondents' had no idea of the various diagnostic tests for glaucoma.

### **5.3.3 Determinants of glaucoma knowledge**

In this study, there was no association between gender and glaucoma knowledge. Surprisingly, there was also no association found between level of education and glaucoma knowledge. This finding is not consistent with several similar studies in the

literature where education played significant roles in the level of glaucoma awareness and knowledge (Krishnaiah et al 2005:207; Sathyamangalam et al 2009:355; Altangerel et al 2009:66). In this study, the respondents' were mostly literate, as about 94% of the respondents had completed at least a secondary education, and because those with little or no education were very few, they were not included in the analysis. This may be able to explain our finding.

Nigeria has divisions on many levels, a few of these being ethnicity, language, and religion. In this study, the relationship between ethnicity and glaucoma knowledge was tested and no association was found between these 2 variables. Similarly, no association was found between glaucoma knowledge and age as well as glaucoma knowledge and respondents' status (i.e. whether staff member or not).

Respondents who were never married were more likely to have knowledge of glaucoma than those respondents' who were married. It is uncertain however whether this finding is clinically useful as it has not been previously reported in the literature. Large community based studies in Nigeria will be required to validate this finding.

Respondents who reported having had a previous eye examination were found to be more likely to have knowledge of glaucoma than those who had never had an eye examination. This association may result because respondents who reported having had a previous eye examination may have had glaucoma checks and also have more potential for exposure to information about glaucoma.

#### **5.4 SCOPE AND LIMITATION OF THE STUDY**

The study was conducted in the Central Bank of Nigeria staff clinic in the Garki district of the Federal Capital Territory (FCT), Abuja, Nigeria. The attendees of the clinic are basically members of staff of the CBN as well as their dependants. These groups of attendees are mostly in the upper middle class. For this reason the findings may be relevant only to the population of this clinic and may not be generalised to other populations in other clinics or hospitals in Abuja.

The convenience sampling technique used in this study is considered a weak approach to sampling because it provides little opportunity to control for biases (Burns & Grove

2005:350). This may have affected the internal validity of the study because of lack of randomisation processes.

Certain aspects of the questionnaire were considered too technical and therefore difficult for the respondents as evidenced by the high proportion of respondents ticking the 'I do not know' option of many questions.

## **5.5 RECOMMENDATIONS**

The findings provided valuable information on the level of glaucoma knowledge amongst our study population. Overall glaucoma knowledge in this clinic-based population was low. Accordingly, based on the findings, the researcher concludes the following main recommendations with special reference to public health, clinical care, education of both eye care workers and the public and research. A pamphlet was also designed as a resource care tool to enhance the knowledge deficit on glaucoma amongst the patients who attend the CBN staff clinic.

### **Public health**

Early detection and treatment is vital in glaucoma. Given the fact that only 14.5% of our respondents have knowledge of this condition, it is unlikely that many patients would come forward for examination. The results of this study have implications for the policy-makers, program planners and practitioners to serve as a knowledge base on which to build strategies for improving glaucoma knowledge. Health promotion and communicating risk is a key public health strategy (Cook & Bellis 2001:54-61). Effective health education about eye care may influence the behavior of individuals to consider regular eye care. The educational programs need to target the known patients and those with epidemiological risk characteristics such as people with family history of glaucoma, aged people and those with associated eye diseases. The aims of education should focus not only on modifying individual's perception of risk of vision loss, but also on providing information regarding the benefits of early detection and treatment. It is important to note that the benefits of eliminating barriers to access can be fully realized only when the issue of adequate utilisation of preventive services is addressed. Javitt (1995:41-44) clearly documented the potential cost savings associated with regular preventive eye care as compared to cost of vision loss. Community level programs and

initiative taken as part of the World Glaucoma Day in increasing awareness on glaucoma through various media and setting up patient awareness groups would help improve glaucoma awareness and knowledge (George & Vijaya 2008:97).

### **Clinical care**

It is essential to ensure early detection through 'opportunistic case detection' by performing a comprehensive eye examination at every available instance is done. Commencing treatment or appropriate referral so as to meet the increased demand that is expected following effective health promotion and raised awareness about glaucoma is equally important. Communicating visual prognosis by primary eye care practitioners and primary health clinicians would help enhance the knowledge and compliance among glaucoma patients. This study can be regarded as a baseline against which future assessments can be made. The researcher will create awareness by designing a pamphlet with information about glaucoma for patients who attend the eye clinic. It is notable that a survey itself can be educational by prompting respondents to obtain information about the survey topic. Patients diagnosed with glaucoma may require post-diagnosis reminders as a strategy to improve follow-up care.

### **Education**

All eye care workers should receive in-service education and training on the diagnosis, treatment and prevention of glaucoma related blindness. Further information is indicated in the leaflet. Although the brochure/leaflet is initially written in English, it will be translated into the local common languages for better understanding. A professional translator will be sought for especially on the translation of complex medical ophthalmology concepts. Copies will be made freely available at the eye clinic and other surrounding clinics. It will complement information needed to give in-service education to the staff on regular basis.

#### **What is glaucoma?**

Glaucoma is the name given to a group of eye conditions in which the optic nerve is damaged at the point where it leaves the eye.

### **What causes glaucoma?**

In some people, the damage to the nerve is caused by raised eye pressure. How much damage there is will depend on how much pressure there is, and how long it has lasted. Others may have an eye pressure within normal limits but damage occurs because there is poor blood supply or a weakness in the optic nerve. In most cases both factors are involved but to a varying extent.

### **Are there different types of glaucoma?**

Yes, there are two main categories which are chronic or slow glaucoma and acute or sudden glaucoma.

### **What are the common symptoms of glaucoma?**

Chronic glaucoma usually has no symptoms while patients with acute glaucoma often have painful, red and watery eyes. Both types lead to blindness if untreated.

### **Who is at risk for glaucoma?**

People who are 40 years of age and above, those who are of African origin, those who have close relatives with glaucoma, patients with diabetes and people who have short-sight (myopia).

### **How is it diagnosed?**

The following eye tests can be used to diagnose glaucoma:

- Viewing your optic nerve by shining a light from a special electric torch into your eye (ophthalmoscopy).
- Measuring the pressure in the eye using a special instrument (tonometry).
- Showing you a sequence of spots of light on a screen and asking you to say which ones you can see (Central visual field assessment or Perimetry).

### **How is it treated?**

The main treatment for glaucoma aims to reduce the pressure in your eye. Treatment to lower the pressure is usually started with eye drops. If this does not help, your specialist may suggest either laser treatment or an operation called a trabeculectomy to improve the drainage of fluids from your eye. Your specialist will discuss which the best method is in your particular case.

### **Can glaucoma be cured?**

Although damage already done cannot be repaired, with early diagnosis and careful regular observation and treatment, damage can usually be kept to a minimum, and good vision can be enjoyed indefinitely.

### **Will I be able to drive?**

Most people can still drive if the loss of visual field is not advanced. To assess possible damage to your peripheral vision you will need a special test to see whether your sight meets the standards of the Driver and Vehicle Licensing Authority.

### **Further Information**

If you have any queries or concerns about your eyes, please contact the Central Bank Staff Eye Clinic on (234) 07058052491.

## **Research**

Further research should be undertaken on the following topics:

- a similar clinic-based study in other parts of Nigeria
- a population-based study to determine glaucoma knowledge and its' determinants in Nigeria would be useful to unveil misconceptions that need addressing
- a qualitative research involving both eye care workers and selected patients will help throw more light on various aspects of glaucoma

Based on the findings, it was noted that it would be helpful to assess the staff's knowledge of glaucoma through further research as patients can lack information due to staff not having the capacity to give such information.

## **5.6 CONCLUSION**

This study sought to answer the question "What is the level of knowledge about glaucoma amongst patients who attend the CBN staff eye clinic?" The question was answered and the objectives of the study were met.

From this study, it is clear that knowledge about glaucoma amongst patients who attend the CBN staff eye clinic is inadequate. At the same time the study identified certain gaps and made appropriate recommendations.

## List of sources

Abdul, MM, Sivasubramaniam, S, Murthy, GV, Gilbert, CE, Abubakar, T, Ezelum, CC & Rabi, M. 2009. Causes of blindness and visual impairment in Nigeria: The Nigeria National Blindness and Visual Impairment Survey. *Investigative Ophthalmology and Visual Science* 50(9):4114-20.

Adegbehingbe, BO & Bisiriyu, LA. 2008. Knowledge, attitudes & self-care practices associated with glaucoma among hospital workers in Ile-Ife, Osun state, Nigeria. *Tanzania Journal of Health Research* 10(4):240-245.

Ali, NS. 2002. Prediction of coronary heart disease preventive behaviours in women: a test of the health belief model. *Women and Health* 35(1):83-96.

Altangerel, U, Nallamshetty, HS, Uhler, T, Fontanarosa, J, Steinmann, WC, Almodin, JM, Chen, BH & Henderer, JD. 2009. Knowledge about glaucoma and barriers to follow-up care in a community glaucoma screening program. *Canadian Journal of Ophthalmology* 44:66-69.

Alward, WL. 2000. The genetics of open-angle glaucoma: the story of GLC1A and myocilin. *Eye* 14:429-36.

Amerasinghe, N & Aung, T. 2008. Angle-closure: risk factors, diagnosis and treatment. *Progress in Brain Research* 173:31-45.

American Academy of Ophthalmology. Basic and clinical science course. 2008. *Glaucoma*. San Francisco.

Araoye, MO. 2004. *Research methodology with statistics for health and social sciences*. Ilorin: Nathadex.

Ashaye, AO. 2003. Clinical features of primary glaucoma in Ibadan. *Nigerian Journal of Ophthalmology* 11:70-75.

Babbie, E & Mouton, J. 2001. *The practice of social research*. Cape Town: Southern Africa.

Baker, H, Cousens, SN & Murdoch, IE. 2010. Poor public health knowledge about glaucoma: fact or fiction? *Eye* 24(4):653-657.

Bandura, A. 1997. Self-efficacy: towards a unifying theory of behavioural change. *Psychological Review* 84:191-215.

Belcher, L, Sternberg, MR, Wolotski, RJ, Halkitis, P & Hoff, C. 2005. Condom use and perceived risk of HIV transmission among sexually active HIV positive men who have sex with men. *AIDS Education and Prevention* 17(1):79-89.

Billings, DM & Halstead, JA. 2009. *Teaching in nursing a guide for faculty*. 3<sup>rd</sup> edition. St Louis: Saunders.



Brink PJ & Wood, MJ. 1998. *Advanced design in nursing research*. 2<sup>nd</sup> edition. Thousand Oaks: Juta.

Burns, N & Grove, SK. 2001. *The practice of nursing research: conduct, critique & utilization*; 4<sup>th</sup> edition. Philadelphia: WB Saunders.

Burns, N & Grove, SK. 2005. *The practice of nursing research: conduct, critique & utilization*; 5<sup>th</sup> edition. St Louis, Missouri: Elsevier Saunders.

Burns, N & Grove, SK. 2007. *The practice of nursing research: conduct, critique & utilization*; 6<sup>th</sup> edition. Philadelphia: WB Saunders.

Centers for Disease Control and Prevention. 2004. Program operations guidelines for sexual transmitted diseases prevention: community and individual behaviour change interventions.

From: <http://www.cdc.gov/std/program/community/9-PGcommunity.htm> (accessed 20 November 2008).

*Collins English Dictionary*. 2007. 9<sup>th</sup> edition. Glasgow: HarperCollins Publishers.

Cook, C. 2009. Glaucoma in Africa: size of the problem and possible solutions. *Journal of Glaucoma* 18(2):124-128.

Cook, PA & Bellis, MA. 2001. Knowing the risk: relationships between risk behaviour and health knowledge. *Public Health* 115:54-61.

Dandona, R, Dandona, L, John, RK, McCarty, CA & Rao, GN. 2001. Awareness of eye diseases in an urban population in southern India. *Bulletin of the World Health Organization* 79:96-102.

Denniston, AKO & Murray, PI. 2006. *Oxford handbook of ophthalmology*. New York: Oxford University Press.

De Vos, AS. (ed). 2002. *Research at grass roots for the social sciences and human service professions*. 2<sup>nd</sup> edition. Pretoria: Van Schaik.

De Vos, AS, Strydom, H, Fouche, CB & Delport, CSL. 2005. *Research at grass roots for the social sciences and human service professions*. 3<sup>rd</sup> edition. Pretoria: Van Schaik.

De wit, JBF, Vet, R, Schutten, M & van Steenberg, J. 2005. Social-cognitive determinants of vaccination behaviour against hepatitis B: an assessment among men who have sex with men. *Preventive medicine* 40(6):795-802.

DocShop.com [s.a.].

From: [www.docshop.com/education/vision/eye-diseases/glaucoma/](http://www.docshop.com/education/vision/eye-diseases/glaucoma/) (accessed 30 January 2009).

Egbert, PR. 2002. Glaucoma in West Africa: a neglected problem. *British Journal of Ophthalmology* 86:131-2.

- Foster, PJ. 2002. The epidemiology of primary angle closure and associated glaucomatous optic neuropathy. *Seminars in Ophthalmology* 17(2):50-8.
- Fraser, S, Bunce, C & Wormald R. 1999. Retrospective analysis of risk factors for late presentation of chronic glaucoma. *British Journal of Ophthalmology* 83(1):24-8.
- Freshwater, D & Maslin – Prothero, SE. 2005. *Blackwell's Dictionary of Nursing*. 2<sup>nd</sup> edition. Oxford: Blackwell.
- Gasch, AT, Wang, P & Pasquale, LR. 2000. Determinants of glaucoma awareness in a general eye clinic. *Ophthalmology* 107:303-8.
- George, R & Vijaya, L. 2008. First World Glaucoma Day, March 6, 2008: Tackling glaucoma challenges in India. *Indian Journal of Ophthalmology* 56:97-98.
- Glanz, K, Rimer, BK & Lewis, FM. (Eds). 2002. *Health behaviour and health education*. 3<sup>rd</sup> edition. San Francisco: Jossey-Bass.
- Glaucoma Research Foundation. 2009.  
From: [http://www.glaucoma.org/learn/anatomy\\_of\\_the.php](http://www.glaucoma.org/learn/anatomy_of_the.php) (accessed 10 February 2010).
- Graham, ME. 2002. Health beliefs and self breast examination in black women. *Journal of Cultural Diversity* 9 (2):49-54.
- Grant, WM & Burke, JF. 1982. Why do some people go blind from glaucoma? *Ophthalmology* 89:991-8.
- Hayden, JA. 2009. *Introduction to health behaviour theory*. Canada: Jones & Bartlett.
- Hochbaum, GM. 1958. *Public participation in medical screening programs: a socio-psychological study* (Public Health Service Publication No. 572). Washington, DC: Government Printing Office.
- Janz, NK & Becker, MH. 1984. The health belief model: a decade later. *Health Education Quarterly* 11(1):1-47.
- Javitt, JC. 1995. Preventing blindness in Americans: The need for eye health education. *Survey of Ophthalmology* 40:41-44.
- Krishnaiah, S, Kovai, V, Srinivas, M, Shamanna, BR, Rao, GN & Thomas, R. 2005. Awareness of glaucoma in the rural population of Southern India. *Indian Journal of Ophthalmology* 53:205-208.
- Kyari, F, Gudlavalleti, MVS, Sivsubramaniam, S et al. 2009. Prevalence of Blindness and Visual Impairment in Nigeria: The National Blindness and Visual Impairment Survey. *Investigative Ophthalmology & Visual Science* 50 (5):2033-2039.
- Kozier, B & Erb, G. 2008. *Fundamentals of nursing – concepts, process and practice*. 9th edition. New York: Addison-Wesley.

- Landers, JA, Goldberg, I & Graham, SL. 2002. Factors affecting awareness and knowledge of glaucoma among patients presenting to an urban emergency department. *Clinical and Experimental Ophthalmology* 30:104-109.
- Lau, JTF, Lee, V, Fan, D, Lau, M & Michon, J. 2002. Knowledge about cataract, glaucoma, and age related macular degeneration in the Hong Kong Chinese population. *British Journal of Ophthalmology* 86:1080-1084.
- Leske, MC, Connell, AM, Schachat, AP & Hyman, L. 1994. The Barbados Eye Study. Prevalence of open angle glaucoma. *Archives of ophthalmology* 112:821-829.
- Leydhecker, W. 1975. *Glaukom. Ein Handbuch*, 2. Berlin: Aufl. Springer. 328.
- Mansouri, K, Orgul, S, Meier-Gibbons, F & Mermoud, A. 2006. Awareness about glaucoma and related eye health attitudes in Switzerland: a survey of the general public. *Ophthalmologica* 220:101-108.
- Merriam-Webster dictionary. [s.a.].  
From: <http://en.wikipedia.org/wiki/Knowledge> (accessed 5 September 2009).
- Merriam-Webster dictionary. [s.a.].  
From: <http://www.merriam-webster.com/dictionary/scientific%20method> (accessed 25 December 2009).
- Mouton, J & Marais, HC. 1994. *Basic concepts in the methodology of the social sciences*. Pretoria: Penrose.
- Mouton, J. 2001. *How to succeed in your master's and doctoral studies: A South African guide and resource book*. Pretoria: Van Schaik.
- Mwingira, B & Dowse, R. 2006. Comprehension and acceptability of a patient information leaflet (PIL) for antiretroviral therapy. *Health SA Gesondheid* 11(3):49-59.
- Neuman, WL. 2000. *Social research methods*. 4<sup>th</sup> edition. Boston: Allyn & Bacon.
- Omoti, AE & Edema, OT. 2007. A review of the risk factors in primary open angle glaucoma. *Nigerian Journal of clinical practice* 10(1):79-82.
- Oxford Advanced Learners Dictionary*. 2006. 7<sup>th</sup> edition. New York: Oxford University Press.
- Parry, CD, Pluddermann, A, Steyn, K et al. 2005. Alcohol use in South Africa: findings from the first demographic and health survey 1998. *Journal of the study of Alcohol* 66(1):91-7.
- Pender, NJ. 1987. *Health promotion in nursing practice*. 2<sup>nd</sup> edition. Norwalk: Apple Lange.
- Pfeiffer, N, Kriegelstein, GK & Wellek, S. 2002. Knowledge about glaucoma in the unselected population: A German survey. *Journal of Glaucoma* 11:458-63.

Polit, DF & Beck, CT. 2008. *Nursing research: generating and assessing evidence for nursing practice*. 8<sup>th</sup> edition. Philadelphia: Wolters Kluwer; Lippincott, Williams & Wilkins.

Polit, DF & Hungler, BP. 1995. *Nursing research: principles and methods*. Philadelphia: Lippincott.

Quigley, HA. 1996. Number of people with glaucoma worldwide. *British Journal of Ophthalmology* 80:389-393.

Quigley, HA & Broman, AT. 2006. The number of people with glaucoma worldwide in 2010 and 2020. *British Journal of Ophthalmology* 90:262-267.

Rosenstock, IM, Strecher, VJ & Becker, MH. 1988. Social learning theory and the health belief model. *Health Education Quarterly* 15(2):175-183.

Saks, M & Allsop, J. 2007. *Researching health: qualitative, quantitative and mixed modes*. London: Sage.

Sathyamangalam, RV, Paul, PG, Ronnie, G, Baskaran, M, Hemamalini, A, Raj, VM, Augustian, J, Prema, R & Vijaya, L. 2009. Determinants of glaucoma awareness and knowledge in urban Chennai. *Indian Journal of Ophthalmology* 57:355-360.

Somekh, B & Lewin, C. 2005. *Research methods in the social sciences*. London: Sage.

Stommel, M & Wills, CE. 2004. *Clinical research: concepts and principles for advanced practice nurses*. Philadelphia: Wolters Kluwer; Lippincott, Williams & Wilkins.

Strecher, VJ & Rosenstock, IM. 1997. The health belief model, in *Health behaviour and health education: theory, research, and practice*, edited by K Glanz, FM Lewis & BK Rimer. 2<sup>nd</sup> edition. San Francisco: Josey-Bass.

Tenkir, A, Solomon, B & Deribew, A. 2010. Glaucoma awareness among people attending ophthalmic outreach services in South Western Ethiopia. From <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2880/> (accessed on 18 November 2010).

The Eye Digest. 2009. University of Illinois Eye and Ear Infirmary. From: <http://www.agingeye.net/glaucoma/glaucomainformation.php> (accessed 9 June 2010).

The Merck manual of diagnosis and therapy. 2006. 18<sup>th</sup> edition. New Jersey: Merck & Co Inc.

The Merck manuals online medical library. 2008. *Primary open angle glaucoma*. From: <http://www.merck.com/mmpe/sec09/ch103/ch103b.html#sec09-ch103-ch103b-460> (accessed 29 December 2009).

Tielsh, JM, Sommer, A, Katz, J, Royall, RM, Quigley, HA, & Javitt, J. 1991. Racial variations in the prevalence of primary open-angle glaucoma. The Baltimore Eye Survey. *Journal of the American Medical Association* 266:369-74.

Trochim, WM. 2006. The research methods knowledge base.  
From: <http://www.socialresearchmethods.net/kb>. (accessed 15 April 2010).

Healthwise. 2008a. Healthwise for every decision.  
From: <http://www.webmd.com/eye-health/tc/glaucoma-exams-and-tests> (accessed 7 February 2010).

Healthwise. 2008b. Healthwise for every decision.  
From: <http://www.webmd.com/eye-health/tc/glaucoma-treatment-overview> (accessed 9 June 2010).

Healthwise. 2009. Healthwise for every decision. From: <http://www.webmd.com/eye-health/vision-tests#hw235696> (accessed 7 February 2010).

World Health Organization. 2001. *Health research methodology: a guide for training in research methods*. 2<sup>nd</sup> edition. Manila: WHO.

**APPENDIX E**

**QUESTIONNAIRE ON ASSESSMENT OF KNOWLEDGE ABOUT GLAUCOMA AMONGST THE PATIENTS THAT ATTEND THE CENTRAL BANK OF NIGERIA STAFF EYE CLINIC, ABUJA**

*All information herewith provided will be treated confidentially. It is not necessary to indicate your name on this questionnaire*

**INSTRUCTIONS**

1. Please answer all questions in section A by providing an “X” in the box corresponding to the chosen alternative or by encircling the chosen option(s)
2. Answer all the multiple choice questions in section B by choosing and encircling the right option
3. Please answer all questions as honestly, frankly and objectively as possible
4. Please hand in the questionnaire to the researcher immediately after completion

**Answer the question by placing an “X” in the box corresponding to the alternative which is applicable to you on section A**

**SECTION A: PERSONAL DATA**

Ref no:	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>						<b>For official use</b> 4																	
Today's date:	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20px;">Day</td> <td style="width: 20px;">Month</td> <td style="width: 20px;">Year</td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>	Day	Month	Year				<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> 10																
Day	Month	Year																						
. What is your gender?  <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20px; height: 20px;">1. Male</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;">2. Female</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>	1. Male		2. Female					<table border="1" style="width: 100%; height: 30px;"> <tr> <td style="width: 100%;"></td> </tr> </table> 11																
1. Male		2. Female																						
2. What is your age category?  <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20px;">1</td> <td style="width: 60%;">Less than 25</td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td>2</td> <td>25-34</td> <td style="height: 20px;"></td> </tr> <tr> <td>3</td> <td>35-44</td> <td style="height: 20px;"></td> </tr> <tr> <td>4</td> <td>45-54</td> <td style="height: 20px;"></td> </tr> <tr> <td>5</td> <td>55-64</td> <td style="height: 20px;"></td> </tr> <tr> <td>6</td> <td>65-74</td> <td style="height: 20px;"></td> </tr> <tr> <td>7</td> <td>75 years or older</td> <td style="height: 20px;"></td> </tr> </table>	1	Less than 25		2	25-34		3	35-44		4	45-54		5	55-64		6	65-74		7	75 years or older			<table border="1" style="width: 100%; height: 30px;"> <tr> <td style="width: 100%;"></td> </tr> </table> 12	
1	Less than 25																							
2	25-34																							
3	35-44																							
4	45-54																							
5	55-64																							
6	65-74																							
7	75 years or older																							

3. What is your ethnic background?

1	Hausa	
2	Igbo	
3	Yoruba	
4	Others	
	If 4, please specify	

  
13

4. How many times have you attended the eye clinic?

1	First time	
2	1 – 2 times	
3	3 – 4 times	
4	5– 6 times	
5	7 or more	

  
14

5. What is your marital status?

1	Never married	
2	Married	
3	Cohabiting	
4	Separated	
5	Divorced	
6	Widowed	
7	Other	

  
15

6. What is the highest level of education you have completed?

1	No schooling	
2	Primary education	
3	Secondary education	
4	College diploma	
5	University, first degree	
6	Post graduate qualification	
7	Other (please specify)	

  
16

<p>7. What is your status within the Central Bank of Nigeria?</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;">1</td> <td style="width: 85%;">Member of staff</td> <td style="width: 10%;"></td> </tr> <tr> <td style="text-align: center;">2</td> <td>Wife of staff member</td> <td></td> </tr> <tr> <td style="text-align: center;">3</td> <td>Husband of staff member</td> <td></td> </tr> <tr> <td style="text-align: center;">4</td> <td>Child of staff member</td> <td></td> </tr> <tr> <td style="text-align: center;">5</td> <td>Other, please specify:</td> <td></td> </tr> </table>	1	Member of staff		2	Wife of staff member		3	Husband of staff member		4	Child of staff member		5	Other, please specify:		<div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div> <p>17</p>
1	Member of staff															
2	Wife of staff member															
3	Husband of staff member															
4	Child of staff member															
5	Other, please specify:															
<p>8. Have you ever heard about the eye condition, glaucoma?</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">1. Yes</td> <td style="width: 5%;"></td> <td style="width: 45%; text-align: center;">2. No</td> <td style="width: 5%;"></td> </tr> </table>	1. Yes		2. No		<div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div> <p>18</p>											
1. Yes		2. No														
<p>9. Have you ever had an eye examination?</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">1. Yes</td> <td style="width: 5%;"></td> <td style="width: 45%; text-align: center;">2. No</td> <td style="width: 5%;"></td> </tr> </table>	1. Yes		2. No		<div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div> <p>19</p>											
1. Yes		2. No														
<p>10. When was your last eye examination?</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;">1</td> <td style="width: 85%;">Within the last 6 months</td> <td style="width: 10%;"></td> </tr> <tr> <td style="text-align: center;">2</td> <td>Between 6 months and a year ago</td> <td></td> </tr> <tr> <td style="text-align: center;">3</td> <td>2 to 5 years ago</td> <td></td> </tr> <tr> <td style="text-align: center;">4</td> <td>More than 5 years ago</td> <td></td> </tr> </table>	1	Within the last 6 months		2	Between 6 months and a year ago		3	2 to 5 years ago		4	More than 5 years ago		<div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div> <p>20</p>			
1	Within the last 6 months															
2	Between 6 months and a year ago															
3	2 to 5 years ago															
4	More than 5 years ago															
<p>11. How is your eye sight?</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;">1</td> <td style="width: 85%;">Excellent</td> <td style="width: 10%;"></td> </tr> <tr> <td style="text-align: center;">2</td> <td>Fair</td> <td></td> </tr> <tr> <td style="text-align: center;">3</td> <td>Poor</td> <td></td> </tr> </table>	1	Excellent		2	Fair		3	Poor		<div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div> <p>21</p>						
1	Excellent															
2	Fair															
3	Poor															



**SECTION B: ASSESSMENT OF PATIENT'S KNOWLEDGE ABOUT GLAUCOMA**

For questions 1 – 20, please choose only one correct answer and tick the appropriate box to the right of the options provided, and select only one option for each question.

1. What is glaucoma?

1	It is an eye infection	
2	A whitening which grows across the eye obscuring vision	
3	An increase in the pressure in the eye which causes vision loss	
4	Excessive tearing from the eyes	
5	I do not know	

22

2. Can most patients with glaucoma tell that they have an eye problem?

1	Yes	
2	No	
3	I do not know	

23

3. The most common symptom of glaucoma is

1	itching of the eyes	
2	redness of the eye	
3	no symptom	
4	pain in the eyes	
5	I do not know	

24

4. The following are important risk factors for glaucoma:

1	Age	
2	Sex	
3	High pressure measured in the eyes	
4	1 and 2 above	
5	1 and 3 above	
6	I do not know	

25

5. Which of the following is an important risk factor for glaucoma?

1	History of glaucoma of the spouse	
2	History of glaucoma of a close friend	
3	History of glaucoma of the sibling	
4	History of glaucoma of the neighbour	
5	none of the above	
6	I do not know	

26

6. The normal intra-ocular pressure is between:

1	1 to 10 millimeters of mercury (mmHg)	
2	10 to 21 millimeters of mercury (mmHg)	
3	21 to 50 millimeters of mercury (mmHg)	
4	Another measure	
5	I do not know	

27

7. Diagnosis of glaucoma includes 'a combination of two of the following?'

- |  |
|--|
| a. Testing the field of vision of the eyes |
| b. Taking an X-ray of the eye              |
| c. Measurement of the eye pressure         |

1	Option a and b	
2	Option b and c	
3	Option a and c	
4	None of the above	
5	I do not know	

28

8. Untreated glaucoma leads to

1	swelling of the eyes	
2	loss of vision	
3	severe pains in the eye	
4	None of the above	
5	I do not know	

29

9. Treatment of glaucoma is directed at:

1	Stopping headaches	
2	Increasing the eye pressure	
3	Lowering the eye pressure	
4	None of the above	
5	I do not know	

30

10. Treatment options include all the following except one:

1	Eye drops / medicines	
2	No treatment	
3	Laser treatment	
4	Surgery	
5	I do not know	

31

11. Treatment of glaucoma is usually

1	for a duration of one week	
2	for a duration of one month	
3	for a duration of one year	
4	for life	
5	I do not know	

32

12. Which of the following eye care professionals can best diagnose and treat glaucoma?

1	Optician	
2	Ophthalmologist	
3	Optometrist	
4	I do not know	

33

13. Is visual loss due to glaucoma permanent or reversible?

1	Permanent	
2	Reversible	
3	I don't know	

34

14. How often should one **normally** have an eye examination?

1	once a week	
2	once a month	
3	once a year	
4	once in 5 years	
5	I do not know	

  
35

15. What is the most common cause of blindness worldwide?

1	Cataract	
2	Glaucoma	
3	Refractive errors	
4	Eye infections	
5	I do not know	

  
36

16. Glaucoma is characterized by damage to the lens of the eye.

1	True	
2	False	
3	I do not know	

  
37

17. Glaucoma is usually associated with high eye pressures.

1	Yes	
2	No	
3	I don't know	

  
38

18. Glaucoma can be associated with low eye pressures.

1	Yes	
2	No	
3	I do not know	

  
39

<p>19. Glaucoma is not a common cause of blindness.</p> <table border="1" data-bbox="347 365 863 465"> <tr> <td>1</td> <td>Yes</td> <td></td> </tr> <tr> <td>2</td> <td>No</td> <td></td> </tr> <tr> <td>3</td> <td>I do not know</td> <td></td> </tr> </table>	1	Yes		2	No		3	I do not know		<table border="1" data-bbox="1230 376 1401 421"> <tr> <td></td> </tr> </table> <p style="text-align: right;">40</p>	
1	Yes										
2	No										
3	I do not know										
<p>20. Most patients with glaucoma have no symptoms.</p> <table border="1" data-bbox="347 672 863 772"> <tr> <td>1</td> <td>Yes</td> <td></td> </tr> <tr> <td>2</td> <td>No</td> <td></td> </tr> <tr> <td>3</td> <td>I do not know</td> <td></td> </tr> </table>	1	Yes		2	No		3	I do not know		<table border="1" data-bbox="1230 683 1401 728"> <tr> <td></td> </tr> </table> <p style="text-align: right;">41</p>	
1	Yes										
2	No										
3	I do not know										

**Match the eye test used in Column B with the description thereof in Column A (questions). For example 26=2**

<b>COLUMN A Description</b>	<b>COLUMN B Term</b>
21. The test used to examine the inside of the eye, especially the optic nerve	1. Visual acuity test
22. The test that measures the inner pressure of the eye	2. Refraction
23. Measures the eye's ability to see details at near and far distances	3. Tonometry
24. A test that measures the eyes' need for corrective lenses	4. Ophthalmoscopy
25. A visual field test to detect loss of both side vision and central vision	5. Perimetry

42 – 46

**Thank you for your participation.**

## APPENDIX F

### QUESTIONNAIRE MARK SHEET

Question      Answer

1.	3
2.	2
3.	3
4.	5
5.	3
6.	2
7.	3
8.	2
9.	3
10.	2
11.	4
12.	2
13.	1
14.	3
15.	1
16.	2
17.	1
18.	1
19.	2
20.	1
21.	21=4
22.	22=3
23.	23=1
24.	24=3
25.	25=5