A nursing care costing model for wound dressing in Nigeria

by

KOLAWOLE DAMILARE OGUNDEJI

submitted in accordance with the requirements

for the degree of

DOCTOR OF PHILOSOPHY

in the subject

NURSING

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: Prof P R Risenga

CO-SUPERVISOR: Prof G B Tshwneagae

(NOVEMBER 2021)

DECLARATION

I declare that **A NURSING CARE COSTING MODEL FOR WOUND DRESSING IN 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 other institution.

SIGNATURE

15th August 2021

DATE

Ogundeji Kolawole Damilare

ABSTRACT

Background: Wound dressing is a major component of wound management, and it is documented to consume huge healthcare resources in most countries. In Nigeria, the cost of wound dressing for an average wound care is unknown and it is borne almost entirely by the patients as most do not have health insurance coverage. This study examined the economic burden of wound dressing among inpatients and outpatients in an acute care episode.

Purpose of the study: The purpose of the study was to develop a costing model to capture cost implications of wound dressing and hospitalization in order to contribute to the knowledge gap regarding the cost of wound dressing in Nigeria.

Method: The investigator examined the cost of wound dressing materials, consumables, lotion used and hospitalization incurred by patients during a minimum of four weeks acute care episode. A descriptive cross-sectional design was adopted. The study was carried out in three Teaching Hospitals South West Nigeria. The study centres were purposively selected while the respondents (n= 320: Inpatients-190, Outpatients-130) were selected via a convenient sampling technique from wards and clinics where wound dressings were performed. Every patient who had spent not less than four weeks on the ward or who were discharged or on clinic visits were interviewed. Variables of interest included: frequency of wound dressing per week, number of dressing packs used per week, cost of dressing pack, cost of consumables, cost of lotion used, cost of hospitalization, occupation, monthly income, family size and health insurance coverage. The data was entered into the Statistical Package for Social Sciences (SPSS) version 23 and analyzed by descriptive and chi-square statistics while modelling cost of wound dressing and hospitalization was done by regression model analysis at 0.05 level of significance. The results were presented in a frequency table, percentages, mean and standard deviation. 1USD= ₦515, 1ZAR= ₦45- August 2021

Results:

Phase I: Inpatients cost of wound dressing

According to the study findings, the average age of the respondents was 44.95 ±16.12. Two-thirds of the men were artisans and traders who had completed at least high school. Over 70% of respondents have a family size of 5 to 10 and more than half earn less than ₦50000 each month.

The majority (79.5%) had no comorbidities and about half (50%) were on daily dressing, which required 1-5 moderate or major dressing packs per week. Most respondents (85.3 %) had a hospital stay of less than 11 weeks. Almost all the respondents were not on health coverage (90.5%).

The cost of wound dressing varies every week and per acute care episode, depending on the wound type: The average cost of wound dressing per week ranges from ₦9000 to ₦27000, with burn injury dressing costing the most (₦26,783.33). Other wound dressing costs include ₦13,919.31 for an open wound, ₦13,870 for a pressure injury, ₦12,632.50 for diabetic foot ulcers, ₦10,867.87 for a surgical wound, ₦10,717.22 for a leg ulcer, and 9,473.04 for a cancer wound.

The average cost of wound dressing per acute care episode was discovered to be between ₦5000 and ₦120000. The average cost of wound dressing per acute care episode for open wounds, pressure injuries, burn injuries, surgical wounds, leg ulcers, cancer wounds, and diabetic foot ulcers was ₦119,802.759; ₦110.546.667; ₦107,331.333; ₦89,501.463; ₦70,413.33; ₦67,874.783 and ₦50,350, respectively, according to differential cost per wound type.

Furthermore, the cost of hospitalization per acute care episode ranges from ₦40000 to ₦178000, with the differential cost of hospitalization per acute care episode by wound type ranging from ₦177,333.33; ₦152,617.07; ₦150.717.24 and ₦120,866.67 for burn injury, surgical wound, open wound, and leg ulcer, respectively.

Phase II: Outpatients cost of wound dressing:

According to the study findings, the average age of the respondents was 43.03 ± 15.47. The population of both sexes was roughly the same (males accounted for 53.1%, females accounted for 46.9%). Most of the respondents were artisans and traders who had

completed at least secondary school. The majority (72.3%) had a monthly income of less than ₦50000, with over 60% having a household size of 5 to 10.

The most common wound aetiology was road traffic accident (34.6%), while the most common wound type was a leg ulcer (40%). The vast majority are free of comorbidities (82.3%). Furthermore, 40% of the participants were on wound dressing three times per week. In addition, over 60% of patients required a moderate dressing pack at each visit.

Almost all of the participants who responded did not have health insurance (90.8%). The cost of wound dressing varies by wound type and outpatient care episode per week: wound dressing costs range from ₦3000-₦10000 per week, with costs for burn wounds, open wounds, and leg ulcers totalling ₦10048, ₦9452, and ₦9272.88, respectively. Apart from the cost of other expenses during a wound care episode, the cost of wound dressing per care episode ranges from ₦30000 to ₦160000.

Phase III: Modelling cost of wound dressing and hospitalization

The cost of wound dressing among hospitalized patients is estimated to be ₦54909.36 per acute care episode, with no contribution from other variables. The cost of wound dressing differed depending on the wound type, with a parameter estimate of ₦521801.92 for an open wound, ₦140885.20 for a surgical wound, and ₦332271.98 for a cancer wound.

In addition, without accounting for other variables, the projected cost of hospitalization per acute care episode for all types of wounds was found to be ₦144693.65. The cost of hospitalization differed depending on the wound type, with a parameter estimate of ₦11830.10 for an open wound, ₦67694.90 for a surgical wound, and ₦26065.44 for a cancer wound.

Similarly, the cost of wound dressing is estimated to be ₦176109.48 per care episode among outpatients, with no contribution from other variables. The parameter estimate for the differential cost of wound dressing per wound type was ₦28847.94 for an open wound, ₦33772.33 for a surgical wound, ₦267751.14 for a leg ulcer, ₦102640.00 for a diabetic foot ulcer, and ₦390328.72 for a cancer wound.

Conclusion: For average Nigerians who are not registered in a health insurance program, the expense of wound care and hospitalization is prohibitively expensive. Essentially, a nursing care costing model for wound dressing and hospitalization was designed to aid individuals with wounds, hospital management, and health insurance companies in the design of healthcare finance. Nurses are additionally encouraged to deliver efficient and effective wound care since patients are paying out of limited resources. This will demonstrate how nurses contribute to the overall care of patients.

Key Words: Nursing care, wound dressing, inpatients, outpatients, hospitalization, out of pocket, modelling, catastrophic healthcare expenditure, health insurance coverage, Nigeria.

ACKNOWLEGDEMENTS

I want to sincerely thank the following persons and institutions for their respective contributions to this thesis

- A special thank you to my supervisor, Prof PR Risenga, for her guidance, support and timely response starting from the development of my proposal and the whole process of the conduct of the study
- My co-supervisor, Prof Gloria Thupayagale-Tshweneagae, for her unflinching support and guidance in the whole process of my research work
- Prof. Henry A. Akinsola for his assistance, advice and encouragement throughout the admission and study processes
- I appreciate the department of Health Studies for the selection and admission to study doctoral programme in Nursing
- The University of South Africa for finalizing and granting me admission into doctoral programme in Nursing and for the bursary award
- UNISA College of Human Sciences Research Ethics Review Committee for reviewing my research proposal and granting ethical approval
- The legal and ethics Units of the National Orthopedic Hospital, Igbobi, Lagos Nigeria
- The UI/UCH Ethical Committee in the Institute for Advanced Medical Research & Training for reviewing my research proposal and granting ethical approval to conduct research
- The CMD/CMAC of the University College Hospital (UCH), Ibadan for granting permission to conduct research at the hospital
- The Ethic and Research office of the Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) for ethical clearance to conduct research at the hospital
- The data collection supervisors and assistants: Mrs. Sijuwade Bukola, Mrs. Akinyemi Kehinde, Mrs.Oluwaleke Kudirat, Mrs. Alo Ayooluwa for conducting and facilitating data collection smoothly
- The nurses in wards and clinics where wound dressings were performed in the three hospitals in Nigeria
- Mrs. Ogundeji Adepeju for entering the data timely
- Study respondents for granting the interview as scheduled in each hospital

  My wife and children for allowing the process to run smoothly.

DEDICATION

This thesis is dedicated to God, for the strength and grace to pull through this study.

I dedicate the thesis to my late father, Ezekiel Oyewole Ogundeji, who valued education so much and always wished the best for me. Unfortunately, you could not live to observe and celebrate my success. May his soul continue to rest in peace.

I also dedicate the study to individuals who are hospitalized or visiting outpatient clinics for wound dressings in the hospitals in Nigeria as well to their families, sponsors, care givers and health policy makers. I hope the modelling of the cost of wound dressing will be of immense benefit especially in designing working tariffs for wound dressing in Nigeria.

TABLE OF CONTENTS

DECLARATION ii

ABSTRACT iii

ACKNOWLEGDEMENTS vii

DEDICATION viii

CHAPTER ONE 1

OVERVIEW OF THE STUDY 1

1.1 INTRODUCTION AND BACKGROUND 1

1.2 STATEMENT OF THE RESEARCH PROBLEM 5

1.3 PURPOSE OF THE STUDY 6

1.4 RESEARCH OBJECTIVES 6

The objectives of the study were addressed according to three phases 6

1.4.1 Phase I: Inpatients cost of wound dressing 6

1.4.2 Phase II: Out-patients cost of wound dressing 7

1.4.3 Phase III: Development of a Model for cost of wound dressing 7

1.4.3.1 Inpatients (Modelling cost of wound dressing and hospitalization) 7

1.4.3.2 Outpatients (Modelling cost of outpatients wound dressing) 8

1.5 RESEARCH QUESTIONS 8

1.5.1 Phase I: Inpatients cost of wound dressing 8

1.5.2 Phase II: Out-patients cost of wound dressing 9

1.6 SIGNIFICANCE OF THE STUDY 9

1.7 OPERATIONAL DEFINITION OF TERMS 10

1.7.1 Nursing Care Cost 10

1.7.2 Costing and costing model 11

1.7.2.1 Costing 11

1.7.2.2. Costing model 11

1.7.3 Wound dressing....11
1.7.4 Hospitalization....12
1.7.5 In-Patients....12
1.7.6 Out-Patients....12
1.7.7 Enrollee....12
1.7.9 Health Insurance Coverage....12
1.7.10 Health care expenditure....12
1.7.11 Catastrophic household expenditure....13
1.7.12 National Health Insurance Scheme (NHIS)....13
1.7.13 Formal Sector Social Health Insurance Programme (FSSHIP)....13
1.7.14 Informal sector social health insurance programme (ISSHIP)....13
1.7.15 Voluntary contributors social health insurance programme (VCSHIP)....13
1.7.16 Out of pocket payment....14
1.7.17 Discharged Against Medical Advice (DAMA)....14
1.8 RESEARCH PARADIGM....14
1.8.1 Assumptions underlying the study....15
1.9 THEORETICAL FRAMEWORK....17
1.9.1 System Research Organizing Model (SROM)....17
1.10 RESEARCH METHODS....19
1.10.1 Phase I: Inpatients cost of wound dressing....20
1.10.2 Phase II: Outpatients cost of wound dressing....20
1.10.3 Phase III: Model Development....21
1.11 SCOPE OF THE STUDY....21
1.12 STRUCTURE OF THE THESIS....21
1.13 CONCLUSION....23
CHAPTER TWO....24

LITERATURE REVIEW 24
2.1 INTRODUCTION 24
2.2 SYSTEMATIC REVIEW.....24
2.3 ECONOMIC BURDEN OF WOUND CARE: AN OVERVIEW 25
2.3.1 Wound type and cost of care 29
2.4 ACUTE WOUND AND COST OF CARE 31
2.4.1 Cost implication of burn injury care.....31
2.4.2 Cost implication of Surgical Wound Care 33
2. 5 CHRONIC WOUND AND COST OF CARE.....33
2.5.1 Cost implication of pressure injury care 34
2.5.2 Cost implication of Diabetic foot ulcer care.....35
2.5.3 Cost implication of venous leg ulcers care.....36
2.5.4 Cost implication of cancer wounds 36
2.6 EXTRINSIC FACTORS AFFECTING COST OF WOUND CARE 37
2.6.1 Patient acuity/comorbidities/infection.....37
2.6.2 Staff certification and expertise.....38
2.7 SOCIO-DEMOGRAPHIC CORRELATES OF COST OF WOUND CARE 39
2.7.1 Age 39
2.7.2 Gender.....39
2.7.3 Education.....40
2.7.4 Occupation 40
2.7.5 Family Income 40
2.7.6 Family size.....41
2.8 HEALTHCARE FINANCING IN NIGERIA.....41
2.8.1 Taxation and Nigeria healthcare financing.....42
2.8.2 Healthcare funding from external sources 43

2.8.3 Healthcare financing via Out of pocket (OOP) payment 43
2.8.4 Retainership health management system....44
2.8.5.1 Formal sector social health insurance programme (FSSHIP)....47
2.8.5.2 Informal sector social health insurance programme (ISSHIP) 49
2.8.5.2.1 Voluntary contributors social health insurance programme (VCSHIP) 49
2.8.6 Health maintenance organizations (HMOs) 51
2.8.6.1 HMO services- public sector....52
2.8.6.2 HMO services- private sector 53
2.8.6.3 Capitation 53
2.8.6.4 Fee for service....54
2.8.7 Healthcare service tariff....54
2.8.9 Challenges of health insurance scheme in Nigeria....55
2.8.9.1 Challenges related to NHIS 55
2.8.9.2 Challenges related to HMOs....57
2.9. WOUND CARE COST: IMPLICATION FOR HEALTHCARE INSURANCE 59
2.10. THEORETICAL FRAMWORK 61
2.10.1 System Research Organizing Model (SROM) 61
2.10.2 Application of System Research Organizing Model to nursing care cost of wound dressing....62
2.11. SUMMARY OF LITERATURE REVIEW....65
CHAPTER THREE 66
RESEARCH METHOD....66
3.1 INTRODUCTION....66
3.2 RESEARCH APPROACH AND DESIGN 66
3.2.1 Research Approach....66
3.2.2 Research Design....67

3.2.2.1 First quantitative phase....68
3.2.2.2 *Second quantitative phase* 68
3.2.2.3 Third development phase 69
3.3 PHILOSOPHICAL PERSPECTIVE AND PARADIGMS....69
3.4 RESEARCH SETTING 70
3.5 TARGET POPULATION....72
3.6 STUDY POPULATION 72
3.7 SAMPLE SIZE DETERMINATION 73
3.8 SAMPLYING METHOD 74
3.8.1 Inclusion Criteria....75
3.8.2 Exclusion Criteria....75
3.9 INSTRUMENT FOR DATA COLLECTION 76
3.10 ENSURING RIGOUR 76
3.10.1 Validity of the instrument 76
3.10.2 Reliability of the instrument....77
3.11 PROCEDURE FOR DATA COLLECTION....77
3.12 METHOD OF DATA ANALYSIS....79
3.13. ETHICAL CONSIDERATIONS 80
3.13.1 Ethical Approval....81
3.13.2 Permission to Conduct Research Work in Facilities 81
3.13.3 Ethical Principles 82
3.13.3.1 Confidentiality 82
3.13.3.2 Anonymity....83
3.13.3.3 Beneficence to respondents 83
3.13.3.4 Non-maleficence to respondents 83
3.13.3.5 Voluntariness....84

3.14 CONCLUSION....84
CHAPTER FOUR....85
PHASE I-INPATIENTS....85
DATA ANALYSIS AND INTERPRETATION....85
CHAPTER FIVE....108
PHASE II-OUTPATIENTS....108
DATA ANALYSIS AND INTERPRETATION....108
CHAPTER SIX....122
6.1. INTRODUCTION....122
6.2. KEY FINDINGS AND RELATIONSHIP WITH PREVIOUS STUDIES....122
6.2.1. Findings from direct cost of wound dressing and wound aetiology....126
6.2.2. Findings from direct cost of wound dressing and diagnosis....129
6.2.3. Findings from direct cost of wound dressing and type of wound....129
6.2.4. Findings from direct cost of wound dressing and frequency of wound dressing....134
6.2.5. Findings from direct cost of wound dressing and length of hospital stay....135
6.3 MODELLING COST OF WOUND DRESSING AND HOSPITALIZATION PER ACUTE CARE EPISODE....136
6.5 LIMITATIONS OF THE STUDY....149
6.6 IMPLICATION FOR NURSING EDUCATION AND PRACTICE....150
6.7 SUMMARY AND CONCLUSION....151
CHAPTER SEVEN....153
7.1. INTRODUCTION....153
7.2. KEY FINDINGS AND RELATIONSHIP WITH PREVIOUS STUDIES....153
7.2.1. Findings from direct cost of wound dressing and wound aetiology/diagnosis....156
7.2.2. Findings from direct cost of wound dressing and type of wound....157
7.2.3. Findings from direct cost of wound dressing and frequency of wound dressing....159

7.3 MODELLING COST OF OUTPATIENTS WOUND DRESSING 160
7.5. LIMITATIONS OF THE STUDY 173
7.6. IMPLICATIONS FOR NURSING EDUCATION AND PRACTICE.....174
7.7. SUMMARY AND CONCLUSION 175
CHAPTER EIGHT 176
8.1. INTRODUCTION 176
8.2. CONCLUSION OF THE STUDY 176
8.3. CONTRIBUTION OF THE STUDY 177
8.4. RECOMMENDATIONS 178
8.5. DISSEMINATION OF RESEARCH FINDINGS 181
8.6. CONCLUDING REMARKS.....181
REFERENCES 182
ANNEXURES 189

LIST OF TABLES **PAGE**

Table 2.1: Annual cost expended on wounds from 2012-2013 NHS expenditure 29

Table 2.2: An illustration of different type of wound 31

Table 2.3: Prevalence of pressure injury in different countries 34

Table 2.4: The structure of Nigeria NHIS 47

Table 2.5: Classification of Nigeria NHIS Programme 51

Table 4.1: Shows the Respondents Socio-demographic Characteristics 85

Table 4.2: Wound and Dressing Characteristics 89

Table 4.3: Healthcare Insurance Coverage response rate 95

Table 4.4: Mean distribution of variables by direct cost of wound dressing and wound aetiology 98

Table 4.5: Mean Distribution of variables by Direct Cost of Wound Dressing and Diagram 100

Table 4.6: Mean distribution of variables by direct cost of wound dressing and type of wound 102

Table 4.7: Mean distribution of variables by direct cost of wound dressing and frequency of wound dressing 104

Table 4.8: Mean distributions of variables by direct cost of wound dressing and length of hospital stay 105

Table 5.1: Analysis of Demographic Data of Respondents 107

Table 5.2: Wound Characteristics 111

Table 5.3: Healthcare Insurance Coverage 113

Table 5.4: Mean distribution of variables by direct cost of wound dressing and wound aetiology 115

Table 5.5: Mean distribution of variables by direct cost of wound dressing and diagnosis 116

Table 5.6: Mean distribution of variables by direct cost of wound dressing and type of wound 117

Table 5.7: Mean distribution of variables by direct cost of wound dressing and comorbidities 118

Table 5.8: Mean distribution of variables by direct cost of wound dressing and frequency of wound dressing 120

Table 6.1: Parameter estimates for the cost of wound dressing per acute care episode 135

Table 6.2: Parameter estimates for the cost of hospitalization per acute care episode 138

Table 6.3: Parameter estimates for the cost of dressing per acute care episode (open wound) 139

Table 6.4: Parameter estimates for the cost of hospitalization per acute care episode (Open wound) 141

Table 6.5: Parameter estimates for the cost of dressing per acute care episode (Surgical wound) 142

Table 6.6: Parameter estimates for the cost of hospitalization per acute care episode

(Surgical wound) 144

Table 6.7: Parameter estimates for the cost of dressing per acute care episode (Cancer wound) 145

Table 6.8: Parameter estimates for the cost of hospitalization per acute care episode (Cancer wound) 146

Table 7.1: Estimates for cost of wound dressing per outpatients' care episode 159

Table 7.2: Estimates for cost of wound dressing per week 161

Table 7.3: Estimates for cost of dressing per care episode for Open Wound 162

Table 7.4: Estimates for cost of dressing per week for Open Wound 163

Table 7.5: Estimates for cost of dressing per care episode for Surgical Wound 164

Table 7.6: Estimates for cost of dressing per week for surgical wound 165

Table 7.7: Estimates for cost of dressing per care episode for Leg Ulcer 166

Table 7.8: Estimates for cost of dressing per week for Leg Ulcer 167

Table 7.9: Estimates for cost of dressing per care episode for Diabetes Foot Ulcer 168

Table 7.10: Estimates for cost of dressing per week for Diabetes Foot Ulcer 168

Table 7.11: Estimates for cost of dressing per care episode for Cancer Wound 169

Table 7.12: Estimates for Cost of dressing per week for Cancer Wound 170

LIST OF FIGURES **PAGE**

Figure 1.1 Flow diagram of positivism paradigm assumptions 17

Figure 1.2 Diagrammatic representation of SROM constructs 18

Figure 1.3 An illustration of the quantitative approach phases 20

Figure 2.1 An illustration of systematic literature review 25

Figure 2.2 An illustration of cost implication of providing wound dressing 28

Figure 2.3: An illustration of the type of chronic wounds 37

Figure 2.4 An illustration of methods of healthcare financing in Nigeria 42

Figure 2.5 Chain of healthcare insurance financing in Nigeria 52

Figure 2.6 Diagrammatic representation of SROM constructs 61

Figure 2.7 A framework illustrating the application of SROM to nursing care cost of wound care 64

Figure 3.1 Phases of quantitative research design 68

Figure 3.2. An illustration of the research paradigms 71

Figure 3.3. An illustration of positivism paradigm assumptions 74

Figure 3.4. Map showing locations in Nigeria and continental boundaries 79

Figure 3.5. Illustration of the Study Sampling Techniques 80

Figure 4.1: Bar chart showing the age-group of respondents 81

Figure 4.2: Pie chart showing the gender of respondents 87

Figure 4.3: Bar chart showing the highest level of education of respondents 88

Figure 4.4: Bar chart showing the occupation of respondents 88

Figure 4.5: Bar chart showing the monthly income of respondents 89

Figure 4.6: Bar chart showing the different type of wound aetiology 92

Figure 4.7: Bar chart showing types of respondents' diagnosis 92

Figure 4.8: Bar chart showing the type of wounds 93

Figure 4.9: Bar chart showing the respondents' comorbidities 93

Figure 4.10: Bar chart showing the frequency of wound dressing per week 94

Figure 4.11: Bar chart showing the number and type of dressing packs used per week 94

Figure 4.12: Bar chart showing the length of hospital stays by respondents 95

Figure 4.13: Pie chart showing the respondents' response about healthcare insurance coverage 96

Figure 4.14: The bar chart shows the type of health insurance scheme 96

Figure 4.15: The bar chart shows the duration of health insurance coverage 97

Figure 4.16: Pie chart showing respondents' responses on payment of wound dressing 97

Figure 5.1: Gender of the respondents 108

Figure 5.2: Age of the respondents in years 109

Figure 5.3: Highest education level 109

Figure 5.4: Respondent's Occupation 110

Figure 5.5: Family Size 110

Figure 5.6: Monthly income 111

LIST OF ANNEXURES **PAGE**

Annexure A: Unisa ethical clearance 188

Annexure B: UI/UCH ethical clearance 190

Annexure C: National orthopedic hospital Igbobi Lagos ethical clearance 191

Annexure D: Oauthc ethical clearance 192

Annexure E: UCH approval letter to conduct research 193

Annexure F: Introduction to research ethics 194

Annexure G: Research ethics evaluation 195

Annexure H: Informed consent training 196

Annexure I: Participant information sheet 197

Annexure J: Questionnaire for nursing care cost of in-patients wound dressing 201

Annexure K: Questionnaire for nursing care cost of out-patients wound dressing 203

Annexure L: Researcher acknowledgment 205

Annexure M: Permission letter request 1 206

Annexure N: Permission letter request 2 208

Annexure O: Permission Letter request 3 210

Annexure P: Turnitin report 212

Annexure Q: Letter from language editor 213

Annexure R: Turnitin receipt 214

LIST OF ACRONYMS AND ABBREVIATIONS

ABC: Activity Based Costing

AUD: Australia Dollar

CAC: Corporate Affairs Commission

CMAC: Chairman, Medical Advisory Committee

CMD: Chief Medical Director

CNS: Clinical Nurse Specialist

COVID: Coronavirus Disease

CSSD: Central Sterile Storage Department

DAMA: Discharged Against Medical Advice

DFU: Diabetic Foot Ulcer

DNP: Doctor of Nursing Practice

DRG: Diagnosis Related Group

FMOH: Federal Ministry of Health

FSSHIP: Formal Sector Social Health Insurance Programme

HCP: Health Care Provider

HMO: Health Maintenance Organization

IITA: International Institute of Tropical Agriculture

IMF: International Monetary Fund

IRB: Institutional Review Board

ISSHIP: Informal Sector Social Health Insurance Programme

IT: Information Technology

LASU: Lagos State University

LASUTH: Lagos State University Teaching Hospital

LG: Local Government

MCPDP: Mandatory Continuing Professional Development Programme

NDHS: Nigeria Demographic and Health Survey

NHIS: National Health Insurance Scheme

NHS: National Health Service

NIMR: Nigeria Institute of Medical Research

NISER: Nigeria Institute of Social and Economic Research

NLC: Nigeria Labour Congress

N&MCN: Nursing and Midwifery Council of Nigeria

NOHIL: National Orthopaedic Hospital, Igbobi Lagos

NP: Nurse Practitioner

NUC: National Universities Commission

OAUTHC: Obafemi Awolowo University Teaching Hospital Complex

OOP: Out of Pocket

PAYE: Pay as You Earn

PPP: Public Private Partnership

PTF: Presidential Task Force

RTA: Road Traffic Accident

SDG: Sustainable Development Goal

SGD: Singapore Dollar

SOP: Surgical Outpatients

SPSS: Statistical Packages for Social Sciences

SROM: System Research Organizing Model

SSI: Surgical Site Infection

UCH: University College Hospital

UI: University of Ibadan

UK: United Kingdom

VLU: Venous Leg Ulcer

UN: United Nation

UNILAG: University of Lagos

UNISA: University of South Africa

USAID: United State Agency for International Development

USD: United State Dollar

U.S: United State

VAT: Value Added Tax

VCSHIP: Voluntary Contributors Social Health Insurance Programme

WB: World Bank

WHO: World Health Organization

ZAR: South Africa Rand

CHAPTER ONE
OVERVIEW OF THE STUDY

1.1 INTRODUCTION AND BACKGROUND

A wound is a loss in the skin's integrity that can occur because of trauma, systemic disease, or underlying pathology. Wounds affect people of all ages, but recent research has found a link between the frequency of chronic wounds and getting older (Cheng, Gibb, Graves, Finlayson, Pacella, 2018: 1; Narwade, Saxena, Wasnik, Akhtar, 2019: 2070). Acute wounds follow the normal reparative process and heal within six weeks while the chronic wounds or the non-healing wound do not follow the normal healing process and prolong beyond six weeks (Builder & Oseni-Momodu, 2017:60; Sen, 2019:40; Cho, Mattke, Gordon, Sheridan &Ennis, 2020:1; Munro, 2017:88). Wounds have an impact on the physical, psychological, and emotional well-being of patients, and are a burden for both patients and healthcare providers (Lotz 2019: 29; Cho et al., 2020:1; Munro, 2017:88).

There is a geometric increase in the cost of wound care globally especially with the aging population (Cheng et al., 2018: 1; Narwade et al., 2019: 2070). Research findings on cost of managing wounds continue to demonstrate unusual high cost of wound care across the globe. In the United Kingdom, for example, the annual National Health Service (NHS) cost on managing various types of wounds with associated comorbidities was estimated to be £5.3 billion in 2012-2013 (Guest, Vowden & Vowden, 2017a:292).

Furthermore, Guest et al. (2017a:292) revealed that in 2013, the NHS spent over £5 billion on wound management, accounting for nearly 4% of total spending. In addition, the treatment of stage III or IV pressure ulcers alone cost $9-11 billion a year in the United States (Etafa, Argaw, Gemechu, Melese, 2018:1). Cheng et al. (2018:1) also found that in 2012-2013, $8,106 AUD was spent on the treatment of venous leg ulcers in Australia. According to a Nigerian study, successfully managing diabetic foot ulcers (DFU) stage IV, III, and II cost an equivalent of 1808 US$, 1104 US$, and 556 US$, respectively, with the expense of foot dressing ranking high. Essentially, the cost of wound dressing alone is known to contribute a significant percentage of the total wound care expenditure. Guest, Fuller, Vowden (2017b:245) alluded to the evidence that managing the wound healing time can influence the attributable cost of providing dressing changes, product, and nursing time.

Wound dressing is a tremendous financial burden for individuals and the healthcare system, and it is projected to get worse in low- and middle-income nations where resources are scarce and health insurance coverage is poor (Aregbesola, 2017:43; Aregbesola & Khan, 2017; Aregbesola & Khan 2018a: 1015; Aregbesola & Khan 2018b: 798; Namomsa, 2019; Adamu 2019:2). For instance, a study conducted in 2010 in Southwestern Nigeria indicated that over 40% of patients spent around ₦500 (1.35 US$) each week on wound dressing alone (Lotz 2019: 32). This was the time when inflation was under control and Nigeria was not yet in recession. The actual cost of wound dressing is predicted to have climbed geometrically in recent years. The authors of the same study also claimed that over 70% of the patients are small traders who are unable to meet the financial requirements of wound dressing. However, previous research has found possible family impoverishment as a result of continuous healthcare costs (Oreh 2017:159; Aregbesola & Khan 2018b:798).

Furthermore, Odusan, Amoran, and Salami (2017: 102) found that 53% of respondents in a diabetic foot ulcers (DFU) study in Southwestern Nigeria earned less than ₦20,000 (54.13US$) per month, 34% earned between ₦20,000 and ₦49,000 (54.13US$- 132.61US$) per month, and no respondents earned more than ₦100,000 (270.63US$) per month. The findings in the same geographical region of Nigeria by Ogundeji, Akinyemi, Adeyemo, Oluwaleke, and Ilesanmi (2018: 149) show that about 75% of the study respondents' monthly income was less than ₦50,000 (130.72US$) and that they would need to spend between ₦2000 (5.41US$) and ₦3000 (8.12US$) on wound dressing materials per week. This is a threat that has wreaked havoc on several underdeveloped countries. In Nigeria, the government is ramping up measures to expand access to health insurance, but the scheme's benefits are still primarily reserved for government employees and the organized private sector. In essence, insufficient access to medical care is the primary cause of the ongoing gaps between the rich and the poor, as the poor grow poorer as a result of increased health-care spending (Karimo, Krokeyi & Ekainsai, 2017:25: Ogundeji, 2017:15; Aregbesola, 2017:43).

Consequently, the global re-engineering of clinical methods and practice ushers in the use of empirical approaches and scientific innovations in wound care protocol. For effective wound care, practitioners have recently advocated for the use of modern dressing materials

and a multidisciplinary team approach (Jiang, Chen, Wang, Chen, 2017; Lotz 2019: 29; Brain, Tulleners, Lee, Cheng, Graves, Pacella 2019:2; Lowin, Winfield, Price, Anderson, Potokar, Lowin, Winfield (2019:222). These innovative techniques for treating patients' wounds also necessitate a significant financial investment on the part of the patients or their family. Significantly, in most developing countries like Nigeria, there is lack of prospective wound dressing cost operational guidelines to track the cost of wound dressing. There are few national or regional data on the financial impact of various wound care or severe injuries. Across care settings, the epidemiology and cost of wound cases are generally under documented (Builder and Oseni-Momodu, 2017:61). As a result, wound dressing planning and budgetary allocation are affected.

Importantly, nurses are the frontline in wound dressing across care settings (Sen 2019:43-44), and research evidence suggests that repetitive dressing changes are to blame for the high expenses associated with wound management (Cheng et al, 2018:1). According to Builders and Oseni-Momodu (2018:14) study at Bingham University Teaching Hospital in Jos, Nigeria, 86.6% of patients underwent dressing changes twice a week at first, then weekly (29.9%). Similarly, in Odhiambo, Omondi, and Magak's (2019: 34) study on wound dressing technique and costs at a County hospital in Kenya, wound dressing was done every third day interval, whereas Ogundeji et al's (2018:152) study on the economic burden of wound dressing among patients attending teaching hospitals in southwest Nigeria found that more than 80% of wounds required daily wound dressing.

In addition, Narwade et al (2019:2071) found that wound dressing is a primary treatment option for non-diabetic chronic leg ulcers. Different care modalities were titrated in the trial, with wound dressing accounting for 56.7 % of the total, compared to varicose vein surgery and grafting accounting for 25% and 18.3 % respectively (Narwade et al 2019: 2071). As a result of this discovery, the cost of wound dressing alone can cause an indigenous family to become impoverished. Certainly, the cost of fulfilling other family expenses such as dairy products and other critical necessities might be swapped for wound dressing on a daily or alternate-day basis (Aregbesola and Khan 2018b:798; Oreh 2017:160). For families with a big family, the situation might be even worse, especially if the wound victim is the family breadwinner. As a result, interventions aimed at lowering the expense of daily or alternate-

day dressing will have a broad impact on lowering the incidence of catastrophic household expenditure.

However, there is a severe lack of data in Nigeria that specifies the total cost of inpatient and outpatient wound dressings. Often when wound care costs are tracked, it is usually the cost of medical and surgical expenses while the huge care cost emanating from daily or alternate day wound dressing are neglected. This has a significant impact on determining the actual financial costs of wound dressing. In most wound care costs and analysis studies, this is a gap. As a result, a critical review of the wound dressing cost component of wound management is urgently needed in order to enhance data on wound dressing cost, budget, and planning.

In addition, wound dressing necessitated a significant financial investment and resulted in a catastrophic household expense in cases when insurance coverage was inadequate (Aregbesola & Khan 2018b:798). In Nigeria, the healthcare insurance plan is not evenly dispersed, and indigenous families that are poor frequently pay out of pocket, further impoverishing the family (Raheem, Adewale, Adeneye, Musa, Ezeugwu, Yisau et al 2019:2; Ogundeji et al 2018: 150; Aregbesola 2017:43; Grace, Brian, Uche, Valentine, 2017:2; Nshakira-Rukundo, Mussa, Nashakira, Gerber & von Braun, 2019:594; Aregbesola & Khan 2017b:194; Aregbesola & Khan 2018b: 798; Oreh 2017:159). When a patient requires funding for a chronic, non-healing wound, the situation may deteriorate. This may explain why the majority of the poor have been discharged against medical advice (DAMA) and have turned to traditionalists for treatment to avoid the financial burden imposed by orthodox medicine.

Furthermore, the Nigerian government established the National Health Insurance Scheme (NHIS) in 2005 to safeguard the country's burgeoning population from medical financial difficulties, regardless of their geopolitical affiliations (Aregbesola 2017:43; Ogundeji, 2017:14; Raheem et al 2019:2; Ogundeji et al., 2020: 1112). The program began with federal government employees being covered under a formal sector social health insurance program (FSSHIP). The informal sector social health insurance program (ISSHIP) has also

been in operation for more than a decade (Ogundeji et al, 2018:150; Raheem et al 2019:2; Ogundeji et al., 2020:1112).

The ISSHIP, which takes the form of a voluntary contributor's social health insurance program (VCSHIP), is designed to cover the healthcare costs of petty merchants, small business owners, and low-income earners. The VCSHIP required the insured person to pay a yearly premium of 15,000 (29 USD) (Ogundeji et al., 2020:1112; Ogundeji & Adeyemo, 2020:2; Ogundeji 2017:15). However, researchers are divided on the destitute population's ability to pay the VCSHIP annual payment because they live below the poverty level. Furthermore, empirical studies reveal that NHIS scheme(s) coverage is very low, and that there are long bottlenecks, political bureaucracy, and corruption in the registration and responsiveness to urgent healthcare needs (Aregbesola & Khan 2018b:1015).

This study is significant because there is paucity of data that specify the cost implication of wound dressing and hospitalization in Nigeria. The limited studies that were available focused mostly on the gross estimate of wound treatment costs, with a bias toward medical and surgical procedural costs (Ogundeji 2020: 1464; Ogundeji, Oluwaleke & Akinyemi, 2017:42). There is a need to close the knowledge gap, offer statistics, and demonstrate the usefulness of nurses in patient care, particularly in Nigeria's resource-poor settings.

1.2 STATEMENT OF THE RESEARCH PROBLEM

Wound dressing is an important part of wound care and it is well established that it consumes a significant amount of healthcare resources in most countries. In Nigeria, the cost of wound dressing for a typical wound is unclear, and it is nearly totally borne by the patients because most do not have health insurance coverage. Also, there are no potential wound dressing tariffs available to determine the cost of wound dressing. In most cases, the cost of wound dressing is included in the cost of the medical or surgical procedures.

Furthermore, according to Ogundeji (2017:14); Aregbesola (2017: 43); Cleopatra & Komolafe (2018: 1); Ogundeji et al (2018: 146, out-of-pocket payment remained the most common method of settling medical expenses in Nigeria. Most patients who appear with wounds in Nigerian teaching hospitals are members of the dependent community who are

unable to pay their medical fees. Patients and their relatives are often unaware of the financial implications of daily or alternate day wound dressing. Patients frequently discharge against medical recommendation or sell a valuable investment to meet the financial need for wound dressing owing to long-term healthcare costs. Catastrophic healthcare costs are one of the most serious repercussions of the Nigerian population's inability to pay for wound dressing (Ogundeji et al, 2018:144; Karimo, Krokeyi, Ekainsai, 2017:25; Cleopatra & Komolafe, 2018:1).

Patients are known to have financial and emotional difficulties when it comes to wound dressing. The cost of wound dressing has increased exponentially because of the employment of current technology and a multidisciplinary approach. In Nigeria, future wound dressing cost tariffs are lacking, making it difficult for patients and healthcare institutions to plan for wound dressing treatment. This is exacerbated by the scarcity of data on the cost of wound dressings, which is the most important component of wound care. Hence, the purpose of the study was to develop a nursing care costing model for wound dressing to fill the gap.

1.3 PURPOSE OF THE STUDY

The purpose of the study was to investigate the cost of inpatients and outpatients' wound dressing in southwest Nigeria and to develop a costing model to capture cost implication of wound dressing and hospitalization to contribute to the knowledge gap regarding costs of wound dressing in Nigeria.

1.4 RESEARCH OBJECTIVES

The objectives of the study were addressed according to three phases

1.4.1 Phase I: Inpatients cost of wound dressing

The specific objectives of the study were to:

- Determine the average cost of wound dressing of different wound etiologies per acute care episode
- Determine the average cost of wound dressing of different wound diagnoses per acute care episode

- Determine the average cost of wound dressing of different type of wounds per acute care episode
- Determine the frequency of wound dressing per week with the average cost of dressing per acute care episode
- Determine the average cost of hospitalization per acute wound care episode

1.4.2 Phase II: Out-patients cost of wound dressing

The specific objectives of the study were to:

- Determine the average cost of wound dressing of different wound etiologies per care episode
- Determine the average cost of wound dressing of different wound diagnoses per care episode
- Determine the average cost of wound dressing of different type of wound per care episode
- Determine the average cost of wound dressing of patients with different comorbidities per care episode
- Determine the frequency of wound dressing per week with the average cost of dressing per acute care episode

1.4.3 Phase III: Development of a Model for cost of wound dressing

1.4.3.1 Inpatients (Modelling cost of wound dressing and hospitalization)

- Parameter estimates for the cost of wound dressing per acute care episode
- Parameter estimates for the cost of hospitalization per acute care episode
- Parameter estimates for the cost of dressing per acute care episode (open wound)
- Parameter estimates for the cost of hospitalization per acute care episode (Open wound)
- Parameter estimates for the cost of wound dressing per acute care episode (Surgical wound)
- Parameter estimates for the cost of hospitalization per acute care episode (Surgical wound)

- Parameter estimates for the cost of wound dressing per acute care episode (Cancer wound)
- Parameter estimates for the cost of hospitalization per acute care episode (Cancer wound)

1.4.3.2 Outpatients (Modelling cost of outpatients wound dressing)

- Estimates for cost of wound dressing per outpatients' care episode
- Estimates for cost of wound dressing per week
- Estimates for cost of dressing per care episode for Open Wound
- Estimates for cost of dressing per week for Open Wound
- Estimates for cost of dressing per care episode for Surgical Wound
- Estimates for cost of dressing per week for Surgical Wound
- Estimates for cost of dressing per care episode for Leg Ulcer
- Estimates for cost of dressing per week for Leg Ulcer
- Estimates for cost of dressing per care episode for Diabetes Foot Ulcer
- Estimates for cost of dressing per week for Diabetes Foot Ulcer
- Estimates for cost of dressing per care episode for Cancer Wound
- Estimates for Cost of dressing per week for Cancer Wound

1.5 RESEARCH QUESTIONS

The study will answer the following questions according to phase I and II

1.5.1 Phase I: Inpatients cost of wound dressing

- What is the average cost of wound dressing of different wound etiologies per acute care episode?
- What is the average cost of wound dressing of different wound diagnoses per acute care episode?
- What is the average cost of wound dressing of different type of wounds per acute care episode?
- What is the frequency of wound dressing per week with the average cost of dressing per acute care episode?
- What is the average cost of hospitalization per acute wound care episode?

1.5.2 Phase II: Out-patients cost of wound dressing

- What is the average cost of wound dressing of different wound etiologies per care episode?
- What is the average cost of wound dressing of different wound diagnoses per care episode?
- What is the average cost of wound dressing of different type of wound per care episode?
- What is the average cost of wound dressing of patients with different comorbidities per care episode?
- What is the frequency of wound dressing per week with the average cost of dressing per acute care episode

1.6 SIGNIFICANCE OF THE STUDY

The aim of this study was to contribute to the body of knowledge that is uniquely nursing and serve as a framework to investigate the cost of wound dressing among inpatients and out-patients in resource constrained settings of southwest Nigeria and to develop a nursing care costing model for wound dressing in Nigeria.

To simplify the design of healthcare funding, a nursing care costing model for wound dressing was devised. Individuals, families, communities, nursing, government, and international agencies would all gain greatly from this: To begin, the pricing model will be used to generate working tariffs on the cost of wound dressing so that the individual, family, and community may understand the financial consequences of each type of wound and hospitalization in southwest Nigeria. The developed costing model for wound dressing will also foster the development of community-based healthcare financing scheme which will enable the low-income earners in the community to enroll into the scheme thereby reduce out of pocket healthcare expenditure.

Secondly, the costing model will check for healthcare bill excesses and ensure that patients only pay for the resources they use. Similarly, calculating the cost of wound dressing will encourage nurses to provide better service and be more accountable. As a result, nurses

will be encouraged to deliver efficient and effective wound care for large wound dressing budgets to be commensurate with the level of service provided. Furthermore, the study's findings highlighted the need for trained wound care nurses in Nigeria to expand the frontier of wound care knowledge and practice in order to provide high-quality services, which is a benefit to the individual, family, and community.

Thirdly, the pricing model will aid in the separation of wound dressing costs from medical or surgical procedure costs. This would promote a nursing-friendly accounting system for wound dressing in Nigeria, highlighting nurses' contributions to total patient care and elevating nurses' status within the healthcare ecosystem. Fourthly, the findings gave government agencies like the National Health Insurance Scheme (NHIS), the Federal Ministry of Health (FMOH), and private organizations like Health Maintenance Organizations (HMOs) the ability to formulate health policies on wound dressing costs, as well as estimate and facilitate the design of professional service tariffs for wound dressing in the region. This is made possible by knowing the typical cost of wound dressing for each wound type, which includes materials, consumables, the product utilized, and hospitalization. It would also allow them to forecast future costs of wound dressing for various types of wounds in south-western Nigeria.

Finally, the findings provided useful information for international funding agencies such as the World Health Organization (WHO), the International Monetary Fund (IMF), the United States Agency for International Development (USAID), and others to determine the scope and gradient of wound-related funding in Nigeria and beyond.

1.7 OPERATIONAL DEFINITION OF TERMS

An operational definition depicts the researcher' thought and narration of concepts as relevant to the idea or subject being investigated. In this study, the operational definitions are as follows:

1.7.1 Nursing Care Cost

The cost expended on wound dressing materials, product used and hospitalization in a typical teaching hospital in southwest Nigeria. Wound care requires considerable nursing

intensity and the cost of providing continuous wound dressing is influenced by variables such as the wound aetiology, type, comorbidities, acuity rating as well as staff level of education, professional experience, wound care certification and unit characteristics (Ilesanmi & Ogundeji, 2020:44).

1.7.2 Costing and costing model

1.7.2.1 Costing

Generally, costing is an estimated cost of producing something or undertaking a procedure. It is a process of calculating the cost of service or production of materials. Cost calculation in healthcare is not so common but the process is evolving to provide an estimate for the healthcare procedures and services. Activity based costing (ABC) and by extension resources allocation costing is becoming a necessity in healthcare management. This becomes imperative due to the escalating cost of healthcare services across the globe. For more than two decades, healthcare researchers have shifted focus on new technology that can enable cost-resources calculation in hospital service to track the cost of material utilizations and service.

1.7.2.2. Costing model

A framework that establishes the cost implications of providing wound dressing in resource poor settings of southwest Nigeria. This model gives an empirical understanding of the costs required for continuous provision of wound dressing and hospitalization in acute care settings. It is necessary to develop tariffs and effectively evaluate the value of nursing care. According to Ogundeji, (2020: 1465), a costing model that will organize variables of interest to develop a framework for the costing process is essential.

1.7.3 Wound dressing

This is a nursing practice that involves covering the wound surface with traditional or modern-day dressing materials and lotion to allow for the laying of collagen fibers, re-epithelization, and healing of damaged tissues. Wound dressing is an important aspect of wound care regimen (Ogundeji et al. (2018: 144). It also necessitates a high level of nursing effort and is carried out on both inpatients and outpatients (Ilesanmi and Ogundeji, 2020:38).

1.7.4 Hospitalization

This is the healthcare domiciliary arrangement for the purpose of providing evidence based and effective wound dressing. Length of hospital stay is noted to influence the cost of care in an acute care episode (Ogundeji et al, 2018:149).

1.7.5 In-Patients

A hospitalized patient who requires continuous wound assessment, treatment, and evaluation throughout the acute care episode. The individuals require nurses' interventions for daily or alternate day wound dressing.

1.7.6 Out-Patients

These are patients who require continuous wound assessment, treatment, and evaluation on a regular visit from home to the healthcare facility.

1.7.7 Enrollee:

An individual who is registered under the public or private health insurance scheme and is eligible to access care in the accredited health care facilities. The patient is hospitalized for acute wound care episode or on a regular clinic visit for wound assessment and management.

1.7.8 Health Insurance Coverage

A prepayment arrangement for healthcare services which mainly covers the insured members. It is also the extent of healthcare financial security among the indigenous people of southwest Nigeria. In Nigeria, various forms of healthcare coverage exist and is greatly influenced by the patient's financial commitment and the enrollee employment status (Ogundeji 2017:25).

1.7.9 Health care expenditure

The number of financial resources expended on provision of wound dressing and hospitalization in teaching hospitals in southwest Nigeria. This often covers financial expenses on wound dressing materials, lotion used, other dressing consumables as well as professional costs (Ogundeji et al., 2018: 147).

1.7.10 Catastrophic household expenditure

This is a healthcare expenditure beyond the limit the patients and families can cope with. Many of the households in low-income population become impoverished because of unending healthcare financing particularly on provision of continuous wound dressing and hospitalization (Ogundeji et al, 2018:144; Karimo et al., 2017:25; Cleopatra & Komolafe, 2018:1).

1.7.11 National Health Insurance Scheme (NHIS)

This is a Nigeria government programme aim at reducing the incidence of out-of-pocket payment for healthcare services among the teeming Nigeria population by provision of healthcare financial security for the insured members (Aregbesola 2017:43; Ogundeji, 2017:14; Raheem et al 2019:2; Ogundeji & Adeyemo, 2020:1). The scheme is optimized to cater for the formal and informal sector of the Nigeria social system.

1.7.12 Formal Sector Social Health Insurance Programme (FSSHIP)

A national health insurance programme for the coverage of healthcare finances of government workers and organized private sector. It is the popular government health insurance programme in Nigeria. Significantly, in 2005, the FSSHIP started with enrollment of working staff in federal government parastatals (Ogundeji et al., 2018: 150; Ogundeji, 2017: 14; Raheem et al 2019:2).

1.7.13 Informal sector social health insurance programme (ISSHIP)

A national health insurance programme for the coverage of individuals who are not enrolled into the formal sector social health insurance programme (Ogundeji et al, 2018: 150, Ogundeji 2017:14, Raheem et al., 2019:2). The scheme is planned to cover the cohort of traders, artisans, retirees, and other low-income earners in the population (Ogundeji et al., 2018: 150). Also, according to Ogundeji, (2017:14-15), a classical type of ISSHIP is the voluntary contributor's social health insurance programme (VCSHIP).

1.7.14 Voluntary contributors social health insurance programme (VCSHIP)

A type of prepayment health insurance programme to prevent out of pocket payment. In Nigeria, the programme is designed to cover the informal sector of the economy (Ogundeji, 2017:14; Ogundeji, 2018: 150). It requires a premium payment from the insured individual (Ogundeji, 2017: 15).

1.7.15 Out-of-pocket payment

Out-of-pocket payment, often known as user fees, is a kind of healthcare financing in which the patient or family pays for their own treatment without the need for a prepayment or insurance. Out-of-pocket payment is a frequent method of healthcare funding in Nigeria, according to several research, and is the leading cause of catastrophic healthcare cost (Raheem et al 2019:2; Ogundeji et al, 2018: 150; Aregbesola 2017:43; Grace et al 2017:2; Nshakira-Rukundo et al, 2019:594; Aregbesola & Khan, 2017b: 194; Aregbesola & Khan, 2018b: 798; Oreh, 2017: 159).

1.7.16 Discharged Against Medical Advice (DAMA)

This is a situation whereby the hospitalized patient or family decides to discontinue healthcare services in the hospital without formal discharge by the medical officer. It is a common practice among the indigenous families due to protracted healthcare finances.

1.8 RESEARCH PARADIGM

Paradigm is the world view of a phenomenon (Polit and Beck 2012:11). It is a foundational belief system and theoretical framework with underlying assumptions. It can also be defined as an epistemological stance, a set of basic belief among the scientific community. Paradigm is also described as different approaches to scientific inquiry each with their own beliefs, assumptions, and methodical techniques.

Specifically, a research paradigm is an approach which has been verified overtime by a scientific community which provides a model or framework for conducting research. There are different types of paradigms. The common four distinct paradigms include positivism, post-positivism, pragmatism, and constructivism. In positivism, there is a single external reality which can be known by an objective observer while in constructivism there is multiple socially constructed realities which are known by a subjective observer. In the context of this study, positivism was relevant.

According to Grove, Burns & Gray (2013:66) positivism paradigm supports scientific process that involves collection of data to transform nursing practice or development of a model to solve a specific problem. Positivism favors an approach involving scientific inquiry to draw evidence-based inferences using valid measurements. Therefore, in this study, scientific

data was collected among inpatients and outpatients with wounds to develop a nursing care costing model for wound dressing in Nigeria.

Furthermore, positivism paradigm provides a philosophical grounding for quantitative research and allows for the generation of ideas into knowledge about the concept under study. Therefore, based on this paradigm, a cross-sectional research design with theoretical framework-system research organizing model (SROM) was used to harness the independent variables of wound dressing to develop a nursing care costing model for wound dressing in Nigeria.

1.8.1 Assumptions underlying the study

Assumptions are propositions based on the paradigm perspectives which are used to shape the research process. The assumptions underlying this study are ontological, epistemological, methodological, and axiological assumptions. Polit and Beck (2008:14) defined assumptions as a set of basic principles that are acknowledged as true on the foundation of reasoning without being proven or verified. Assumptions are entrenched philosophical stance which modulate the development and implementation of the research process. Burns & Grove (2005:146) underline assumptions that help to develop a more astute scholarly inquiry.

Positivism paradigm consists of the following assumptions:

What constitutes reality is emphasized by *ontological assumptions*. It is the pursuit for truth from the standpoint of research. The researcher's perception of how things are and could work is called into play in ontological assumption. The purpose of this study is to investigate the financial impact of continuous wound dressing on those who have been diagnosed with one type of wound or another, with or without health insurance coverage. A nursing care costing model was designed to capture the cost of administering wound dressing in Nigeria, based on the positivist paradigm of a single external reality.

Epistemology is a philosophical field concerned with the origin, nature, techniques, and limits of human knowledge. Knowledge is essential for communicating the seriousness of an issue and finding a solution to it. The epistemological assumption acknowledges man's unique and comprehensive nature. As a result, this study used an interview administered questionnaire

to obtain information on the cost of daily or alternate day wound dressing from patients with wounds who are hospitalized or who have regular clinic visits in selected teaching hospitals in Nigeria. In this regard, the patient can enumerate the financial impact of continuous wound dressing during the acute care episode.

Methodological assumptions deal with the relevant methods that are used in the research process. Literature is replete with huge financial burden imposed by continuous wound dressing and hospitalization on patients especially in middle- and low-income countries. In this study, a quantitative approach via cross-sectional research design was used to examine the cost implication of wound dressing among inpatients and outpatients in Nigeria teaching hospitals with the purpose of developing a costing model for wound dressing in Nigeria. Interview administered questionnaire was utilized for data collection. The researcher utilized non-probability, convenience sampling to choose the study respondents based on the inclusion criteria. Considering the various ethical principles, the respondents enumerated how wound dressing has impacted their finances with or without health insurance coverage.

Axiology is the philosophical study of value. It is concerned with ethics and aesthetics. *Axiological assumptions* deal with what is important and valuable in research. Axiologists work on objectivity and purpose in research. In this present study, the purpose was to develop a nursing care costing model for wound dressing in Nigeria. The assumption in this study was the value of cost of nursing care in wound management protocol. The researcher valued a clear delineation of the cost of wound dressing and hospitalization in wound care costing to show-case the value of nursing care within the healthcare ecosystem. In this study, it is also valuable to understand the impact of health insurance coverage in mitigating the effect of out-of-pocket payment in middle- and low-income countries. This assumption also supports bioethical principles underpinning the conduct of clinical research.

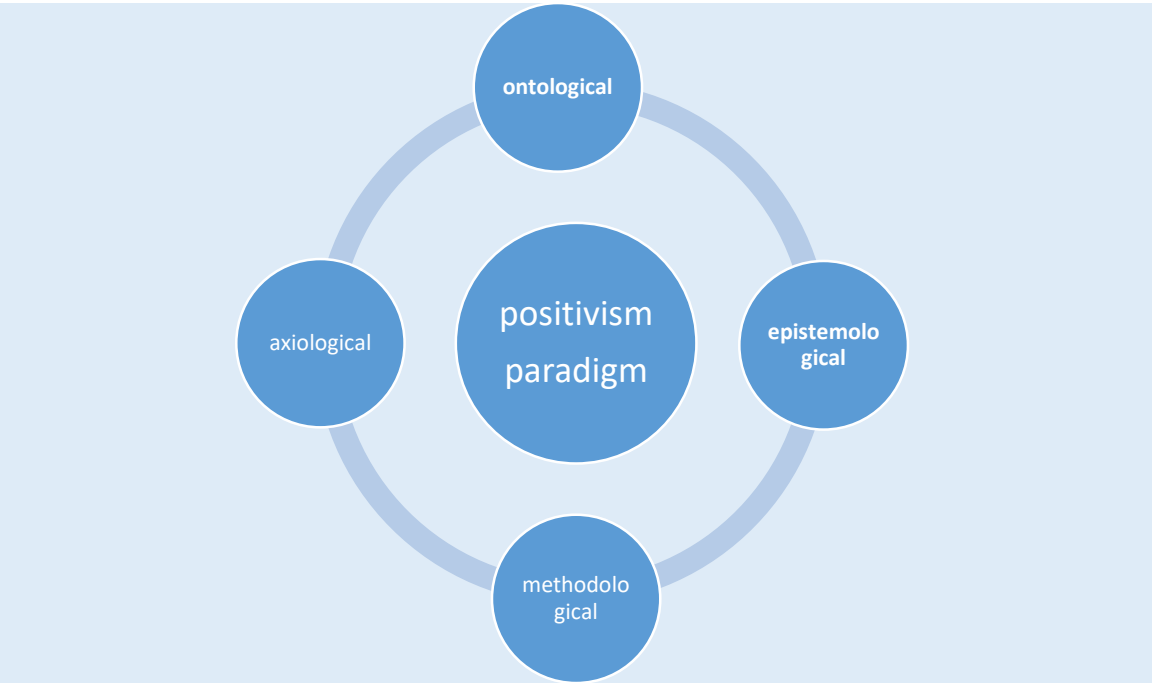


Figure 1.1: Flow diagram of positivism paradigm assumptions

1.9 THEORETICAL FRAMEWORK

1.9.1 System Research Organizing Model (SROM)

The SROM was designed as a framework to evaluate nursing systems research by examining the system's influences on outcomes of care but can also be used in other healthcare research (Brewer, Verran, Stichler (2008:7). It is a tool to help explain relationships among variables of interest in evidence-based healthcare design (Brewer et al 2008:7). SROM is thought to be an offshoot of some previously conceptualized theories or models. The theoretical models underpinning SROM include Avedis Donabedian's Quality of Health Outcome Model-the classic structure, process, outcome framework, Outcome Model for Healthcare Research, and the American Academy of Nursing Quality of Healthcare Outcomes Model (Mitchell, Ferketich Jennings 2007; Gilmartin, & Sousa 2016:150; Brewer et al 2008:7).

SROM is useful in synthesis of a body of knowledge that can be translated into the healthcare environment. The healthcare environment is the context in which care is planned, organized, delivered, evaluated, and managed across a continuum. Each characteristic or attribute of healthcare design depends on such variables as patient characteristics including disease

burden or chronicity, acuity rating, nursing care cost, staff, clinical and organizational outcomes.

The SROM is a model with four constructs: client, context, action focus and outcomes. The core constructs are interrelated and recognize the complex nature of the healthcare environment. The first construct: client represents the system input. The client drives the model. The second construct, context, represents elements in the environment that can influence outcomes. The third construct, action focus, is the intervention that also has strong influence on the outcome. The fourth construct, outcome, is the result of the care. It is the product of the interaction of the other constructs.

The SROM construct is a dynamic model suggesting how client and contextual characteristics affect outcomes. It has flexibility because phenomena being measured can be attributed to one of the four constructs at different times depending on the structure of the research design. Consequently, SROM is a framework for building nursing knowledge because it represented the four-nursing metaparadigm of person, health, environment, and nursing.

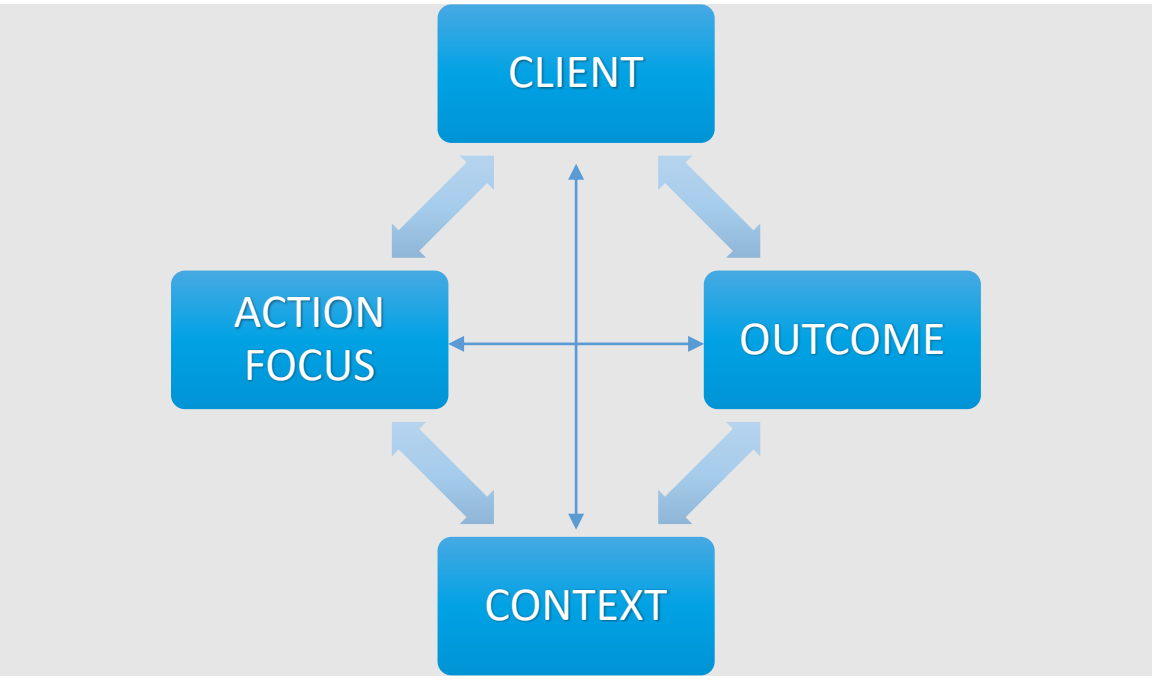


Figure 1.2: Diagrammatic representation of SROM constructs

1.10 RESEARCH METHODS

Research methodology is finding scientific solutions to solve research problems. Creswell (2014:31) describes research approaches as research plans and procedures that involve either a broad or detailed data collection methods, analysis, or interpretation. Creswell (2014) further exposited that research approach selection is basically determined by the nature of the research problem, the subject matter, research respondents including researcher's expertise. Three types of research approaches are commonly used in scientific inquiry which are quantitative, qualitative, and mixed methods. However, for the purpose of this study, a quantitative research approach was adopted to ensure generalization of the study inferences to the wider population of southwest Nigeria.

Mertler and Charles (2008:26) explain that quantitative approach is the process of gathering and analyzing numerical data to describe, explain, predict, or control phenomena of interest. Based on the research objectives, questions, and the hypotheses, a descriptive cross-sectional research design was used to assess nursing care costs of inpatients and outpatients wound dressing in three Nigerian teaching hospitals. The study was unfolded in three interwoven phases to capture the research purpose. The first two phases were examined via a quantitative approach while the phase dealing with the developments of a nursing care costing model was based on the evidence from the first two phases. A detailed research methodology was discussed in chapter three of this study as follows:

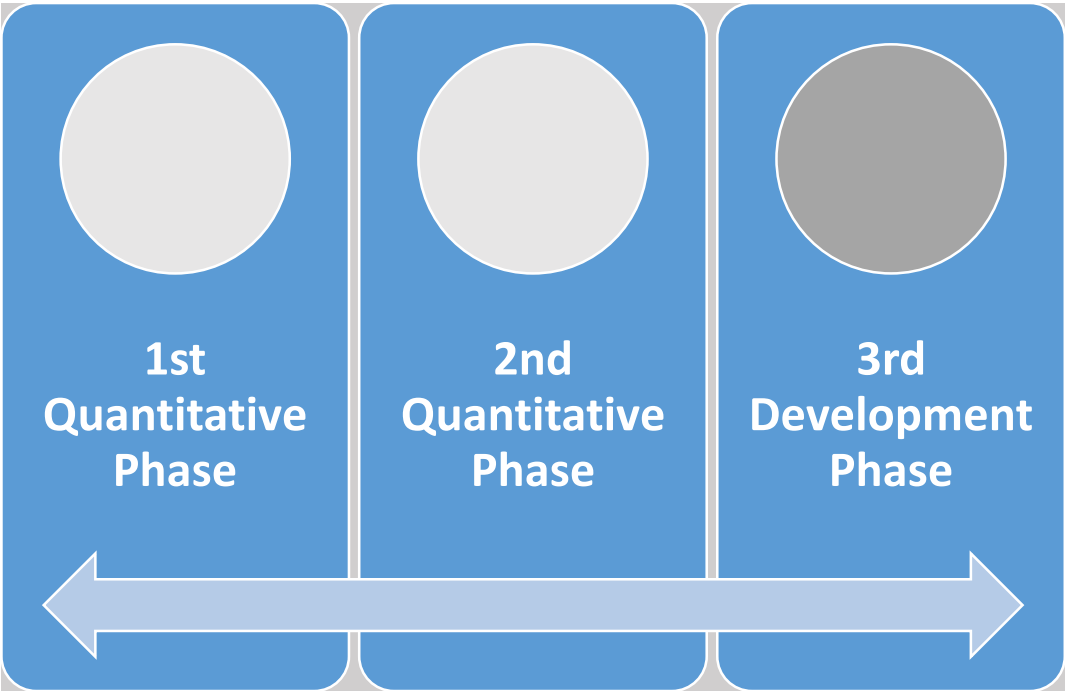


Figure 1.3: An illustration of the quantitative approach phases

1.10.1 Phase I: Inpatients cost of wound dressing

The first phase utilized a quantitative approach via a cross-sectional research design to investigate the nursing care costs on wound dressing among the hospitalized patients attending the selected teaching hospitals. All in-patients with wounds in the selected wards where wound dressing is carried out were involved in the study. The inclusion criteria focused on inpatients about to be discharged or already spent a minimum of four weeks on admission. The interview-administered questionnaire design was based on systematic literature review and the researcher' previous field experience.

1.10.2 Phase II: Outpatients cost of wound dressing

The second phase also employed the use of a quantitative approach via cross-sectional research design to investigate the nursing care costs of wound dressing materials and products used among the out-patients attending the out-patients clinics of the selected teaching hospitals. The inclusion criteria mainly focused on patients who are regular clinic attendees for at least four weeks regular clinic visits. The input into the research instruments were mainly from synthesis of relevant literature and the researcher' previous field experience.

1.10.3 Phase III: Model Development

A model is a framework that explains, describes and define relevant variables or propositions which are closely related to the phenomenon under study. Independent variables from the two quantitative studies in phase I and phase II were computed into the regression model analysis for parameter estimates and prediction of the costs of wound dressings and hospitalization in southwest Nigeria. The developed nursing care costing model will provide data that will facilitate the design of healthcare financing in southwest Nigeria.

1.11 SCOPE OF THE STUDY

This study was mainly carried out among hospitalized and out-patients with wounds in resource poor settings of Nigeria with the aim of developing a costing model to capture cost implications of wound dressing and hospitalization. The study site was delimited to selected teaching hospitals in southwest Nigeria and generalization of the study findings beyond the targeted population does not represent the financial outlook of providing continuous wound dressing and hospitalization in all care settings in Nigeria. However, the selected teaching hospitals are national reference centres for wound care, training, and research in Nigeria. The author opined that the findings could serve as a yardstick for costing wound dressing across the geo-political zones of Nigeria. Also, based on the template from the results of this present study, multi-centre studies can be carried out to validate the cost implications of providing wound dressing and hospitalization in resource limited settings of Nigeria.

1.12 STRUCTURE OF THE THESIS

The layout of the proposed thesis included the following chapters:

Chapter 1: Overview of the study

This chapter presents an overview of the entire study and discussed the introduction and background to the study, the purpose of the study, study objectives, research questions, hypotheses, research paradigm and theoretical framework. It explained the operational definitions of terms and provided brief insight into the research methodology and ethical considerations. It also covered the scope of the study, structure of the thesis and conclusion.

Chapter 2: Literature review

This chapter dealt with systematic literature review of relevant journal articles, books, and other available knowledge within and outside Nigeria about wound care and costs of wound dressing. Information was sourced via Google scholar, Google advanced search, PubMed and UNISA library repository. Variables of interest included costs of wound dressing, costs of dressing materials and products and cost of hospitalization. It also evaluated views of other researchers and results of previous studies on the subject under study.

Chapter 3: Research design and method

This chapter explained in detail the overall design of the research and specific methods employed in the study. It covers study setting, study population, sampling method, instruments for data collection, validity and reliability of the instruments, procedure for data collection, ethical considerations, and data analysis.

Chapter 4: Data analysis and interpretation (Phase I)

It deals with the data analysis, presentation, and description of the results from the first phase quantitative study. It also presented results of the relevant hypotheses testing.

Chapter 5: Data analysis and interpretation (Phase II)

It also deals with the data analysis, presentation, and description of the results from the second phase quantitative study.

Chapter 6: Phase III – Development of a model (Inpatients)

This chapter explored the development of a nursing care costing model for wound dressing among the hospitalized patients in Nigeria. This was based on evidence from phase I quantitative study in relation with relevant literatures. It also discussed the modelling cost of wound dressing in southwest Nigeria and the influence of various independent variables on the cost estimates of wound dressing. It discussed the implications of nursing education and practices as well as the limitations of the study.

Chapter 7: Phase III - Development of a model (Outpatients)

This chapter explored the development of the nursing care costing model for wound dressing among the outpatients in Nigeria. This was based on evidence from phase II quantitative study. It discussed the results presented in chapter 5 in relation with the relevant literature reviewed. It also discussed the modelling cost of wound dressing in southwest Nigeria and the influence of various independent variables on the cost estimates of wound dressing. It also discussed the implications of nursing education and practices as well as the limitations of the study.

Chapter 8: Conclusion, implications, and recommendations

This is the last chapter of the study, and it features conclusion, implications, and the recommendations of the study. It highlights the study implications to nursing education, practice, and research as well as the recommendations to nursing researchers, administrators and largely to national health insurance scheme (NHIS), health maintenance organizations (HMOs) and other stakeholders in healthcare financing.

1.13 CONCLUSION

In this chapter, an overview of the cost of wound dressing in developed countries such as the United Kingdom, United states, Australia as well as the cost expended on wound dressing in some developing countries such as India, Kenya, Ethiopia and down to Nigeria were presented. The statement of the problem was discussed which led to the development of the research purpose, objectives, and questions. With regards to research grounding, positivism and pragmatism paradigms were chosen to shape the quantitative research approach while System Research Organizing Model (SROM) was identified as a theoretical framework to capture both dependent and independent variables on cost implications of providing wound dressing and hospitalization in Nigeria. Also, the research design and methodology for the study indicating the study settings, instruments for data collection, validity, and reliability of the instruments as well as the procedure for data collection and data analysis were discussed. The next chapter deals with the literature review.

CHAPTER TWO
LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, the author reviewed relevant literature to understand similar work carried out by various researchers. The systematic review covers studies within and outside Nigeria and capture study objectives and questions. Information sources included journal articles in printed form and via Google scholar, Google advanced search, PubMed, UNISA library repository and textbooks. Variables of interest were cost of wound dressing, cost of dressing materials, products and consumables, and cost of hospitalization. Inferences on economic burden of wound care particularly wound dressing were drawn from study findings, data, and discussions. The thrust of this study was to estimate the nursing care cost component of wound care finances and to develop a nursing care costing model to capture cost implications of wound dressing and hospitalization particularly among patients with wounds attending teaching hospitals in resource constraint settings of southwest Nigeria.

2.2 SYSTEMATIC REVIEW

Systematic literature review enables the researcher to understand what the previous researchers on the topic or similar topics have examined, formulated and the gap that exists which is to be filled. It involves critiquing, analysis and evaluation of the previous researchers' thought, methodology, data, findings, and conclusions. In this study, the author investigated the nursing care cost component of wound care with emphasis on cost of wound dressing materials, product used and hospitalization with the goal of developing a costing model for wound dressing in Nigeria.

Considering the various independent and extraneous variables in this study, the researcher approached the review in a pyramidal sequence from what is currently known to the unknown. Furthermore, since data on nursing care cost of wound dressing is generally inadequate in developing countries including Nigeria, most of the points discussion started from studies conducted in high income (developed) countries to middle and low income (developing) countries with particular emphasis on Nigeria which is the study geographical area.

Figure 2.1: An illustration of systematic literature review

2.3 ECONOMIC BURDEN OF WOUND CARE: AN OVERVIEW

A wound is known to have physical, emotional, and financial consequences for the sufferer and the healthcare system around the world. It might be caused by physical or temperature factors, or it can develop because of an underlying medical problem (Builder & Oseni-Momodu 2017: 60). Depending on how long it takes for a wound to heal, it might be classed as acute or chronic (Ogundeji et al 2018:140). Acute wounds usually recover in six weeks or less, however chronic wounds might take up to a year to heal. Acute wounds also heal in the regular sequence of inflammatory, proliferative, and remodeling phases; however, chronic wounds are considerably stalled at the first inflammatory phase (Ogundeji et al., 2018:140; Ilesanmi & Ogundeji 2020:36: Munro, 2017: 88). Recently, healthcare researchers have begun to focus more on the global economic impact of wound dressing. Continuous wound dressing typically depletes healthcare resources and presents a challenge to patients, families, and wound care experts (Cho et al., 2020:2; Lowin et al., 2019:222).

Gray, Rhodes, Atkinson, Rothwell, Wilson, Dumville et al (2018:1) noted that wound care imposes substantial financial burden on the health system globally. According to the authors, findings revealed that an estimated population of 80,000 people in the United Kingdom are diagnosed of one type of complex wound or the other annually. In 2012-2013, Guest et al.

(2017b: 245); Guest, et al. (2017a:292) reported that the National Health Service (NHS) in the United Kingdom managed 2.2 million wounds and associated comorbidities at a cost of £5.3 billion, while another UK study revealed that chronic wound costs to the NHS accounted for about 4% of the total national health expenditure in that year (Guest, et al 2017a:292).

In addition, chronic wound management in the United States is estimated to cost around $37 billion per year, while chronic wound management in Wales is estimated to account for 55% of the total health spending (Delaplain & Joe 2018: 564). A retrospective research of 2014 Medicare chronic wound expenditures in the United States found that the greatest projected cost for outpatients was $9.9- $35.8 billion, whereas the highest estimated cost for inpatients was $5.0- $24.3 billion (Nussbaum, Carter, Fife, DaVanzo, Haught, Nusgart et al) (2017:1). Similarly, Lotz (2019:31) estimated that wound management in Denmark costs 7.7 million Euros per year.

Specific wound care components such as the cost of dressings, products, and hospitalization are frequently not estimated in most wound care cost studies. Extant studies, on the other hand, have revealed that where wound care cost analysis is performed, the cost of providing continuous wound dressing remains high. For example, according to a retrospective study conducted in the United States, wound dressing has the highest projected mean cost of $2884 for patients with diabetes-related wounds of all the operations. According to a study by Gray et al (2018:6), the average cost of a small size silver dressing alone in the UK is £32 for two dressing changes each week over a two-week period. According to Lindholm and Searle's (2016:8) study, 50% of wound treatment resources are used for hospitalization, 30-35% for nursing time, and 15% for dressing and materials. The authors found that dressing changes took up the majority of the nurses' time, and so concluded that the frequency of dressing changes is the key cost driver in wound treatment, with 3-4 dressing changes per week being the average.

Specifically, wound dressing remains a significant aspect of wound care and modern dressing materials have been advocated for wound dressing as against the traditional wound dressing materials (Jiang, Chen, Wang, Chen, 2017; Ogundeji et al 2018:144). Lowin et al., (2019:222). This however requires more finances on the part of the patients or their relatives

whereas economic burden of wound dressing is a major challenge among the indigenous people of Nigeria who are ultra-poor. Furthermore, wound dressing is an integral part of nursing services and require high nursing intensity Ilesanmi & Ogundeji, 2020: 44; Ogundeji et al., 2018:144). Ilesanmi & Ogundeji 2020: 42; Lotz (2019: 31; Ogundeji et al., 2017: 44) posited that wound care represents a larger proportion of what nurses do among inpatients and outpatients and studies have shown that the cost of daily dressing or alternate day dressing constitutes a significant proportion of the patients' care cost.

This implies that eliminating the cost of daily dressings, as well as other costs of care, can relieve the patient of the burden of wound management. The prevalence of infections, comorbidities, and the length of hospitalization all influence the daily or alternate day dressing necessary for continuous wound care. Tan et al. discovered an annual average hospitalization fee of 8,435 Singapore dollars per patient in 2012-2013 in Southeast Singapore (Tan et al 2016: 134). The expense of hospitalization in the United Kingdom has been estimated to be as high as £400 per day (Guest et al, 2017:292). Similarly, Ogundeji et al (2018:149) found that roughly 70% of patients spend between ₦30,000 (81.19US$) and 100,000 (270.63US$) on hospitalization with each acute care episode in a typical Nigeria teaching hospital. This suggests that interventions aimed at minimizing hospital stay and infection recurrence will have a higher impact on the expense of routine wound dressing.

Furthermore, because wound dressing entails a significant financial risk due to the intensive use of resources and expertise, nurses who are the primary wound dressing providers must improve their service delivery to ensure that patients receive the best care possible considering the high cost of healthcare. Tan et al. (2016:130) advocated for early wound treatment by regular wound screening by wound care experts, particularly in local settings. Unfortunately, in Nigeria, licensed wound care nurses are either insufficient or completely missing. There is no certification and license wound care training program for nurses in Nigeria, according to Ilesanmi & Ogundeji (2020:44); Ogundeji et al., (2018: 146). Wound dressing is done by all types of nurses at all levels of care in this regard. Wound treatment is now left in the hands of any category of nurse, which is typical of care settings in developing countries. This assumption is confirmed by Lotz's (2019:32) findings, which show that chronic wound care falls under the jurisdiction of nurses who aren't specifically trained

to manage wounds. In contrast, investigations have indicated that wound care is in the hands of certified and specialist wound care nurses in developed countries (Sen 2019:44; Brain et al 2019:2).

Consequently, following progressive literature review, it appears that there is complete dearth of data that specifically analyze the actual cost of wound dressing materials, products and hospitalization which are significant components of wound care protocol in Nigeria. A study that will examine nurses' contributions to wound care of both inpatients and outpatients is essential to provide a complete assessment of the cost of managing wounds in the tropical Africa. Furthermore, wound care costing data is essential to make decisions on the cost of wound dressing. Therefore, it is the interest of the researcher to examine the cost implications for providing wound dressing in resource poor settings of southwest Nigeria and the extent of health insurance coverage.

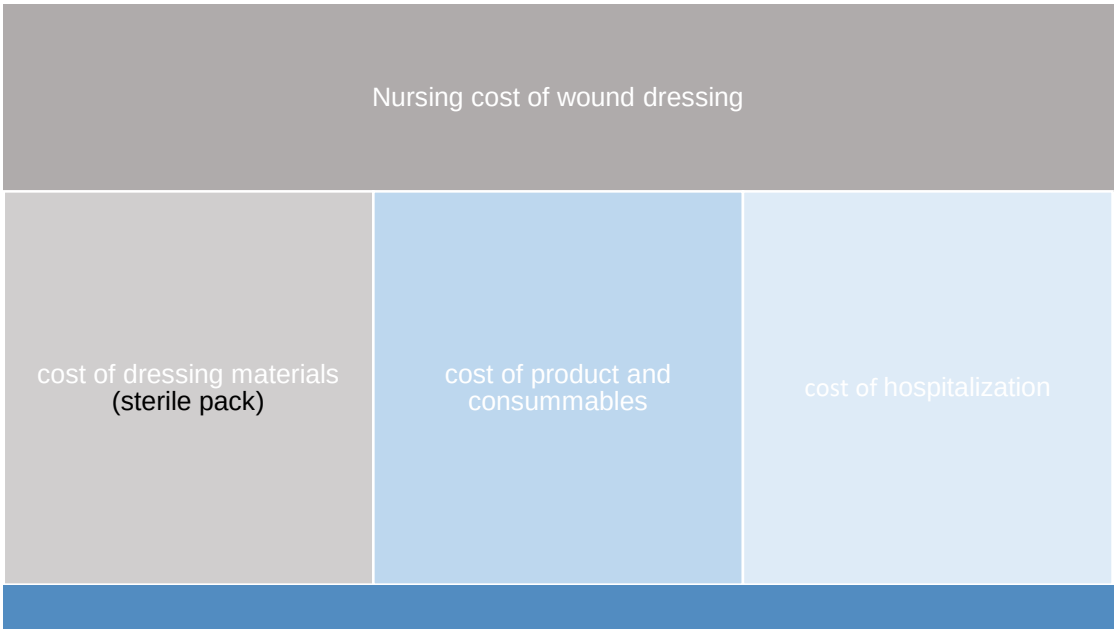


Figure 2.2: An illustration of cost implication of providing wound dressing

2.3.1 Wound type and cost of care

Acute wounds and chronic wounds are characterized based on the morphology of the wound and the amount of time it takes for it to heal. Acute wounds recover within six weeks if they follow the usual reparative process, however chronic wounds or non-healing wounds do not follow the regular healing process and take longer than six weeks to heal (Builder & Oseni-Momodu, 2017:60; Sen, 2019:40; Cho et al., 2020:1). The cost of wound care varies greatly depending on the type of wound. For example, according to Guest et al (2017:245), £194 billion was spent on treating 731,000 cases of leg ulcers (chronic wounds), while £896 million was spent on treating 87000 cases of burn injuries (acute wounds).

Guest et al (2017a: 292) conducted another UK retrospective cohort analysis for 2012/2013 NHS expenditure and found that 61% of wounds were acute wounds with an estimated cost management of £2.1 billion, while chronic wounds accounted for 39% of wounds with an estimated cost management of £3.2 billion. The cost of care per patient for acute wounds versus chronic wounds was also looked at in the same retrospective analysis. Acute wound costs range from £698 to £3998 per patient, while chronic wound costs range from £1719 to £5976 per patient (Guest et al 2017a: 292). In the 2017/2018 financial year, the NHS estimated the cost of wound management to be £8.3 billion, with £2.7 billion spent on acute wounds and £5.6 billion spent on chronic wounds, respectively (Guest, Fuller, & Vowden, 2020:1).

Most wound care studies, in general, do not mention the cost of various wound care resources, particularly nursing-related charges such as wound dressing materials, lotion, and other consumables, as well as the cost of hospitalization. The current study was designed to fill a gap in most investigations. Existing research, on the other hand, found that when wound care costs are properly documented, the costs of wound dressing materials, products, and nursing time remain high (Guest, 2017:292). The results of a retrospective cohort analysis of NHS expenditure for the 2012-2013 fiscal year revealed a range of costs spent on wound dressing products for wound care, including £1,203,896 on acute wounds (12%), £2,307,146 on chronic wounds (15%), £224,892 on unspecified wounds (12%), and £3,735,935 on all wounds (14%) (Guest et al 2017:245).

TABLE 2.1: ANNUAL COST EXPENDED ON ACUTE AND CHRONIC WOUNDS FROM 2012-2013 NHS EXPENDITURE

Type of wounds	Percentage (%)	Cost expended
Acute	12	£1,203,896
Chronic	15	£2,307,146
Unspecified	12	£224,892
All wounds	14	£3,735,935

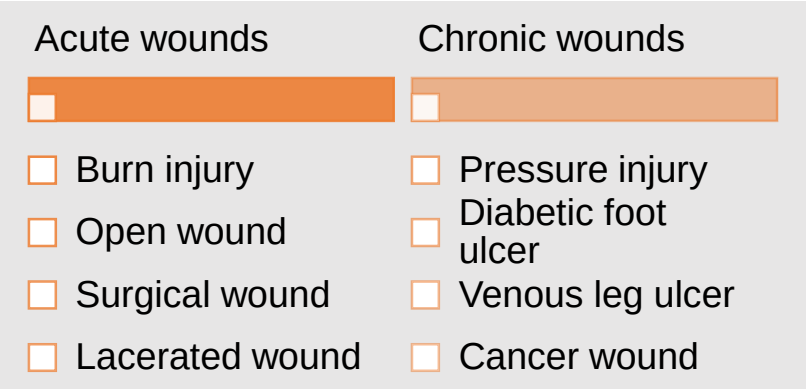
Source: Guest et al 2017

Wound care, on the other hand, is not regarded as a high priority healthcare need in most nations, especially when compared to communicable diseases, which are frequently regarded as life-threatening conditions (Tan et al 2016:130-131). Wound care costs have risen dramatically in recent years, and studies continue to forecast an increase in the cost of delivering wound care around the world. If the annual prevalence rises from 5.5% to 16.5% in the 2019-2020 fiscal year, Guest et al (2017a: 292) anticipated that the annual number of wounds and NHS costs would rise. According to the forecast, the number of wounds will rise from 16,200 to 32,600, with NHS costs rising from £35 million to £70.4 million (Guest et al 2017a: 292). In 2009, Guest et al. (2017b:245) estimated that treating chronic wounds cost the UK NHS between £2.5 billion and £3.1 billion per year, accounting for around 4% of the NHS budget. Furthermore, according to a 2013 research of NHS wound care costs, the cost of maintaining chronic wounds with associated comorbidities has climbed to between £4.5 billion and £5.1 billion per year (Guest et al.,2017:245; Guest, et al 2017a: 292).

In Nigeria, few research notably point to a geometric increase in the expense of wound dressing on a daily or alternate-day basis. For example, a Nigerian study reported by Lotz (2019: 32) claimed that an average of ₦500 (1.2USD) was required for wound dressing per week, but that most patients were unable to pay, and that in 2018, Ogundeji et al (2018: 149) found that patients required between ₦2000 and ₦3000 (4.86USD- 7.29USD) naira per week for wound dressing alone. The cost of wound dressing is also considered to be excessive for indigenous Nigerian families that are poor, and until a health insurance program is made

equally accessible to the poor, the cost of health care services would continue to rise, resulting in catastrophic household spending.

TABLE 2.2: AN ILLUSTRATION OF DIFFERENT TYPE OF WOUND



2.4 ACUTE WOUND AND COST OF CARE

Acute wounds necessitate a significant financial commitment due to the expense of wound dressing materials, products utilized, hospitalization, and expert services. According to Guest et al (2017a:292), the average cost of acute wound treatment per patient in the NHS in 2012-2013 was £2151. Burn injuries, surgical wounds, and lacerated wounds are all common acute wounds.

2.4.1 Cost implication of burn injury care

Burn injury is a life-threatening acute wound that puts a strain on the healthcare system (Botman, Beijneveld, Negenborn, Hendricks, Schoonmade, Mackie et al 2019:29). In high-income nations, the incidence, management, and result of burn wound care has significantly improved, however in middle- and low-income countries, burn injuries continue to pose substantial healthcare and economic issues with negative effects (Ibeanusi and Kejeh 2018: 29; Lowin et al., 2019: 223). Burn wound care is known to consume a significant amount of healthcare resources, leaving the family impoverished. According to Ibeanusi and Kejeh (2018:30), the inability of the patient or family to pay for burn injury care, even when it is accessible, is the leading cause of complication and mortality following acute burn injury in Sub-Saharan Africa.

Furthermore, the high cost of care for larger percentage burns has been attributed to multimodal therapy and a multidisciplinary approach to burn injury management. In the United Kingdom, Guest et al (2017a:292) stated that in the NHS budget for the year 2012/2013, £896 million was spent on the management of 87000 patients with burn injuries. However, in high-income countries, complications, and mortality from higher-percentage burns, which typically manifest with local and systemic reactions, have decreased dramatically, but in low- and middle-income countries, burn injury complications and death remain prevalent (Delaplain & Joe 2018: 562).

Moreover, this experience is largely due to one or all of the following factors; firstly, the economic situations in most of the underdeveloped and developing countries especially on the Africa continent: healthcare insurance coverage is not well organized in third world countries making out of pocket payment to be as high as over 90% (Ogundeji 2017:14; Aregbesola 2017: 43; Oreh 2017:159; Ogundeji et al 2018: 146; Cleopatra & Komolafe 2018:1; Aregbesola & Khan 2018b:798; Raheem et al 2019:2). Third- or fourth-degree burn requires intense and prompt management with high economic demand whereas resources are limited in these settings.

According to a Nigerian author, most patients who appear with wounds are members of the dependent community who are unable to afford wound treatment. Secondly, there is a lack of data and political will in low and middle-income countries when it comes to wound care management: Data on the financial burden of wound care, particularly among the elderly, is insufficient, implying that healthcare policymakers are unaware of the ramifications of catastrophic healthcare spending on the treatment, prognosis, and quality of life of patients with burn injuries or other types of wounds.

Thirdly, most burn injury treatment settings in impoverished countries lack highly skilled wound care nurses such as tissue viability nurses (Lotz 2019:32). Wound treatment, particularly burn damage care, is left to the authority of registered nurses who do not have any further wound care qualification (Ilesanmi & Ogundeji, 2020: 44; Lotz 2019:32). Despite the training program in burn and plastic nursing, the situation in Nigeria remains unchanged, given that burn and plastic nurses are woefully understaffed in most care settings, and all types of nurses are frequently involved in wound care (Ilesanmi & Ogundeji, 2020: 44,45; Ogundeji et al., 2018: 144). In the same vein, to the best of the author's knowledge, there

are no dedicated and recognized wound treatment centres in Nigeria, other than "burn care units" inside medical centres or teaching hospitals.

2.4.2 Cost implication of Surgical Wound Care

Open surgical wounds are widespread among patients with a variety of wound etiologies, and their treatment necessitates a significant amount of healthcare resources. With frequent nursing assessment and careful aseptic procedure, most surgical wounds healed by primary intention (Chettera, Oswald, McGinnisc, Stubbs, Arundel, Buckley et. al, 2019:70). In the United Kingdom, Guest et al. (2017:245) discovered that most surgical wounds heal by secondary intention, accounting for around 28% of surgical wounds requiring continued nursing care. Surgical wounds are said to be common all over the world: in South Africa, Lotz (2019:29) observed a 45 % prevalence of surgical wounds compared to other types of wounds. Similar studies in Nigeria, Denmark also reported high prevalence of surgical wounds. While there are several studies that have documented the occurrence and expense of surgical site infection (SSI), the cost of dressing and hospitalization is usually included in the medical or surgical procedure financial analysis (Ogundeji 2020: 1464; Ogundeji et al., 2017: 42).

2. 5 CHRONIC WOUND AND COST OF CARE

Chronic wounds impose high costs on healthcare systems and stresses the caregivers and the patients. It's also known to have an impact on a patient's social, emotional, and psychological well-being, lowering their quality of life (Cho et al., 2020:2; Munro, 2017:88). Researchers are paying more attention to studies on the expense of various types of chronic wounds. This is owing to a consistent rise in the cost of chronic wound care because of study results throughout the world. Although the majority of the known data comes from research done in high-income countries, there is a scarcity of data on the cost of chronic wound care in middle- and low-income countries. However, few studies also indicated a persistent rising in the costs of chronic wounds care among the developing countries.

The overall cost of management of chronic wounds in Singapore per year was about SGD 5.45 million with the cost of hospitalization alone amounting to SGD 274,000 in a retrospective study between January 2012 to December 2013 (Tan 2016: 133). In the same

study, differential cost of care of different type of chronic wounds were harnessed. The annual cost of ischemic ulcers, pressure injuries and diabetic foot ulcers amounted to SGD 0.43 million, SGD0.63 million and SGD 1.68 million respectively (Tan et al 2016: 130). Similarly, in 2014, the cost of managing chronic wound with the associated comorbidities ranges between $28.1 and $96.8 billion in the U.S Medicare expenditure (Cho et al., 2020:2). Chronic wounds are complex wounds which are difficult to manage and require huge financial input. They are the major drivers of prolong hospitalization, increased product used and continuous dressing choices (Guest et al 2017a:292). Generally, the common type of chronic wounds includes pressure injury, diabetic foot ulcer and venous leg ulcer with varying severity (Munro, 2017:89).

2.5.1 Cost implication of pressure injury care

Pressure injury (PI) is a prevalent kind of chronic wound that affects people all over the world. The ulcers are frequently seen on bony prominences and are graded or classed based on the extent of tissue destruction (Etafa et al 2018:2). PI has an impact on the patient's physical, mental, social, and emotional well-being, as well as posing a financial burden on the patient, family, and society (Dincer, Doger, Tas & Karakaya 2018: 488). High-risk categories, such as incontinent or malnourished individuals, have a higher prevalence of stage III or IV pressure ulcers. Several researchers have published a gross estimate of the financial implications of addressing pressure injuries, particularly stage III and IV.

Tan et al (2016:130) reported that an estimated amount of 0.63 million Singapore dollar was spent on the management of pressure injury alone in 2012-2013. Research published in the United States by Etafa et al (2018:1) found that $70–150 thousand was spent on the care of pressure injury per patient, with an annual cost of $9-11 billion. In the United Kingdom, Dealey et al & Bennett et al in Guest, et al, (2017:292) claimed that the cost of managing a grade IV pressure injury is ten times higher than the cost of managing a grade I pressure injury, and that complicated grade IV pressure injury is more expensive to treat than uncomplicated grade IV pressure injury by about £2. Consequently, the prevalence of pressure injury varies from one country to another and expectedly as discussed above cost also differ.

TABLE 2.3: PREVALENCE OF PRESSURE INJURY IN DIFFERENT COUNTRIES

Country	Pressure injury prevalence (%)
Norwegian	54
Sweden	25
Norway	17
Denmark	15
Jordan	12
Wale	8.9
Nigeria	3.22

Source: Etafa et al 2018

2.5.2 Cost implication of Diabetic foot ulcer care

Diabetic foot ulcers (DFU) are a common type of chronic wound which drains healthcare resources. According to Akaa, Ahachi, Kortor, Mue, Elachi, Ogiator et al (2017:2) the incidence of DFU is around 12-15% worldwide of all patients with diabetes mellitus while the prevalence in Nigeria is estimated to be between 0.9 – 8.3%. Ugwu, Adeleye, Gezawa, Okpe, Enamino, Ezeani (2019:200) remarked that while the incidence, management, and outcome of DFU has significantly improved in most Western countries, DFU remains a potentially life-threatening condition of diabetes mellitus in Sub-Saharan Africa, with Nigeria bearing the heaviest burden. According to Danmusa, Terhile, Nasir, Ahmed, Muhammed (2016: 223), 40% of the patients with DFU fall under stage IV category.

DFU is a complication of diabetes mellitus which is why some don't see it as a separate clinical condition (Akaa et al 2017:2; Anumah, Mshelia-Reng, Abubakar, Sough, Asudo, Jamda et al 2017:17). Hyperglycemia is known to complicate many incidences of foot ulcers which often lead to amputation. Thus, the cost implication of DFU treatment is reportedly high. In Singapore, the cost of treating a diabetic foot ulcer alone was projected to be SGD 1.68 million in 2012-2013 (Tan et al 2016:130). Guest et al (2017:292) estimated the comparable cost of controlling DFU to be $10,604 in a UK study. According to the authors, the total cost of DFU in Canada over three years is projected to be C$52,360. In Nigeria,

properly managing diabetic foot ulcers (DFU) stages IV, III, and II needed an estimated sum of 1808 US$, 1104 US$, and 556 US$, respectively (Danmusa et al 2016:219).

2.5.3 Cost implication of venous leg ulcers care

This is a chronic leg ulcer which required huge financial commitment and varied wound care expertise to manage. VLU is known to stretch the healthcare system and drain the patient and family finances especially where there is lack of healthcare insurance coverage. Like other chronic wound types, studies carried out in UK, U.S, Australia and other high-income countries have reported escalating costs of managing diagnosis of venous leg ulcers and undiagnosed leg ulcers. In the UK for instance, Guest, Fuller & Vowden, (2018:29) in a retrospective study on 2015/2016 estimated NHS prices for the management of chronic wounds reported that £7600 was spent per VLU over the 12-month period. Also, Tan et al (2016:130) reported an estimated cost of managing ischemic ulcers in Singapore between 2012 and 2013 to be SGD 0.43 million.

Similarly, in 2012-2013, £1·94 billion was reportedly spent on managing 731,000 cases of leg ulcers in the UK (Guest et al 2017a:292) while another UK retrospective study by Guest et al (2017:245b) observed that in 2012/2013, out of 2.2 million wounds and associated comorbidities managed by the NHS with an estimated cost of £5.3 billion, venous leg ulcers covers a total of 278,000 while the cost of management with associated comorbidities was £941.1 million. Also, an Australia study by Cheng et al (2018:1) underlines that 8,106 Australia dollar (AUD) was spent on the treatment of venous leg ulcer in 2012-2013. Moreover, Guest et al., (2017:292) reported that incremental cost of managing venous leg ulcer (VLU) was estimated to be $6,391-$7,086 in the United States.

2.5.4 Cost implication of cancer wounds

Wound resulting from neoplastic disorders require considerable nursing intensity, large proportion of wound dressing materials, product, consumables, and length of hospital stay. Thus, nursing care input in cancer care is enormous. Generally, the cost estimate of providing wound care and hospitalization to patients living with cancer is poorly tracked by most researchers. Therefore, data in this area of cost of wound care is grossly inadequate

to give empirical view of the cost of management of neoplastic disorder. This is in tandem with a Nigerian study by Ogundeji et al (2018:152) which underlines those costs of cancer wound care are often not estimated in most wound care cost calculations. This is a pointer for future studies on cost of managing various cancer wounds.

Figure 2.3: An illustration of the type of chronic wounds

2.6 EXTRINSIC FACTORS AFFECTING COST OF WOUND CARE

2.6.1 Patient acuity/comorbidities/infection

Patient acuity rating or severity of the condition can affect the frequency of dressing changes and length of hospitalization. Obviously, studies have associated the rising cost of wound care to cost expended on repeated dressing changes (Cheng et al 2018:1; Ogundeji et al 2018: 152). Studies conducted in Nigeria and Kenya consistently reported that patients who required wound dressing received at least three dressing changes per week (Builders & Oseni-Momodu 2018:16; Odhiambo, Omondi & Magak 2019: 34). Also, in UK and Denmark,

dressing changes are done on the average of three times per week (Lindholm & Searle 2016:6).

Furthermore, continuous dressing changes due to presence of infection, comorbidities influence, and the length of hospital stay. Increased cost of hospitalization due to patient wound severity, infection and comorbidities has been reported to contribute a major financial threat to the patient and family. For instance, in Singapore, Tan et al (2016:134) revealed an annual average hospitalization fee of over 8,000 Singapore dollars. Similarly, in Nigeria, Ogundeji et al (2018:149) revealed that about 70% of the study participants required between ₦30,000 and ₦100,000 to complete the hospitalization fees per acute care episodes. The implication is that effort targeted at reducing the rate of infection, treatment of underlying pathology and comorbidities will have far-reaching effect on the rate of dressing changes and length of hospitalization.

2.6.2 Staff certification and expertise

Literature is replete with the effort of specialized wound care nurses to improve the care of patients with chronic wounds and reduce the financial burden in developed countries of the world (Guest et al., 2017a:292; Sen 2019:44; Brain et al., 2019:2). Conversely, in most developing countries including Nigeria, certified wound care nurses are conspicuously inadequate or unavailable. Ilesanmi and Ogundeji, (2020:44); Ogundeji et al., 2018: 146 posited that there is no specialized and licensure training programme on wound care for nurses in Nigeria. This implies that all categories of nurses are involved in wound care in Nigeria and expertise is questionable, yet the patients pay out of the scarce resources. This development is a common challenge across the developing countries and call for concern within the healthcare system (Lotz 2019:32). Furthermore, to the best of the author's knowledge, apart from "burn unit" which is often domicile in medical centres teaching hospitals, there is no designated wound care centres in Nigeria.

2.7 SOCIO-DEMOGRAPHIC CORRELATES OF COST OF WOUND CARE

2.7.1 Age

Danmusa et al (2016: 219), Guest, et al, (2017:292); Guest et al, (2018: 29) associated the escalating cost of wound care to advancing age. The rising population of the elderly presenting for wound care has also resulted into escalating costs of wound care across the globe (Cheng et al 2018:1; Narwade et al 2019: 2070). A Nigerian study by Rahman et al in Ogundeji et al (2018:141) revealed that the statistics of patients presenting with wounds in Nigeria health facilities show higher ages from 60 years and above. Similarly, a study conducted in Northern Nigeria by Danmusa et al (2016:225,226) revealed that prevalence of diabetic foot ulcer is common among individuals aged 50 and above.

Also, Ilesanmi & Fatiregun in Ogundeji et al (2018: 145) reported that the overall mean cost of care of inpatients surgical wounds is higher for patients who are 40 years and above. This increased cost of wound care among the aged population may not be unconnected with comorbidities such as diabetes, hypertension as well as overwhelming infections emanating from debilitating body immune system (Nussbaum 2017:1). This is consistent with Guest et al's (2017: 292a) retrospective cohort study which revealed that younger patients had acute wounds while elderly patients had chronic wounds with more comorbidities.

2.7.2 Gender

Gender disparities in wound healing rates and types are rarely reported in research findings. In addition, demographic data from research reveals that the sex index of wound occurrence varies by geographical area. For instance, a study conducted by Tan et al (2016:133) shows a large proportion of female patients (51.1%) while a study conducted by Ogundeji et al (2018:150) shows a large proportion of male patients (64.7%). The disparities might be attributable to a variety of factors, including Nigeria's geographical location and socioeconomic contrasts with Singapore (Builders & Oseni-Momodu 2018:14). Secondly, there are methodological differences: the Singapore study was retrospective, so some data may have been lost, but the Nigeria study was a cross-sectional study that collected data through interviewer administered questionnaires. Nonetheless, the gender disparities in patients with wounds have not been thoroughly investigated (Anumah et al 2017:17). Furthermore, the author believes that in an indigenous African culture, several male-dominated industries such as industrial labour, driving, and construction work may put men

at risk of injury-related wounds that require hospitalization or treatment on an outpatient basis (Danmusa et al 2016: 224).

2.7.3 Education

The educational influence on wound aetiology, care cost and rate of healing is poorly understood. Research studies often do not report effects of educational attainment on causes, ability to pay and length of hospitalization among patients with wounds. Recent studies however associated unemployment and underemployment with poor monthly salary to inability to cope with required healthcare finances. For instance, in southwest Nigeria, Odusan et al (2017:102) and Ogundeji et al (2018:149) argued that most of the patients with wounds in typical Nigeria teaching hospitals are poorly remunerated despite that over 50% have tertiary education (Ogundeji et al 2018:149) and could not meet the financial requirement of successful wound care.

2.7.4 Occupation

Occupation related to the use of machinery; travels can pose risk of injuries to the individuals. Studies which examine the aetiology and epidemiological data of wounds have become standard. Most wounds are said to be related to traumatic, underlying clinical condition or surgical procedure (Tan et al 2016: 130).

2.7.5 Family Income

The financial implication of successful wound care in low- and middle-income countries where insurance coverage is not well organized is enormous. Several studies have reported catastrophic household expenditure resulting from unending healthcare finances (Karimo et al 2017:25; Ogundeji 2017:17; Cleopatra & Komolafe 2018:1; Ogundeji et al 2018:144). In Nigeria, out of pocket payment remains the highest means of settling healthcare bills with negative effects on family finances (Ogundeji 2017:14; Aregbesola 2017: 43; Aregbesola & Khan 2018b: 798; Ogundeji et al 2018: 146; Cleopatra & Komolafe 2018:1; Raheem et al 2019:2). More importantly, existing research has demonstrated that most patients who are hospitalized or require regular clinic visits for wound dressing are financially reliant and unable to pay for their wound care (Lotz 2019: 32). According to a few Nigerian studies, this population is either underpaid or unemployed, and their monthly income is insufficient to

meet their family's needs and healthcare expenses (Odusan et al 2017:102; Ogundeji 2018: 149).

2.7.6 Family size

The effect of protracted household healthcare expenditure on family size could be enormous. Indigenous family in developing countries like Nigeria could find it difficult to cope with combining wound care expenses with meeting daily family needs like dairy products and other essential food supplies. Sadly, the funds necessary for the upkeep of the family is often being substituted for provision of wound dressing materials, lotion, consumables, and hospitalization (Oreh 2017:160; Aregbesola & Khan 2018b: 798). It is noted that the situation can worsen where there is large family size, and the victim is a family head or the bread winner. A similar Nigerian study by Ogundeji et al (2018:150) reported that 68.3% of the families in their study have a family size between five to ten and this has a ripple effect on the family income and healthcare expenses.

2.8 HEALTHCARE FINANCING IN NIGERIA

Nigeria, like other developing nations, has a wide range of healthcare finance options. Internally produced income in the form of taxpayers' money, foreign funding (World Bank, International Monetary Fund, USAID), out-of-pocket payments, private health insurance, and public health insurance are the most popular forms of healthcare financing in Nigeria (Grace et al 2017; Adamu 2019:1). According to several authors, out-of-pocket payments are the most common means of paying healthcare services in Nigeria, followed by state and private health insurance plans. In essence, while funds raised from taxes and other external sources may be used to build healthcare infrastructure and combat widespread epidemics such as Lassa fever, Ebola hemorrhagic fever, or pandemic disease outbreaks such as the coronavirus, direct healthcare financing is typically provided through out-of-pocket payments or private/public health insurance schemes.

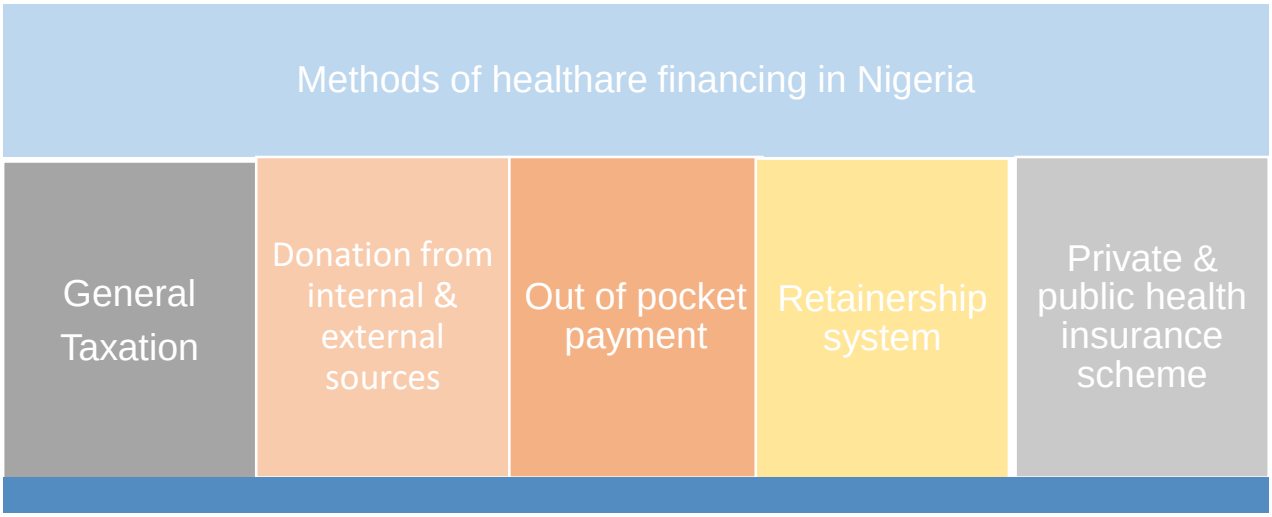


Figure 2.4: An illustration of methods of healthcare financing in Nigeria

2.8.1 Taxation and Nigeria healthcare financing

General taxation is a financial obligation from the citizen to the government for the provision of common services for all citizens. Taxpayers' money apart from social services and physical structural development is also used for health facility development such as building of hospitals, laboratories and purchase of hospital machines and equipment. The fund is also harnessed for training of medical personnel. The sources of taxation may include value added tax (VAT), income tax, pay as you earn (PAYE). In Nigeria, tax is levied by federal, state, and local government. Furthermore, tax ratio is often crippling in most developing countries. An event which affects healthcare finances in those countries.

In Nigeria, higher tax revenue is predominantly from import and export taxes including tax from sales while lower tax revenue is linked to taxes from income and business transactions (Akinbile 2016:47). One study opined that crippling tax revenue in developing countries is insufficient and unreliable to finance the healthcare sector. In addition, budgetary allocation from tax revenue is often disproportional to the actual fund disbursement resulting into insufficient fund availability for healthcare programme and services. Akinbile 2016:48) posited that tax revenues are targeted at financing various socioeconomic unit. In essence, such critical unit of the economy like the agricultural sector compete favorably with the health sector which also affect the allocation of the limited tax revenue.

2.8.2 Healthcare funding from external sources

Financial aids from international organizations are also a method of healthcare financing in Nigeria. Donation in the form of grants from international organizations such as the United Nation (UN), World Health Organization (WHO), International Monetary Fund (IMF), World Bank (WB) are common funds to tackle epidemic and pandemic diseases in most developing countries. A close example is the Nigerian presidential task force (PTF) on COVID-19/UN basket fund on COVID-19 to tackle the health and economic challenges imposed by the coronavirus infectious disease. Another source is in the form of loans from those national and international financial institutions. This also depends on the country's debt servicing plan after the moratorium period. Unfortunately, developing countries, Nigeria inclusive lacks the political will of adequate loan repayment plan. Furthermore, donations from individual, family, corporate organizations, religious bodies are also common in recent healthcare challenges globally.

2.8.3 Healthcare financing via Out of pocket (OOP) payment

Several Nigerian studies continue to report that out-of-pocket payment or user fee is the common means of settling healthcare expenses in Nigeria (Ogundeji, 2017:14; Aregbesola 2017; Aregbesola & Khan 2018b:798; Adamu 2019:1). The incidence is as high as over 90% among the low-income earners especially in the suburb and the rural communities (Ogundeji 2017:14; Oreh 2017:159; Aregbesola & Khan 2017; Aregbesola & Khan 2018b:798). The Nigerian indigenous population are mostly self-employed individuals categorized under the informal sector and are not usually enrolled in the formal sector social health insurance scheme (Aregbesola & Khan, 2018a). Out-of-pocket payment is arguably the fore runner of catastrophic healthcare expenditure. A Nigerian study by Rahman et al underlined that most of the patients who are hospital visitors for treatment of chronic wounds are mostly dependent population and are incapacitated in settling the medical bill.

The impact of OOP on indigenous families in underserved communities is tremendous. Individuals and families have suffered psychological and emotional anguish because of unending medical bill settlements coming from chronic diseases. Some chronic wound patients are said to have sold family homes to cover medical expenditures, which has severely harmed their quality of life. Furthermore, healthcare indices are a major

performance measure of a country's growth and development, and ongoing out-of-pocket payments in areas where insurance coverage is abysmally low contributes to rising newborn and maternal death rates.

2.8.4 Retainership health management system

Healthcare financing through retainership was common among organized private organizations in developing countries. In Nigeria, the system is practiced between the corporate organizations and private health care providers. In retainership system, the management of organized private companies usually make arrangements with private hospitals for health care coverage for their staff. The medical bills are forwarded to the company's top manager for reimbursement from the specific health care providers monthly or quarterly. It is worthy of note that retainership system of health care coverage and financing is becoming uncommon due to increasing number of private and public social health insurance scheme across developing countries. Also, major drawbacks of the retainership system are that the organization employees and their relatives can only access health care in a limited health care facility and within the geographical area where the corporate organization is located. This challenge is not associated with the current health insurance scheme therefore, the private and public health insurance scheme have taken the central stage.

2.8.5 National health insurance scheme (NHIS)

The national health insurance scheme (NHIS) is a type of health insurance that has been adopted by various African countries. The initiative attempts to safeguard citizens from out-of-pocket healthcare costs, which have plagued the region for years (Ogundeji 2017:15; Ogundeji & Adeyemo, 2020: 1). Ghana, Kenya, Nigeria, and Rwanda are all familiar with NHIS (Ogundeji 2017:14). According to Ele et al (2016:3) and Akinbile (2016:16), the Nigerian National Health Insurance Scheme (NHIS) was first launched in 1962 and underwent several modifications by successive Nigerian governments until 2005, when it was finally launched under Act 35 of 1999 (Ogundeji 2017:14; Anyebe, Lawal, Igbinlade, and Bolaji 2018: 12; Aregbesola & Khan 2018: 12).

The scheme, like those in other developing countries, entails risk sharing among the participants. It's also a method of prepayment from a fund set up for healthcare funding. The

cost of the premium is split between the employers and the employees (Grace et al 2017:2; Anyebe et al 2018: 11). Currently, there appears to be a political push in Nigeria for the adopted health insurance model, with legislators considering upgrading the program to a national health insurance commission in order to broaden the scheme's scope, articulate the program's relevance, and wield more political and budgetary power. However, it must also be borne in mind that the Nigerian government has not implemented the 2001 Abuja declaration where it was agreed that countries should spend 15% of their annual budget on the health sector (Oreh 2017:160).

Furthermore, while the formal sector social health insurance program is mandatory, the informal sector social health insurance program, which covers most Nigerians, is now voluntary. Several Nigerian writers have argued for a mandatory social health insurance program for both the formal and informal sectors of the Nigerian social system and strengthening political will in this direction would be a positive and brave move forward for Nigerian lawmakers and executives (Oreh 2017:160). Furthermore, Nigerian state governments are speeding up processes to guarantee that more individuals, particularly governmental workers, are enrolled in the system (Oreh 2017: 160; Ogundeji et al., 2018:146).

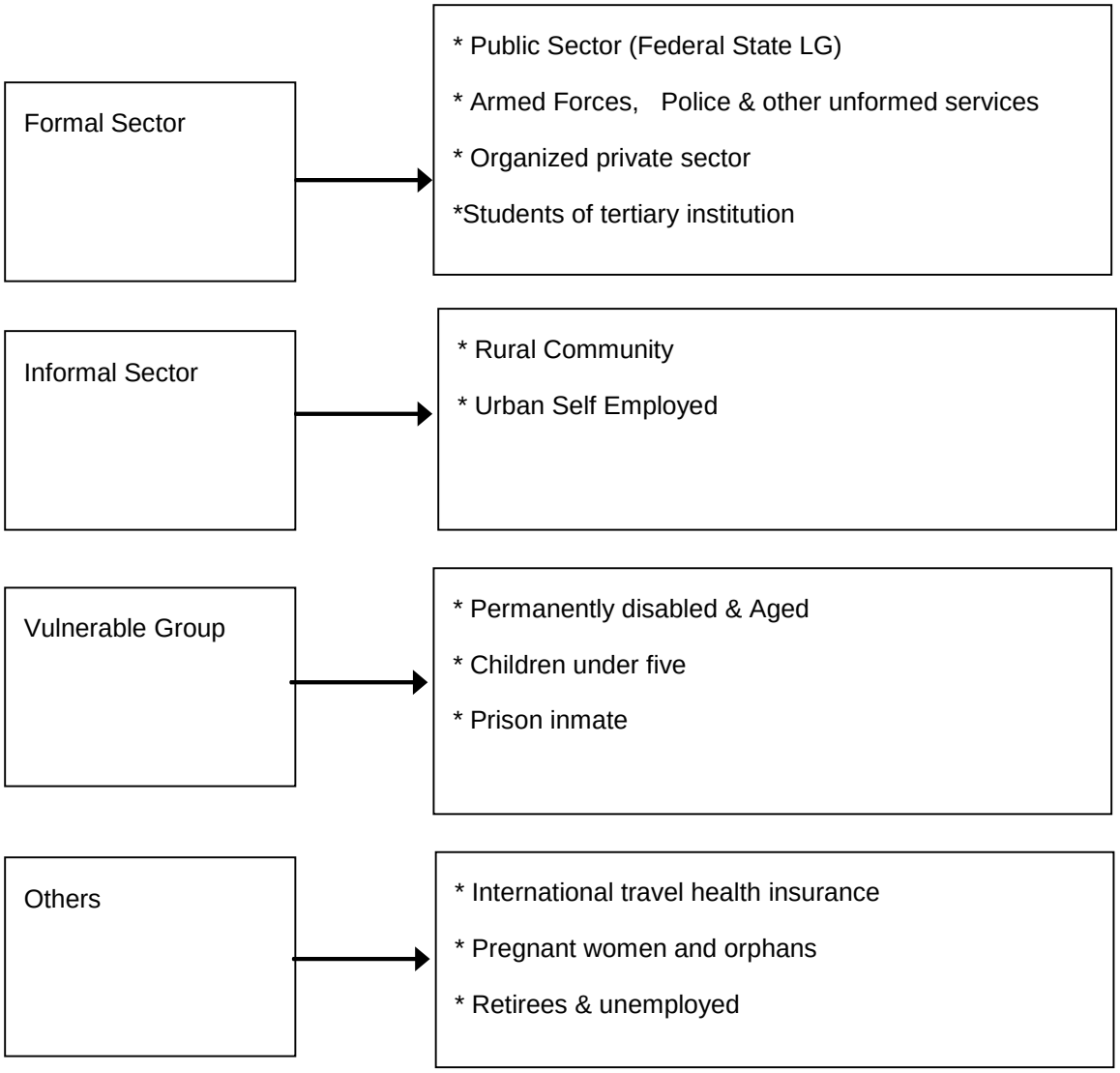
Nonetheless, NHIS seems to have operational and administrative complexity (Ele et al 2016:2). The NHIS as government health agency under the Federal Ministry of Health (FMOH) operates as a regulatory body in relation with the health maintenance organizations (HMOs) and the health care providers (HCPs) (Aregbesola & Khan 2018b:1017), thus, public-private-partnership (PPP) soon emerged (Ogundeji 2017: 14,16). Studies have also dissected the various conundrum inherent in NHIS duo and researchers have not fully covered the political, economic, and bureaucratic pavilion in the NHIS as government agency.

Moreover, NHIS is optimized to cater for the Nigerian social system and since inception the scheme has rolled out various social health insurance programmes which included formal sector social health insurance programmes (FSSHIP), the informal sector social health insurance programmes (ISSHIP), vulnerable groups and others (Ogundeji et al., 2020; Ogundeji 2017:14; Anyebe 2018: 12). Summarily, the formal sector social health insurance programme (FSSHIP) targeted the public sector (government workers), organized private

sector, the military and paramilitary as well as the students in higher institutions. The informal sector captured the rural community and urban self-employed while the vulnerable scheme is for permanently disabled, children under 5 years of age and prison inmates.

The coverage of the social health insurance scheme also extends to the cohort of foreigners, pregnant women, orphans, retirees and the unemployed in the society (Akinbile 2016: 29; Ogundeji 2017:14-15). The NHIS objectives and programmes is laudable and if they are tenaciously implemented, it will go a long way in changing the narrative of the health indices in Nigeria. However, the formal sector social health insurance programme appears to have captured the policy makers' attention than the other sectors of the social health security. This observation is mainly pitched because the formal sector scheme has been running since inception of the NHIS while the informal sector scheme was latent until a decade ago. It is worth noting that till to date, NHIS has not covered most aspects of the planned social health insurance in Nigeria (Oreh 2017: 159; Aregbesola & Khan 2018b:1016).

TABLE 2.4: THE STRUCTURE OF NIGERIA NHIS



***Source**:* Akinbile 2016:28

2.8.5.1 Formal sector social health insurance programme (FSSHIP)

The formal sector social health insurance programme captured the government of Nigeria workers in various government agencies, parastatals, ministries, and commissions including organized private sector (Ogundeji 2017:14; Adamu, 2019). The FSSHIP is made compulsory for government workers (Ele et al 2016:3; Aregbesola & Khan 2018:1016). Significantly, the insurance prepayment contribution is 10% of government contribution (employer) and 5% of the enrollee basic salary (employee) cumulative to 15% (Anyebe 2018:12; Grace et al 2017:2; Aregbesola & Khan 2018:1016).

However, a different perspective on the health insurance charges deduction was reported by Asoka in Akinbile (2016:36). According to the report, the Nigeria Labour Congress (NLC) disputed the scheme's 5% withdrawal straight from employees' basic income, claiming that they were not informed about the scheme's policy design, as well as concerns about low worker remuneration in general. As a result, the author emphasizes that the program began with only a 10% government investment and no employee participation from the beginning. Prior to the coronavirus pandemic, which shook the global economy and had a particularly high impact on Sub-Saharan African countries, the Nigerian minimum wage was raised to ₦30,000. However, there is no evidence that suggests an incremental rate of workers insurance charges or, at the very least, a revamping of the initial 5% deduction.

Interestingly, despite the discussion about the 5% deduction and the minimum pay for workers, the NHIS plan in the formal sector still covers the primary enrollee, spouse, and four children under the age of 18 years (Ogundeji & Adeyemo, 2020:3; Ogundeji et al., 2020:1112. Ogundeji 2017:15; Ogundeji et al., 2018:144; Ogundeji & Adeyemo, 2020:3; Ogundeji et al., 2020:1112). One inciting perspective to the NLC argument could relate to loss of confidence on whether NHIS will deliver or not. This notion is deemed as closely tied to the failure of sister programs that were brushed under the rug despite public financial commitment. The proponents and actors of the NHIS would have to prove their mettle to win the hearts of the populace, after which the NLC and companions may ignominiously accept the 5% charges and join the anti-"cash-and-carry" health-care funding fight in Nigeria.

It's also worth noting that the insured person has access to both government-owned and privately-owned health-care institutions across the federation (Anyebe 2018:12; Ogundeji & Adeyemo, 2020:3; Ogundeji et al., 2020:1112). In certain sectors, the FSSHIP premium is described as silver or basic insurance, implying that it can cover basic medical requirements for the ordinary Nigerian. In other words, the system covers everything from fundamental hospital needs to more advanced healthcare needs, such as consultations, admissions, laboratory examinations, medications, and surgeries including cesarean sections (Ogundeji &Adeyemo, 2020:3; Ogundeji et al., 2020:1112). Overall, the plan has served as a brake on some of the country's health issues, such as rising newborn and maternal mortality (Grace et al 2017:2). Despite the fact that the project faces several obstacles, it is a worthwhile undertaking and a step towards achieving the Sustainable Development Goals (SDG).

2.8.5.2 Informal sector social health insurance programme (ISSHIP)

The informal sector social health insurance programme is organized to cater for the informal sector of the Nigeria social system. The scheme covers non salary earners, government retirees and others who are not enrolled in the formal sector scheme (Ogundeji 2017:14). Specifically, according to NHIS operational guidelines 2012, the participants include viable Nigerian men and women with small scale businesses (staff strength of less than ten), active self-employed Nigerian's who are not captured under the formal sector social health insurance scheme, retired government officials, dependents who were formally registered under the formal sector (children now over 18 years old), foreigners or expatriates working in Nigeria, people with temporal residency status in Nigeria and Nigeria in Diaspora (Ogundeji 2017:15). It is the much-needed social health insurance scheme among the illiterate and rural dwellers. Unfortunately, a Nigerian study by Ogundeji et al (2018: 152; 2020:1112) underlines that the awareness of the low-income friendly health insurance programme is abysmally low among the targeted population. The classical type of ISSHIP is the voluntary contribution social health insurance programme (VCSHIP).

2.8.5.2.1 Voluntary contribution social health insurance programme (VCSHIP)

The voluntary contribution social health insurance programme is an NHIS programme under the informal sector social health insurance programme (Ogundeji 2017:14). The scheme covers all persons who are not enrolled under the formal sector programme including those who were initially enrolled in the formal sector arrangement but no longer a registered member. Such individuals are the government retirees, children now over 18 years old. The VCSHIP is also a prepayment insurance scheme which allocates a proportion of pool resources contributed by the insured members to cater for the healthcare requirement of the members (Ogundeji 2017:15). The enrollee can also access public and private health facilities and the benefits cover from simple registration fee to more intricate requirement for surgical interventions such as the cesarean section.

Importantly, the VCSHIP requires payment of N15, 000 as premium by the enrolled members (Ogundeji 2017:15; Ogundeji 2020:1112). Unlike the formal sector social health insurance scheme where the scheme covers the enrollee with the spouse and four children till retirement, VCSHIP premium only covers for 12 calendar months after which the individual is expected to make another payment for continuity of care. Also, it does not cover the entire

family members (Ogundeji 2017:15). The fact that the VCSHIP does not cover the entire household has divided scholars' opinion on the benefit of the scheme as compared to the traditional out of pocket payment.

Furthermore, experts' views differ on the feasibility of ultra-poor indigenous Nigerian families to pay the VCSHIP premium for each family member (Ogundeji 2017:15; Grace et al 2017:2; Aregbesola & Khan 2018b:1016). According to Aregbesola and Khan (2017), more than 70% of Nigerians live on less than $1.25 a day. Furthermore, while much has been said about the poor's inability to pay the enrolling cost, the rate of withdrawal from the private insurance program needed to be examined more closely. This is especially true in nations like Uganda, where there is no public health-care system. In Uganda, Nshakira-Rukundo et al (2019:594) found that in prior years, the rate of dropping out of the existing health insurance program was high. Many Nigerian authors, on the other hand, have not considered this possibility.

Furthermore, public education on the system has proven to be a struggle (Anyebe et al 2018: 11). Most underprivileged populations are either ignorant of the program or have been misinformed about its benefits (Ogundeji 2017:16; Aregbesola & Khan 2018:1016). In a survey conducted in Abakaliki, Southeast Nigeria, Azuogu and Eze (2018:1) found that 28.7% of craftsmen were aware of the issue. Azuogu & Eze's (2018:7) findings also suggest that public awareness rises with higher levels of education, although enrolment remains low. According to the survey, NHIS knowledge has grown by more than 70% among those with a secondary or university degree.

Extant Nigerian studies have also linked low public subscriptions to health staff' lack of understanding of the scheme's operation and principles (Akinbile 2016:21; Grace et al 2017). According to a survey conducted by Anyebe et al (2018:11) among health professionals in Zaria, Kaduna State, Nigeria, health workers are completely aware of the NHIS (100%) but are dissatisfied with the scheme's module-opererandi, believing that the scheme's coverage is overly sectionalized.

According to Nigerian research by Ogundeji (2017:16), nurses, who are major stakeholders in healthcare institutions, have not been actively involved in the scheme's implementation. Again, a study in Southeast Nigeria by Ndi claimed that nurses' participation in the NHIS program was as low as 64%, while another study in North Central Nigeria by Lar et al in Ogundeji (2017:16) claimed that nurses' awareness and participation in the NHIS program

were respectively 67 percent and 78 percent. In addition, Anyebe et al (2018:18) found that 62.2 percent of nurses participated in the NHIS program. Despite the expansion of nursing programs across the federation, nurses' complete involvement in the NHIS program remains shockingly low (Ogundeji et al., 2020:1112). Nonetheless, the system has been seen to be extremely beneficial to people who have joined, and it is a viable solution to Nigeria's primary health care (PHC) concerns (Ogundeji 2017:15).

TABLE 2.5: CLASSIFICATION OF NIGERIA NHIS PROGRAMMES

NHIS programmes and segmentation of the Nigerian population Formal Sector	Public sector (Federal, State and Local Government) social health insurance scheme
Armed forces, police, and other uniformed services social health insurance scheme	
Organized private sector social health insurance scheme	
Students of Tertiary institutions social health insurance programme (TISHIP) and voluntary participants social health insurance scheme	
Informal sector	Rural community social health insurance scheme (RCSHIS)
Urban self-employed social health insurance scheme (USEHIS)	
Vulnerable groups	Permanently disabled persons and the aged social health insurance scheme
Children under 5 years health insurance scheme (CUFHIS)	
Pregnant women and orphan's social health insurance scheme	
Prison inmate's social health insurance scheme	
Others	Diaspora family and friend's social health insurance scheme
International Travel Health Insurance	
Retirees and the unemployed social health insurance scheme	

Source: Akinbile 2016:35

2.8.6 Health maintenance organizations (HMOs)

Health maintenance organizations (HMOs) act as middlemen for the National Health Insurance Program (NHIS) and healthcare providers (HCPs) (Ogundeji 2017:15). The NHIS has certified HMOs for a national or regional health insurance program that covers Nigeria's six geopolitical zones (Ele et al 2016:3). It is also taught that HMOs, as healthcare middlemen, receive two types of funds from the NHIS on behalf of the federal ministry of finance, budget, and national planning: operational costs, which will be disbursed to HCPs for capitation and fee for service, and administrative costs, which will be used to pay for staff

salaries and overhead costs of service. The NHIS investigated the performance of HMOs in this manner on a regular basis, particularly with regards to HCPs and participants. Certain HMOs were de-certified by the NHIS due to poor performance or fraudulent acts, which were frequently connected to the payment of capitation/fee for service to accredited healthcare institutions. HMOs play an important role in both public and private health insurance. In addition, there are currently over sixty accredited HMOs in Nigeria (Akinbile 2016:34).

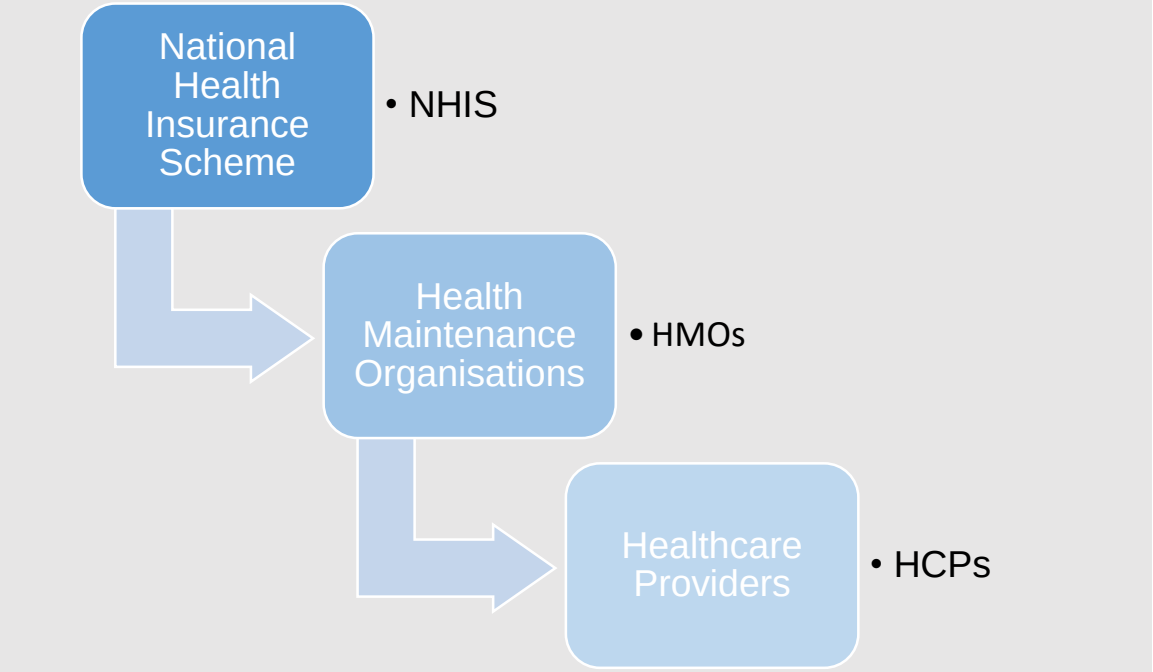


Figure 2.5: Chain of healthcare (insurance) financing in Nigeria

2.8.6.1 HMO services- public sector

For the public health insurance programmes, the HMOs in conjunction with the NHIS coordinates the healthcare services through the health care providers (HCPs). The health care providers (HCPs) receive authorization for enrollee healthcare under the fee for service mode from the HMOs. The HMO also pay capitation and/or fee for service to the HCPs (Aregbesola & Khan 2018b:1017). Furthermore, the HMO receives the health care claims from the HCPs which will be vetted by the HMO based on the NHIS healthcare professional service tariffs. The HMO work within the ambient of the provision in the NHIS operational guidelines and the professional services tariffs.

2.8.6.2 HMO services- private sector

HMOs accredit private health care facilities (HCF) for the care of their clients under private sector health insurance arrangements. In this case, the HMO officer, who is generally a medical practitioner, acts as a field officer, visiting authorized institutions to check on quality assurance concerns. HMO subscribers are frequently employees of major private companies. The organized private organization pays the operational and administrative costs of running to the HMO in the same way as the NHIS pays the HMOs. HMO fees might be paid quarterly, every six months, or once a year. Typically, the enrollment list is forwarded from the organizations to the corresponding health care facility via the HMO.

The HMO pays capitation and fee-for-service to authorized health-care providers and receives health-care claims from the same providers. The claims will then be checked against the agreed-upon healthcare tariffs. Diagnostic-related tariffs are also employed. In addition, a person can purchase an HMO premium that will be sold for a certain amount of time. Basic/silver, gold, and platinum HMO premiums are available. The classification reflects the scope of the health-care coverage. For instance, a basic or silver premium may cover mostly primary health care treatments, whereas a platinum premium may cover services up to and including surgical operations. The insurance premium labeling or classification differs from one HMO to the next, although the package is frequently identical. In my experience, there is less of a bottleneck in obtaining private health insurance than there is in obtaining state health insurance.

2.8.6.3 Capitation

Capitation is a monthly health insurance sum provided by the health maintenance organization to health care providers for the care of members in their register who may get ill. The money is calculated for each individual enrollee, resulting in a lump sum payment for that month. It is a risk-based payment intended for primary care or the treatment of small, uncomplicated illnesses using the agreed-upon diagnostic associated rates. The intriguing characteristic of capitation is that the prepayment for health-care facilities is dependent on the number of participants registered with a specific health-care facility rather than the number of patients treated every month. On the part of the enrollees, the patient can access health facility any time they are ill without paying out of pocket and falling into catastrophic healthcare expenditure.

2.8.6.4 Fee for service

Health-care services can also be paid for on a fee-for-service basis. While capitation is a prepayment fund for NHIS or HMO-accredited healthcare institutions, fee for service is a payment paid after the treatment, typically for secondary care. If the health care professionals request and get authorization for the care of the patient in their custody, the fee for service claims payment is made. The authorization is a coding system between the HMO and the HCP, indicating that the patient is entitled to such secondary care and that the HCP is permitted to provide it. The HCPs' healthcare claims are then forwarded to the HMO desk for verification and payment consideration. Furthermore, the enrollee may be on the HCP register for capitation; but, if the sickness becomes serious or a secondary care case, the health care institution must inform the HMO for authorization to continue treatment; otherwise, the HMO will not pay any fees for services.

2.8.7 Healthcare service tariff

The service tariffs vary depending firstly on whether private or public health insurance. Secondly on the agreed diagnostic related tariffs, thirdly on capitation or the fee for service and fourthly on the category of the insurance premium purchased. The public health insurance diagnostic related tariffs and the fee for service payment are organized by the NHIS. NHIS has a long list of tariffs for diagnoses, professionals' involvement, drug tariffs and laboratory and radiographic tariffs. For the private health insurance tariffs, this is organized by the HMO in agreement with the health care providers. Again, for the private insurance programme, the purchased premium will also determine the tariff-silver, gold, or platinum. Furthermore, capitation is often based on the diagnostic related tariff which is essentially utilized by the health care providers to ensure treatment fall within the resource allocation. When a secondary care is instituted which involves fee for service payment, a special diagnostic related tariff is used which is based on HMO-HCP agreement.

2.8.8 Health care provider (HCP)

The health care providers (HCP) are accredited health facilities either by the NHIS or HMOs or both in different geopolitical region of Nigeria. The HCP must have met the minimum NHIS/HMO criteria for granting accreditation. Such requirement includes but not limited to

the hospital or clinical physical structure, environment/location, hospital equipment/machines, minimum number of health professionals and specialization including prior registration with the Cooperate Affair Commission (CAC) and the state/federal hospital management board in the ministry of health. The HCP accreditation is in categories viz primary, secondary, and tertiary healthcare facility.

The accreditation code or number is given to the successful HCP and are eligible to carry out the services within the limit of their capacity based on the accreditation granted. The NHIS/HMO also encourage referrer system from primary to secondary or secondary to tertiary healthcare facilities. Moreover, The HCPs receive the enrollee for treatment on behalf of the NHIS/HMOs. The HCPs also receive payment in the form of capitation or fee for service or both from the HMOs. The author from previous field experience observed that most HCPs in Nigeria have experienced tremendous growth as a result of partnership with the NHIS/HMOs (Grace et al 2017:5).

2.8.9 Challenges of health insurance scheme in Nigeria

In general, the health insurance program was established in Nigeria to protect residents against catastrophic health-care costs resulting from recurring out-of-pocket payments (Ogundeji 2017:15; Ogundeji & Adeyemo, 2020:1). The government calculated that the program would reduce bad health outcomes and increase patients' quality of life. However, the system has faced serious obstacles in terms of management protocol, bureaucracy, and corruption, among other things, from its start. The difficulties will be listed and examined considering the primary parties in Nigerian healthcare funding, namely the National Health Insurance Scheme (NHIS), HMOs, HCPs, and enrollees, who are the ultimate customers. From experience, the author observed that the enrollees appear to share the highest burden of challenges confronting the programme.

2.8.9.1 Challenges related to NHIS

The NHIS has immediate hurdles in the areas of bureaucracy, registration, and enrolment bottlenecks (Akinbile 2016:14). Overcrowding, a lack of a health information system (eHealth/eNHIS), Information Technology (IT), a lack of openness, and systemic corruption

are among the other difficulties (Aregbesola & Khan 2018b:1017). The Nigerian National Health Insurance Scheme (NHIS) is a somewhat decentralized government organization in that, although having regional and state offices around the country, certain activities such as cash disbursement and enrollment are still centralized. As a result, getting eligible persons to register and enroll is a difficult task. A registered name may take up to three or four months, or possibly longer, to show on the NHIS consolidated enrollment database. The NHIS enrollment backlog has deterred many employees from depending on the registration process and the system (Anyebe 2018:12).

Aregbesola and Khan (2018b: 1015, 1019) looked at the Nigeria Demographic and Health Survey (NDHS) enrollment data and found that many reproductive-age women (98%) were not included in the NHIS register. Similarly, Nshakira-Rukundo et al (2019:594) in Uganda pointed out that reproductive-age women and children suffer from enrolment obstacles more frequently than other age groups. The NHIS's predictors of insufficient enrolment of a critical social class of the population are unknown. This creates a big socio-political dilemma in Africa's emerging countries. Although some Nigerian states, such as Lagos, Ebonyi, Oyo, Ogun, Osun, Niger, and Ekiti, have launched the National Health Insurance Scheme (NHIS), the necessary framework is still missing, and the scheme is yet to gain widespread acceptance. People are skeptical of the scheme's success due to systemic corruption and a lengthy bureaucratic process when healthcare is required (Ele 2016:4; Akinbile 2016:20).

People in Nigeria are losing faith in government programs, which is demoralizing and unethical. Unfortunately, health-care investments are treated like any other program and will suffer at the hands of dishonest public officials who will utilize the funds to benefit themselves while the great majority of people will be left in poverty (Akinbile 2016:20). This viewpoint is influenced by the outcomes of prior government programs as well as individuals' personal experiences, which have left an indelible stamp on their hearts. Furthermore, rural residents' access to qualified health care practitioners is a concern. Nigeria has also seen inadequate health resource allocation, with the government and private sector focusing mostly on secondary and tertiary health facilities in metropolitan and semi-urban areas, leaving primary health care centres in rural areas unpaid (Oreh 2017:159). The much-discussed vulnerable insurance system is unavailable to impoverished rural residents. Poor rural residents couldn't even afford the bare minimum of insurance premiums.

As a result of this development, the NHIS financial risk protection for Nigerian residents has been skewed, prompting some stakeholders to be skeptical of the NHIS' capacity to close the gap between the affluent and the poor in terms of health care. Furthermore, there is a link between the social and health systems; rural towns lack decent roads and a reliable transportation system. As a result, most destitute rural residents were unable to obtain timely health treatment due to a lack of providers. In this case, health problems are ignored until they become chronic or life-threatening.

The voluntary prepayment health insurance program, according to Aregbesola and Khan (2018a: 804; 2018b: 1015, 1021), would not operate in Nigeria since most of the population is impoverished and lives in rural communities. In several published papers, the authors have argued for a "tax-financed non-contributory insurance program" to assure fairness and coverage for impoverished individuals in rural areas. Oreh (2017:160) also suggested that taxes on cigarettes, alcohol, and fast meals, as well as taxes on mobile phones (calls and purchases), airline tickets, luxury items, and foreign exchange transactions, be used to fund the three tiers of health care services, particularly primary health services.

In essence, the suggested health-care financing solutions are designed to dramatically cut out-of-pocket health-care spending, which has a significant impoverishing effect on Nigerian poor households. As a result, if the issues facing the poor in rural regions in terms of accessibility and cost to healthcare services are not addressed, the NHIS program's goal of achieving equity in healthcare delivery would become a mirage or the scheme will completely collapse.

2.8.9.2 Challenges related to HMOs

The HMO is occasionally seen neglecting to repay capitation and fee-for-service payments to the health-care provider (Grace et al 2017:5). Such betrayal has resulted in NHIS sanctions or the HMO's deregistration. Another issue is the time it takes to submit authorizations for enrollee care to the HCP (Akinbile 2016:14). Inadequate personnel and a lack of ICT compliance in the HMO process are known causes of this problem. Furthermore, HMOs packages, particularly for individual informal purchases, distinguish between the rich and the poor in that the basic or silver package covers primarily primary health care for the less fortunate, whereas the gold or platinum package is for the wealthy. As a result, unlike

in some other countries, equity, which was the original mandate of the insurance program, is unrealistic in Nigeria's current system.

2.8.9.3 Challenges related to HCP

The healthcare facility faces issues of non-payment of capitation and fee for service from the HMOs (Grace et al 2017:2). The HMOs who were caught in the web were sanction by the NHIS. According to field reports, certain HCPs were reported to deliver poor medications and other treatments to subscribers, particularly NHIS members, due to intermittent receipt of funds from HMOs (Grace et al 2017:5). It has also been noted that the healthcare services offered to NHIS enrollee inferior to those provided to those who pay out-of-pocket. Long queues before consultation, treatment delays, and a higher likelihood of hospital re-admission are all possibilities when the patient pays out of pocket.

2.8.9.4 Challenges related to the enrollees

The enrollees are reportedly facing the menace of sub-standard treatment. Opinion has it that the HCP could give sub-standard drugs to NHIS enrollees while the more expensive drugs are reserved for private health insurance patients or at best those paying out-of-pocket (Grace et al 2017:5). The NHIS enrollee usually pay 10% of the prescribed drugs, however from experience, some of the drugs may be unavailable in the hospital pharmacy and the patient or the relative will then buy out-of-pocket in a private pharmacy outside the hospital arrangement (Grace et al 2017:5).

This precarious practice put the life of the enrollees in danger with possible complications such as drug abuse, drug dependency, drug resistance strain, treatment failure and high cost of purchase (Grace et al 2017:6). The development is known to further breed catastrophic health care expenditure and loss of confidence in the acclaimed citizen friendly health insurance scheme. Similar experience goes with laboratory and radiological investigations where the NHIS patients will not be able to access the service in the chosen hospital except in outside facility. This is often seen as a permutation between the prescribing physicians and the private pharmacy or the laboratory outside. Therefore, this process has been shown overtime to be colored by corrupt practices.

NHIS subscribers do not appear to obtain standard treatment unless they choose to visit a private practitioner outside of their preferred certified NHIS facilities and pay out of pocket. Even if the patient chooses to go to a private hospital, there is a possibility of additional deception called "open and close surgical intervention," which is a method of falsely diagnosing the necessity for surgical intervention where none exists, as is typical with cesarean section diagnoses. Medical professionals are frequently viewed as lords, and their judgments and acts are rarely questioned. Regrettably, the gullible and largely uneducated family then rushes from pillar to post to guarantee that the amount is made available. As a result, high-profile corruption, political instability, and administrative bottlenecks have a significant impact on the financial performance of Nigeria's public healthcare system.

2.9. WOUND CARE COST: IMPLICATION FOR HEALTHCARE INSURANCE COVERAGE IN NIGERIA

Healthcare insurance coverage in Nigeria is evolving but not without challenges (Cleopatra & Komolafe 2018:1). The Nigeria National Health Insurance Scheme (NHIS) mostly protects Nigerians in the formal sector from healthcare financial hardship (Namomsa 2019:735) while most Nigerians who were not enrolled in the former sector of the social health insurance scheme were left to settle their healthcare bill out of pocket (Aregbesola 2017:43; Ogundeji et al 2018: 150). An alternative is the private health insurance scheme through the Health Maintenance Organizations (HMO) which is not affordable by an average Nigerian (Anyebe et al 2018: 11). The private health insurance scheme is the choice of fraction of organized private sectors and few middle-class individuals who can afford the premium charges. This phenomenon further created a gross disparity between the rich and the poor (Ogundeji, 2017:15; Aregbesola, 2017:43; Karimo et al 2017:25).

Although the National Health Insurance System (NHIS) recently launched the voluntary contributor's social health insurance scheme (VCSHIP), which was designed to serve the informal sector, particularly non-salaried and low-income individuals. Subscribers are required to pay a fee of N15000 (US$29) to VCSHIP (Ogundeji, 2017:15; Ogundeji et al., 2020:1112; Ogundeji & Adeyemo 2020:2). However, the plan can only protect the enrollee against unexpected healthcare costs for a year, and further fees will be necessary to cover additional family members. The need for multiple charges to cater for the entire family have

generated heated debate on the advantages of the scheme over the usual out of pocket payment (Ogundeji, 2017:15).

This development is consistent with a study which concluded that most Nigerians who are regular hospital visitors for management of chronic wounds are in the cohort of widows, petty traders, artisans, and other non-salary earners which are mostly affected by the catastrophic healthcare expenditure (Karimo, Krokeyi, Ekainsai 2017: 25; Cleopatra & Komolafe 2018:1; Namomsa, 2019:736). Similarly, a study conducted in southwest Nigeria by Odusan et al (2017:102) revealed that more than 50% of the respondents earn less than ₦20,000 per month and interestingly none of the respondents earn more than ₦100,000. Similarly, Ogundeji et al (2018: 149) revealed that 75% of the study participants earn ₦50,000 or less and were required to spend about ₦3000 for wound dressing materials per week. In the same study, 75% of the participants spent between ₦30000 and ₦100000 on hospitalization. In essence, the data suggest that the ordinary Nigerian seeking wound treatment is not covered by the government's National Health Insurance Scheme (NHIS) and is overwhelmed by the cost requirements of successful wound care.

Consequently, lack of healthcare coverage and high healthcare bills could explain why some patients or relatives will either discharge against medical advice (DAMA) or sell valuable family properties such as landed property to settle the huge medical bill (Aregbesola & Khan 2017: Ogundeji, Akinyemi, Faremi, 2020: 1112; Ogundeji et al., 2018: 150). The burden of healthcare expenditure is immense on low- and middle-income countries with crippling per capita income (Aregbesola & Khan 2018b:798). Like the situation in Nigeria, a study in Bangladesh retreated that households in low-income countries spent an average of 40% of their income on healthcare finances as against 20% healthcare expenditure among the high-income countries.

2.10. THEORETICAL FRAMWORK

2.10.1 System Research Organizing Model (SROM)

SROM is based on system theory and evolved from the quality health outcomes model (Brewer et al 2008:7), which was linked to Donabedian's 1966 work (Mitchell et al 2007). A framework developed by Donabedian that focuses on the structure, method, and result of medical care quality (Mitchell et al 2007). Avedis Donabedian's classic structure-process-outcome paradigm for quality health assessment is a masterwork in terms of conceiving healthcare quality models (Gilmartin, & Sousa 2016:150; Real, Fay, Isaas, Carll-White & Schadler 2018:2).

SROM has also been used as a framework to understand the interrelationship of the variables closely related to the development of healthcare design (Brewer et al 2008:7). SROM has four constructs which are client, context, action focus and outcomes and can be used to explain both independent and extraneous variables influencing the healthcare system. The first construct *client* represents the system input which drive the model. The second construct, *context*, represents elements in the healthcare environment that can influence outcomes. The third construct, *action focus*, is the intervention that also has strong influence on the outcome. The fourth construct, *outcome*, is the result of the care and represents the product of the interaction of the other constructs in the system. The SROM is a dynamic model because each construct depicts the essential variables to be tested in healthcare research. SROM model can be articulated to synthesize a body of knowledge to guide evidence-based nursing practice and research.

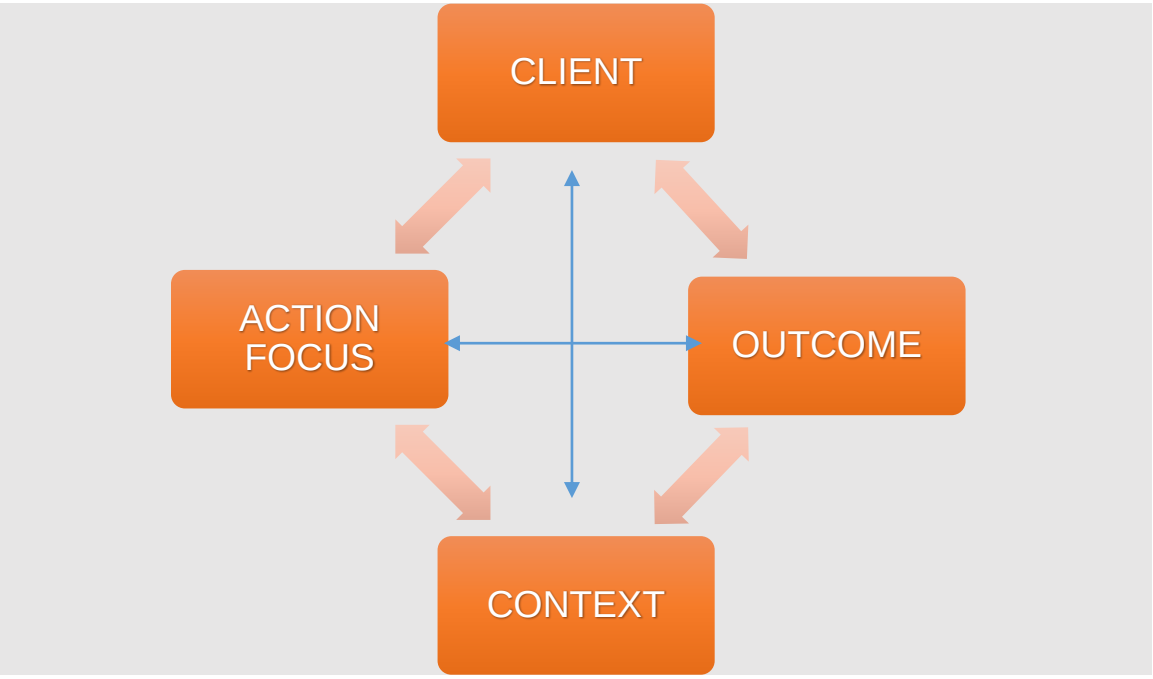


Figure 2.6: Diagrammatic representation of SROM constructs

2.10.2 Application of System Research Organizing Model to nursing care cost of wound dressing

System research organizing model is specially designed for nursing research and reflect philosophical assumptions that comprises broad constructs that help to explain the phenomena of interest. This model focuses on the whole system with four constructs (client, context, action focus and outcomes) which represent the interrelatedness among patients, nurses, the nursing interventions, and cost of nursing care. Patients and nurses' characteristics influence the cost of nursing care.

The client represents the patients that require nurses' interventions such as daily or alternate day wound dressing. Patients' variability such as age, wound aetiology, type of wound, acuity level and comorbidities affect the nursing care cost of wound dressing. Inventory of the daily expenses on wound dressing i.e., dressing materials, consumables, product, and hospitalization considered to determine the average cost of wound dressing among the study population.

The context in this study is the nursing and hospital characteristics that have influence on the outcome of the nursing care cost. Such elements include nursing staff level of education,

years of clinical experience, wound care expertise/specialization including unit characteristics (wards/clinics). While generalizability of the study results may not be appropriate beyond the study settings, it will provide valuable insight on the cost of wound dressing in a similar setting in Nigeria and West Africa.

The action focus according to SROM represents the intervention in the environment. Within the health care domain and in the context of the current study, the action focus is the nursing care rendered to the patient at various levels and units. Nursing interventions represent the largest need of patient in health care facility. Nursing procedures such as wound dressing is a daily activity performed by nurses to produce positive patient outcome. Often, nursing care cost is subsumed into room and board rate (Ogundeji 2020: 1463; Ogundeji et al., 2017:45), however, assessment of the cost implications of providing daily or alternate day wound dressing can be studied by system research organizing model (SROM). Moreover, from understanding of SROM, the action focus that also have strong influence on the outcome of the nursing care cost include nursing intensity (time spent on wound care), frequency of dressing changes, type of dressing materials (modern or traditional), type of wound products used, length of hospital stay, and hospital tariffs.

The fourth construct according to SROM is the result of the interaction of other constructs i.e., the outcome variable which in this study is the nursing care cost of wound dressing. It is the final product of the interplay of other constructs in the system. SROM is a suitable framework to explain the relationship between patients' characteristics, nurses/unit characteristics, the nursing intervention and the nursing care cost of inpatients and outpatients wound dressing. SROM is a holistic model in that it explains the interrelationship among the construct under study.

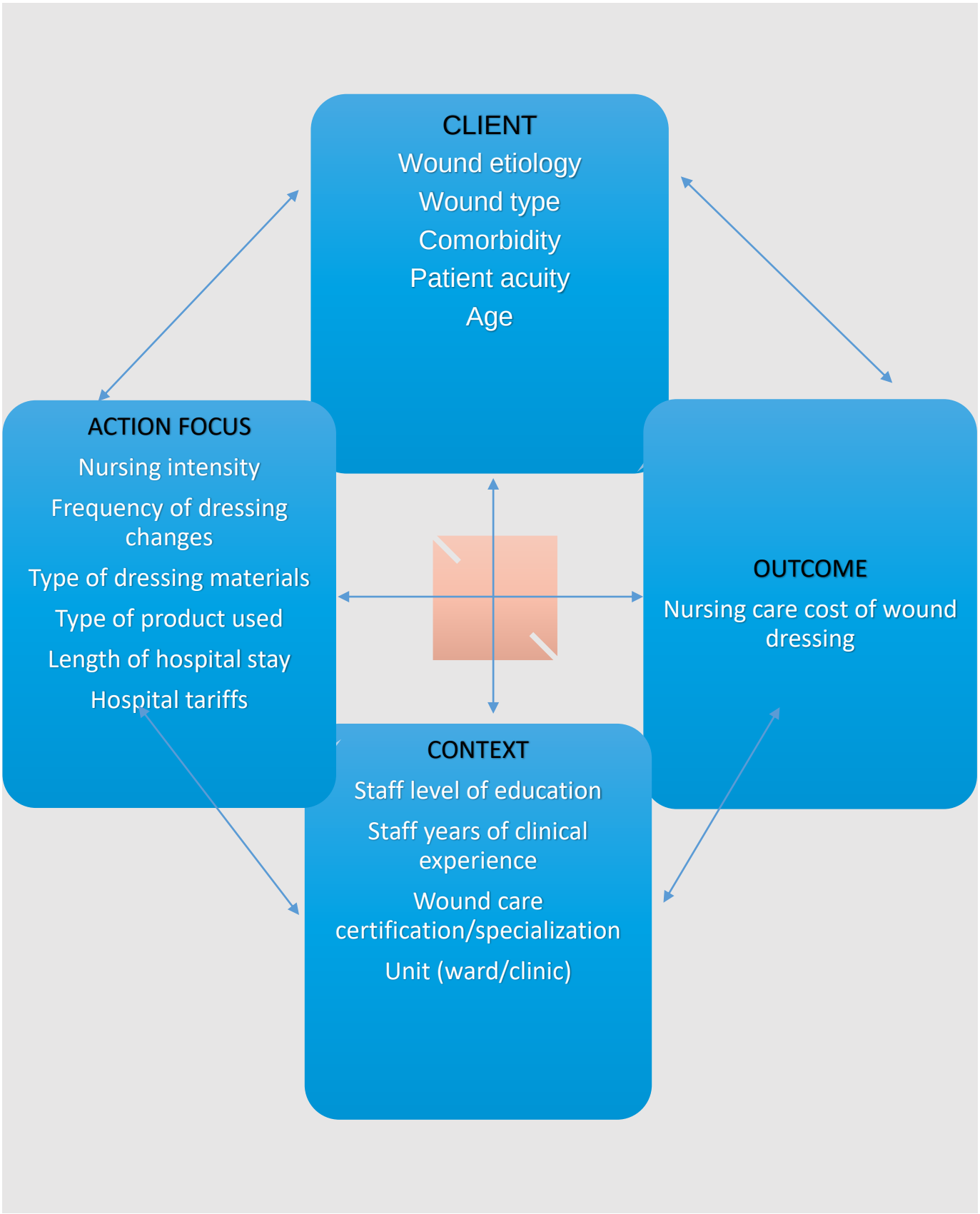


Figure 2.7: A framework illustrating the application of SROM to nursing care cost of wound dressing

2.11. SUMMARY OF LITERATURE REVIEW

Wound dressing is a major function of nurses at all levels of care. The literature review covers studies done in developed and developing countries with emphasis on Nigeria. Some studies attributed the high cost of wound dressing to repeated dressing changes, use of modern dressing materials, length of hospital stay and lack of health insurance coverage.

The gap in most studies is that when wound care costs are tracked, the cost of wound dressing is usually subsumed into medical or surgical procedural costs whereas the cost of daily or alternate day wound dressing contribute a larger percentage of the wound care cost (Ilesanmi and Ogundeji, 2020:44). Available studies revealed that most patients with wounds required two or three dressing changes per week. Studies reviewed also show that wound care nurses are conspicuously absent in most developing countries and wound dressing is seen as the responsibility of nurses of all categories which has profound influence on the quality of wound care services.

Consequently, extant studies revealed that out-of-pocket payment is the leading method of healthcare financing in Nigeria despite the inauguration and the implementation of the Nigeria National Health Insurance Scheme for almost two decades (Ogundeji et al., 2017: 42). The thrust of this study was to estimate the nursing care cost component of wound care finances and to develop a nursing care costing model for wound dressing in Nigeria.

CHAPTER THREE
RESEARCH METHOD

3.1 INTRODUCTION

Research method is a process of finding scientific solutions to solve research problems and it entails carrying out scientific and systematic investigations to establish facts. According to Polit and Beck (2014:733) research method refers to all the procedures and strategies used and followed from data gathering to data analysis. This chapter therefore explained and described the research methodology employed by the researcher to obtain various information and clarity about the burden of cost of wound dressing and hospitalization in resource limited settings of southwest Nigeria. It discusses the research approach and design, research setting, study population, inclusion and exclusion criteria, instrument development, validity and reliability of the instrument, procedure for data collection, ethical considerations, and methods of data analysis.

3.2 RESEARCH APPROACH AND DESIGN

3.2.1 Research Approach

Creswell (2014:31) describes research approaches as research plans and procedures that involve either broad or detailed data collection methods, analysis, or interpretation. Creswell (2014) further exposited that research approach selection is basically determined by the nature of the research problem, the subject matter, research participants including researcher's expertise. Three type of research approaches are commonly used in scientific inquiry which are quantitative, qualitative, and mixed methods. However, for the purpose of this study, a quantitative research approach was adopted to ensure generalization of the study inferences to the wider population of southwest Nigeria. Quantitative approach is the process of gathering and analyzing numerical data to describe, explain, predict, or control phenomena of interest. Burns and Grove (2013:54) exposited that quantitative studies seek to describe variables, investigate relationships among variables and determine cause and effect relationships between variables.

3.2.2 Research Design

Grove, Grays and Burns (2015:211) defined research design as a blueprint guiding the conduct of research while according to Creswell (2014:295), research design was developed to meet the unique requirements of the study and a blueprint indicating how research should be conducted. Furthermore, Burns and Grove (2013:195) exposited that research design is a blueprint for research study and control extraneous variables that could interfere with the validity of the research findings. Research design also clarifies, predicts or control variables of interest through research techniques in identifying statistically meaningful sample data and controlling contextual factors impeding data collection.

In the context of this study, a research design is expected to guide the study to produce an outcome that can adequately contribute to a body of knowledge that is uniquely nursing and ensure evidenced base nursing practice. Essentially, the purpose of a research design is to guide the answering of research questions. Therefore, based on the research objectives and research questions, a descriptive cross-sectional research design was used to assess inpatients and outpatients' costs of wound dressing in three teaching hospitals in Nigeria.

Descriptive research design is used to identify and obtain information concerning the present status of a phenomenon. It is fact-finding enquiries and survey method which describes the characteristics of existing variables. Based on this premise, variables of interest to cost of wound dressing were identified, described, and utilized to develop a nursing care costing model for wound dressing in Nigeria. Thus, the study was unfolded in three interwoven phases to capture the research purpose. The first two phases were examined via a quantitative approach while the phase dealing with the development of a nursing care costing model was based on the evidence from the first two phases. A diagrammatical representation of the three phases is presented below.

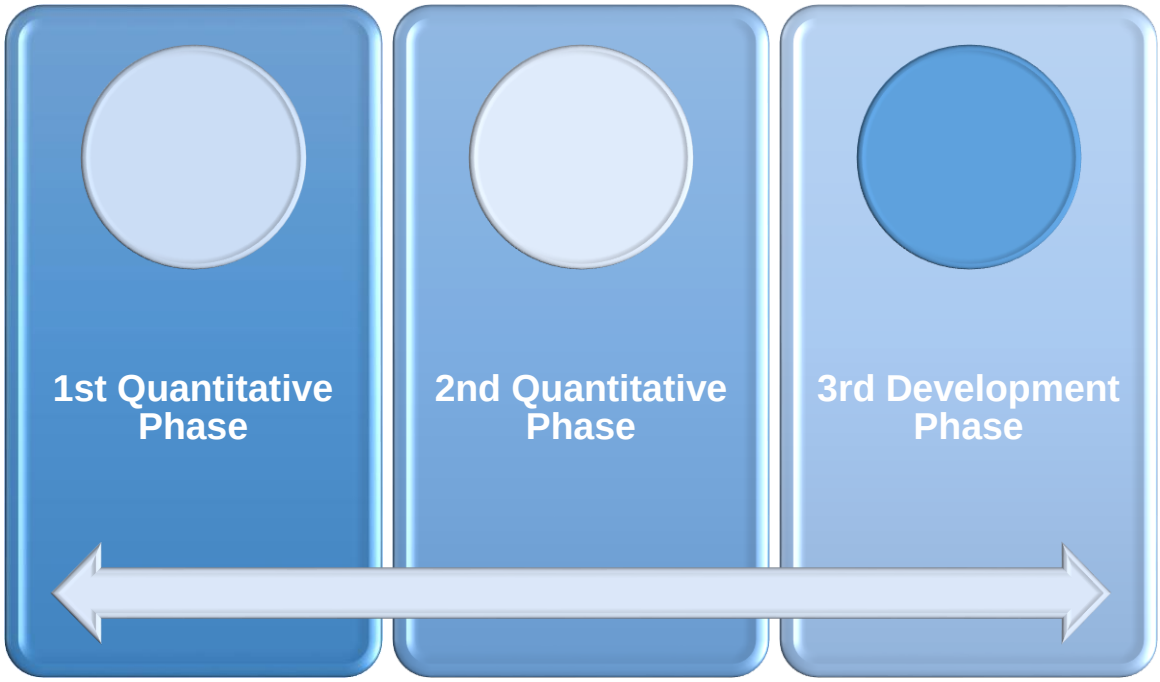


Figure 3.1: Phases of quantitative research design

3.2.2.1 First quantitative phase

The first quantitative phase was designed to investigate the nursing care cost on wound dressing among the hospitalized patients attending the selected teaching hospitals. All in-patients with wounds in the selected wards where wound dressing is carried out were involved in the study. The inclusion criteria focused on inpatients about to be discharged or already spent minimum of four weeks on admission. The questionnaire was designed based on systematic literature review and the researcher' previous field experience.

3.2.2.2 *Second quantitative phase*

The second quantitative phase was designed to investigate the nursing care cost of wound dressing materials and products used among the outpatients attending the medical, surgical, and general out-patients clinics of the selected teaching hospitals. The inclusion criteria mainly are patients who are regular clinic attendees for at least four weeks. The input into the research instruments were mainly from synthesis of relevant literatures and the researcher' previous field experience.

3.2.2.3 Third development phase

The third phase was based on the development of nursing care costing model for wound dressing. A model is a framework that explains, describes, and defines relevant variables or propositions which are closely related to the phenomenon under study. Independent variables from the two quantitative studies in phase I and phase II were considered and computed against the cost of wound dressing and hospitalization per week and per acute care episode using regression model analysis to give parameter estimates and predict the future cost of wound dressing in southwest Nigeria. Regression model analysis was computed for the cost of wound dressing of various categories of acute and chronic wounds.

3.3 PHILOSOPHICAL PERSPECTIVE AND PARADIGMS

Paradigm is used to guide the philosophical perspectives of this study. The underlying philosophical perspectives underpinning this study were used to depict and explain assumptions relating to nursing care cost of hospitalization and outpatients wound dressings in selected hospitals in southwest Nigeria. Paradigm is the world view of a phenomenon (Polit and Beck 2012:11). It is a foundational belief system and theoretical framework with underlying assumptions. Paradigm is also described as different approaches to scientific inquiry each with their own beliefs, assumptions, and methodical techniques.

Specifically, a research paradigm is an approach which has been verified overtime by scientific community which provides a model or framework for conducting research. Significantly, in positivism, there is a single external reality which can be known by an objective observer while in constructivism there is multiple socially constructed realities which are known by a subjective observer. In the context of this study, positivism paradigm is most relevant.

According to Grove, Burns and Gray (2013:66), positivism paradigm supports scientific processes that involve collection of research data in order to transform nursing practice or development of model to solve a specific problem. Positivism paradigm also favours an approach involving scientific inquiry to draw evidence-based inferences using valid measurements. Therefore, in this study, scientific data was collected among inpatients and

outpatients with wounds to develop a nursing care costing model for wound dressing in Nigeria.

Furthermore, positivism paradigm provides a philosophical grounding for quantitative research and allows for the generation of ideas into knowledge about the concept under study. Based on this paradigm, a cross-sectional research design with theoretical framework-system research organising model (SROM) was used to harness the independent variables of wound dressing to develop a costing model which will facilitate the design of working tariffs for wound dressing to assist individuals with wounds and stakeholders in healthcare financing.

3.4 RESEARCH SETTING

According to Polit and Beck (2014:392), research setting is the physical location and conditions where data collection takes place in a study. For this study, major teaching hospitals located in southwestern region of Nigeria were included. Nigeria is an English-speaking Sub-Saharan African country. It is located in West Africa with the following boundaries: Niger Republic (North), Cameroun (South), Chad Republic (East) and Republic of Benin (West). Nigeria is a heterogeneous cultural settlement with large agrarian communities. It has six geopolitical zones with 36 states of the federation. The six geopolitical zones comprising Northeast, Northwest, North Central, Southeast, South, and Southwest. Major teaching hospitals for healthcare practice, research and training were established in each of the six geopolitical zones by successive governments.

Figure 3.2: Map showing locations in Nigeria and continental boundaries
Source: *Encyclopedia Britannica, Inc.* (online)

The southwest Nigeria is mainly the territory of indigenous Yoruba ethnic group of Nigeria. However, they accommodate people from all walks of life for tourism, business, schooling, religious services, and other programmes. Interestingly, western education started in the southwest Nigeria and is known to house most of the foremost organizations in Nigeria. The study was carried out in the University College Hospital (UCH), Ibadan, Obafemi Awolowo University Teaching Hospital Complex Ile- Ife and the National Orthopaedic Hospital Igbobi, Lagos. The teaching hospitals are purposively selected. They are homogenous with similar organizational structure. They are reference centres for trauma care, research, and training. They also have collaboration with international agencies for advancing the frontier of health research and teaching.

The University College Hospital (UCH) is the first teaching hospital in Nigeria located in the urban centre of the ancient city of Ibadan Nigeria. It is the teaching hospital of the Nigeria premier University; the University of Ibadan (UI). The hospital is a centre of excellent with various wards, clinics, units, and departments for all forms of patient care. It is a national reference for all health problems. Other notable institutions around the location of the hospital

include Nigeria Institute of Social and Economic Research (NISER) and International Institute of Tropical Agriculture (IITA).

Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) is a model teaching hospital covering the care of patients from at least four states of the southwest Nigeria. It covers the care of patients with various wound aetiologies and type. It is the teaching hospital attached to Obafemi Awolowo University (OAU) Ile-Ife. Ile-Ife is a semi-urban settlement comprising of agrarian communities.

National Orthopaedic Hospital, Igbobi Lagos (NOHIL) is located in Nigeria's industrial city, Lagos and is a national facility for management of accident victims. It is a reference hospital for patients with diagnosis related to wounds, fractures, and all forms of traumatic injuries. The hospital admits students for training in accidents & emergency and orthopaedic nursing. Other notable institutions around the location include the University of Lagos (UNILAG), Lagos State University (LASU), Nigeria Institute of Medical Research (NIMR) and Lagos University Teaching Hospital (LASUTH)

3.5 TARGET POPULATION

According to Polit and Beck (2012: 274), the target or reference population is the entire population the researcher is interested in. In other words, it is the population which the researcher would like to make generalisation to. In this study, the target population were patients with wounds who were hospitalised or attending clinics for wound dressing in teaching hospitals in southwest Nigeria.

3.6 STUDY POPULATION

The study population refers to the population of people accessible or available for a particular study which are often a subset of the target population (Polit & Beck 2012:719). It is the aggregate of the respondents that the researcher is interested in (Polit & Beck 2012:59). The study sample can be drawn from the study population within the inclusion criteria. In this study, the study population were all patients with wounds in selected wards and clinics of the

three hospitals which included surgical, medical, neurological, radiotherapy wards/clinics and burn unit.

3.7 SAMPLE SIZE DETERMINATION

A sample can be described as a subset or component of a population which is selected and considered for actual inclusion in the study (Grove et al 2015:511). It involves selecting a small group of the population to serve as a reference group for drawing conclusion about the target population. Moule and Goodman (2014:291) exposited that a researcher can select a sample for the study through utilization of eligibility criteria with the aim of getting a sample that will be representative of the target population. The sample sizes are not arbitrarily chosen but are estimated scientifically through a formula. The formula for calculating a single proportion by Leslie Kish was used.

The formula for calculating required sample size by Leslie Kish is given as:

$$n = \frac{z^2pq}{d^2}$$ (Ogundeji et al, 2018: 152; Ilesanmi & Ogundeji, 2020:39)

n= desired sample size

z= level of significance at 95% confidence interval (=1.96)

p = 50% = 0.5

Where q = 1-p =1-0.5 = 0.5

d = Degree of precision (5% = 0.05)

$$n = \frac{1.96)^2 \times (0.5) \times (0.5)}{(0.05)^2}$$

$$n = \frac{3.8416 \times 0.25}{0.0025}$$

n = 384.16 ≈ 384

KEY

n = desired sample size

z= level of significance at 95% confidence interval (=1.96)

p= prevalence (50% = 0.5)

q= 1-p

d= Degree of precision (5% = 0.05)

f= attrition= 10%

To calculate attrition rate

$$n = \frac{1}{1 - f} \times \text{calculated sample size}$$ (Bamgboye, 2013)

Where f= attrition =10%

$$n = \frac{1}{1 - 0.1} = 1.11 \times \text{calculated sample size}$$

Therefore, Sample Size n= 1.11×384 = 426.24 ≈ 426

The estimated sample size after consideration of the attrition rate was 426.

3.8 SAMPLYING METHOD

The non-probability sampling technique was used to select the study settings and study sample. The purposive sampling technique was used to select the study settings and sites while the convenience sampling technique was used to recruit the patients within the inclusion criteria. According to Polit and Beck (2012:735), a non-probability method of sampling is a process whereby respondents are selected from the population using non-random procedure. Purposive sampling is the process whereby the selection of the study settings or the respondents is based on the researcher's special knowledge or expertise about the setting or the population (Polit & Beck (2012:279). Furthermore, convenience sampling technique was used whereby all patients with both acute and chronic wounds in the selected wards and clinics of the three purposively selected hospitals were recruited into the study. Usually, there is continuous traffic of patients in and out of the hospital wards and clinics, therefore convenience sampling was more appropriate such that all the eligible patients at the time of the data collection were recruited into the study.

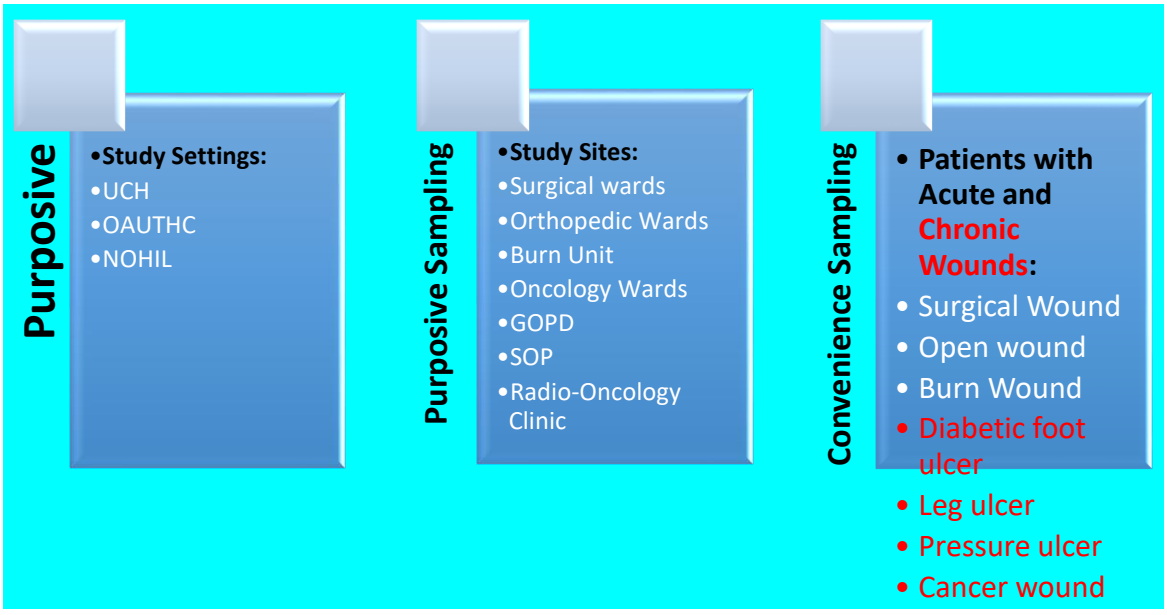


Figure 3.3: Illustration of the Study Sampling Techniques

DISTRIBUTION OF STUDY POPULATION ACROSS STUDY CENTRES

Hospital	Inpatients Sample	Outpatients Sample	Total sample
University College Hospital (UCH)	65	63	128
National Orthopaedic Hospital Igbobi Lagos (NOHIL)	94	38	132
Obafemi Awolowo University Teaching Hospital Complex (OAUTHC)	31	29	60
Total	**190**	**130**	**320**

3.8.1. Inclusion Criteria

Inclusion criterion is defined as those participants who meet certain characteristics required for the study and are eligible to participate in the study. Inclusion criteria indicates reasons why someone is qualified to be included as a participant (Polit & Beck 2012:726). The participants who met the following criteria were included in the study:

- Patients with acute or chronic wounds
- Patients who are 20 years old and above
- Patients with wounds about to be discharged or have spent four weeks on admission
- Patients with wounds who are regular clinic attendees
- Willingness to participate in the study

3.8.2. Exclusion Criteria

These are factors that will prevent someone from being a participant in the study. It involves those potential participants who are excluded from the study based on certain characteristics. In this study, some patients were excluded for the following reasons:

- Newly admitted patients who have not spent four weeks on admission
- Patient with wounds who are mentally challenged and cannot be interviewed
- Healing wounds that require no further clinic visit
- Unwillingness to participate in the study

3.9 INSTRUMENT FOR DATA COLLECTION

The questionnaires for data collection were derived from literature review on cost of patients' wound dressing and researcher's previous field experience. The instruments comprised of section A-D. Section A: Respondents' socio-demographic characteristics, Section B: Wound and dressing characteristics, Section C: Direct cost of wound dressing and Section D: Healthcare insurance coverage. The questionnaires were attached as Annexure J and K.

3.10 ENSURING RIGOUR

Soundness or precision is expected in conducting healthcare research. Therefore, the author and the supervisors took cognizance of detail and appropriateness in terms of the methodology and the general process of conducting this study. The validity and reliability of the research instruments were ensued to answer the research questions as well as precision in design, collection of data and analysis of data. This clearly ensured the research process is trustworthy.

3.10.1 Validity of the instrument

According to Polit and Beck (2012:175), validity is a concept that refers to the soundness or success of the study's evidence without any biases and distortions. The measurement of whether the model to be developed will help to facilitate the design of healthcare tariffs for wound dressing is a key influence on the quality of this study. An Interviewer-administered questionnaire was used for data collection from individuals with wounds to assess the cost of wound dressing during an acute care episode.

An Interviewer-administered questionnaire is a means to ensure that each respondent has an equal opportunity to respond to each question in order to draw scientific conclusions that can be transferred to the larger population. Specifically, the validity of the research questionnaires was tested by face and content validity technique by the researcher's supervisors and the statistician. Based on the reviewer's comments, the instruments were revised to correct unclear and obscure questions. The revised instruments were sent back to the supervisors and the statistician for face validity. The questionnaire was also given to

senior colleagues in nursing and statistical analyst for critiquing, suggestions, and amendments.

3.10.2 Reliability of the instrument

Reliability is a degree of accuracy and consistency of information obtained in a study (Polit & Beck 2012:175). It is required that statistical instruments be used to analyse and interpret statistical results to ensure statistical reliability and scientific merits. Statistical reliability is the probability that the results obtained will represent the wider population than the participated population (Polit & Beck 2012:175). The questionnaires were developed from the literature review and the researcher's personal experience. The data quality was maintained throughout the study ranging from training of research assistants for data collection, piloting of the instruments and supervision of the research process.

In the current study, the reliability of the instruments was done through a test-retest method. Ten patients with wounds were interviewed with questionnaires in a pilot study at the Lagos University Teaching Hospital (LUTH) both among the Inpatients and outpatients. The same number of questionnaires were re-administered two weeks after the first administration. The internal consistency of each item of the instruments was analysed by Cronbach's Alpha (Alpha coefficient). The research instruments were found reliable with the coefficient of stability of 0.774 (Inpatients) and 0.874 (Outpatients).

3.11 PROCEDURE FOR DATA COLLECTION

Data collection is a detailed and systematic collection of precise information from the study participants with the aim of addressing the research objectives and research questions. Also, according to Grove et al (2015:502), data collection is identification of the study participants and systematic collection of useful information or data relevant to the research purpose, specific objectives, questions, or hypotheses of the study. Brink, Van der Walt and Rensburg (2012:56), underlines that the researcher should be familiar with data collection instruments and ensure that data or information to be collected is relevant to the specific objectives of the study.

The data collection for both hospitalised and outpatients followed quantitative approach with the use of interviewer-administered questionnaire for data collection. The principal investigator and six research assistants who are all nurses and can speak both English and Yoruba languages fluently were involved in the data collection for a period of four weeks in each of the purposively selected hospitals. The respondents were interviewed either in Yoruba or English language depending on the preference of the respondents.

Usually on the selected wards, the nurses on duty helped to identify patients who were ready to be discharged or have spent a minimum of four weeks on the ward so that they can be interviewed. The respondents were interviewed after having their consent to participate in the study. The researcher filled the questionnaire based on the respondents' response to the questionnaire. The frequency of dressing changes, type of dressing material, size, product used for wound dressing and the cost implication were recorded. The researcher also checked the patient case file to elicit information about the wound aetiology, wound type, comorbidities and to validate the cost of wound dressing materials and product if receipts were attached to the file.

The principal investigator or the research assistants visited the selected wards/clinics each day to recruit patients who met the eligibility criteria and were willing to participate in the study. Interviews were conducted after wound dressing procedure and the patient becomes comfortable. If the patient gives a specific time for the interview and the expenses inventory, the researcher usually honours the time by re- scheduling the visit.

Furthermore, precautionary measures during the one-on-one interview especially with regards to novel coronavirus (COVID-19) was observed. Specifically, social (physical) distance was strictly adhered to in addition to wearing a face mask. Also, the interview was conducted as shortly as possible to prevent boredom, respiratory uneasiness, and risk of infection transmission. Hand hygiene with regular hand washing or the use of alcohol-based hand sanitizer was used before and after the interview.

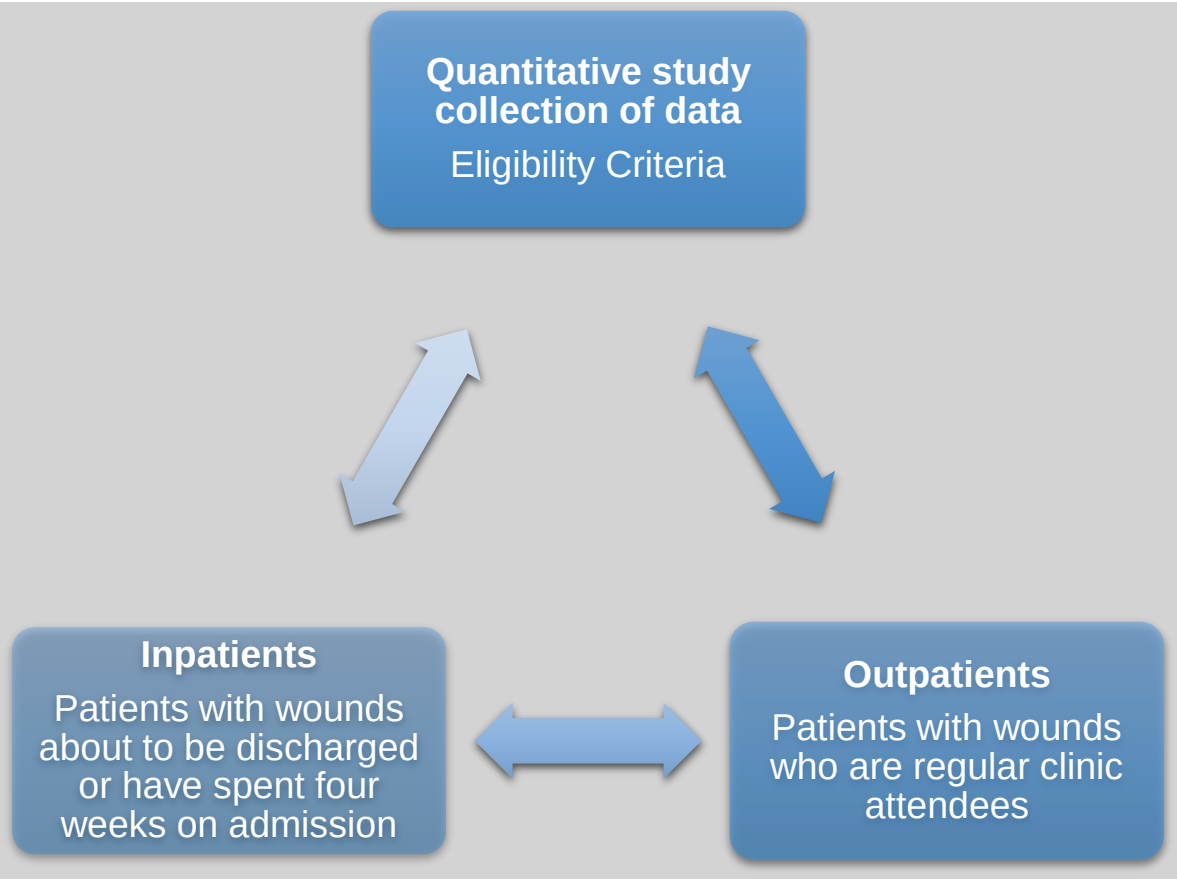


Figure 3.4: Illustration of the quantitative data collection criteria

3.12 METHOD OF DATA ANALYSIS

Data analysis is a procedure whereby collected data from research processes is subjected to hypothesis testing and answering of research questions using appropriate statistical techniques. It is a systematic organization, synthesis of research data and utilization of such data for testing of research hypothesis. Grove et al (2015:85) and Polit and Beck (2012:557) also describe data analysis as a rigorous process of organization of data, answering of research questions and deriving meaning. The inpatients and outpatients' data collection were analyzed and presented separately. The data collected using the interviewer-administered questionnaire was cleaned, entered, and analysed by descriptive and inferential statistics of chi-square via the Statistical Package for social sciences (SPSS) version 23.

Modelling cost of inpatients and outpatients was done by regression analysis to depict the relationship between the dependent and independent variables affecting cost of wound dressing. Statistical significance was done at P value of 0.05. The results were presented in percentage, mean and standard deviation.

Figure 3.5: Illustration of the study data analysis

3.13. ETHICAL CONSIDERATIONS

Ethical principles refer to the code of conduct underpinning the practice in any discipline. Significantly, within the healthcare domain, bioethics require more sensitive and standard ethical obligations that can drive the conduct of the clinical research. West African Bioethics advocates adherence to ethical principles where studies involving human subjects are carried out. The code of ethics and guidelines are primarily to prevent human right violation in research involving human subjects (Polit & Beck 2012:151). Also, Research Ethical Committees at various levels are also involved in assessing research proposals for ethical implications of the conduct of the study on the participants. Firstly, the University of South Africa (UNISA) Higher Degree Committee reviewed the study proposal and granted clearance for the research study. Secondly, ethical approval was also sought from the Institutional Review Board (IRB) of the purposively selected hospitals. Thirdly, consent was also obtained from the respondents before participating in the study. In this present study, general ethical principles were upheld in the conduct of the research.

3.13.1 Ethical Approval

The study commenced after obtaining ethical clearance from UNISA College of Human Science Ethical Committee with the reference number 2020-CHS-90163346 (NHREC Registration: Rec-240816-052, CREC Reference: 2020-CHS -69296707). Ethical protocol was also submitted to the Institution Review Board (IRB) for each of the selected hospitals in southwest Nigeria. Ethical Certificate was obtained from the University of Ibadan/University College Hospital Ethical Committee (UI/UCH Ethical Committee) with reference number NHREC/05/01/2008a (21/0047). Ethical Clearance was also granted by the National Orthopaedic Hospital, Igbobi Lagos, Nigeria with reference number OH/90/C/IX and also approval from the Ethics and Research Committee (ERC) of the Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) with the protocol number ERC/2021/04/07.

3.13.2 Permission to Conduct Research Work in Facilities

Letter of introduction seeking for permission was given to the board of management of the three selected hospitals. Data collection commenced after the permission was granted. Approval to collect data was received from the National Orthopaedic Hospital Igbobi Lagos on the 18th of February 2021, approval to conduct research work was obtained from the University College Hospital on 29th March 2021 while approval to collect data was obtained from Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) on 4th April 2021.

The purpose of the research was explained to the patients recruited for the study on the need to be precise and truthful about the interview while written consent was received from the respondents. On some occasions, only verbal consent was received because the patients were not comfortable with reading and signing. However, such patients often bid the investigator to read the content of the informed consent to their hearing before participation in the study. All explanations were done in a language the respondents can speak and understand. In order to ensure ethicality of the study, obtaining permission from health institutions as well as obtaining informed consent, the researcher took the following steps.

- Ethical Clearance was obtained from UNISA Research Ethics Committee

- Ethical protocol was submitted to the Institution Review Board (IRB) for each of the selected hospitals and approval granted
- Upon receiving of the ethical approval from the hospitals IRB, a letter of introduction seeking permission to conduct research in the health facility was sent to the board of management of each of the selected hospitals
- The director of nursing services and the designated wards/clinics (where wound dressing is performed) was identified
- The ward/clinic manager (usually a senior nurse) was informed with the evidence of approval to collect data from patients in her unit
- During the data collection, the ward manager informed the patients in the ward and introduced the researcher/ assistants to patients on the ward
- At the bed side/side room, the researcher explained the purpose of the study to the patient

  When the patient has fully understood the purpose of the study and he/she has voluntarily indicated to participate, a verbal and written consent form was signed by the patient before commencing with the interview

3.13.3 Ethical Principles

Ethical principles refers to the code of conduct that is expected to be carried out by the investigator in research involving human beings to protect the respondents' interest. Ethical principles of confidentiality, beneficence, non-maleficence, and voluntariness were upheld. Adherence to ethical principles is important with the fact that human beings are the study participants and protection of their rights must be ensured (Polit et al 2012:150).

3.13.3.1 Confidentiality

Healthcare research requires high level of confidentiality. In this process, confidentiality, and protection from invasion of privacy was maintained throughout the study in pertinent areas such as in collection of data, access to collected data and storage of data. The respondents need to be confident that data collected will be kept confidential (Grove et al 2015:106). Therefore, collected data was only shared by the researchers who are professional nurses and are directly involved in the study. All information given by the respondents in written form

were kept in secure, locked iron cabinet in the principal investigator's office. Ensuring patient privacy during the process of data collection is another ethical consideration. In this study, the researcher, being a nurse understands the importance of privacy while dealing with patients. Data collection was done when medical or nursing procedures were completed, and the patient has relaxed. Also, the patients were not approached for interviews when relatives or visitors were around. One on one interview mode employed in this study also helps to modulate the need for privacy (Polit & Beck 2014:85).

3.13.3.2 Anonymity

Any information given by respondents was treated as anonymous and their contribution was not traced back to them. Respondents' names, address, hospital number or any other form of identity was not requested.

3.13.3.3 Beneficence to respondents

Beneficence is an important ethical principle that aims to promote benefits for study respondents and prevent harm (Polit & Beck 2014:375). Respondents did not receive any payment or reimbursement during the study as an immediate benefit. However, a costing model was developed to serve as a guide to ascertain costs that will facilitate the design of healthcare financing to assist individual with wounds. The respondents were interested in the immediate benefits of the study. However, the investigator explained the long-term benefits of the outcome of the study.

3.13.3.4 Non- maleficence to respondents

The ethical principle of non-maleficence optimized that the researcher would do no harm to the respondents (Grove et al 2013:172). Doing good and no harm to patients is rooted in foundation of nursing practice. Nurses are reputed to protect patients' rights and ensure fundamental ethics and jurisprudence. The respondents were not harmed and there was no major risk or negative consequences in this study except for medium psychological and emotional inconveniences due to taking participant time in responding to the questionnaire. Polit et al (2012:152) contend that the researcher must be careful and sensitive to such risks that may occur. The patient has the right to self-determination, to decide on participation in the study without risking punishment or prejudice treatment (Polit & Beck 2014:84)

3.13.3.5 Voluntariness

The purpose of the study was explained to each respondent in simple language and their voluntary written consent was obtained because participation is voluntary. Polit et al (2012:152) underline that patients must not be coerced to participate in the study. The patients were left to decide whether to answer highly personal questions relating to family size, number of children and average monthly income (Polit & Beck 2014:83). In all, patients were briefed and given an opportunity to make informed decisions on whether to participate in the study or not. A signature line was also constructed on the questionnaire to indicate their willingness to participate in the study.

3.14 CONCLUSION

Chapter three focused on the research method. The research design and approach were explained. Quantitative approach was discussed with emphasis on how it met the objectives of the study. This chapter also explored the target and study population, research settings, sample size determination and sampling techniques, instrument for data collection, validity and reliability of research instruments, procedure for data collection, methods of data analysis and ethical considerations. The next chapters deal with the result of the quantitative data collections.

CHAPTER FOUR

PHASE I- INPATIENTS

DATA ANALYSIS AND INTERPRETATION

This is the analysis and interpretation of collected data for nursing care cost of in-patients wound dressing. Data was analyzed using Statistical Package for Social Sciences (SPSS) Version 23.0. The results were presented in frequency distribution tables and chi-square tables. 1 USD= ₦515 and 1 ZAR= ₦45 (August 2021).

TABLE 4.1: SHOWS THE RESPONDENTS SOCIO-DEMOGRAPHIC CHARACTERISTICS

Patients' socio-demographic characteristics (n=190)	Frequency	Percent (%)
Age group (in Years)		
20-29	35	18.4
30-39	44	23.2
40-49	40	21.1
50-59	34	17.9
60 and above	37	19.5
Mean (±SD)	44.95 ± 16.12 years	
Range	20 to 100 years	
Gender		
Male	119	62.6
Female	71	37.4
Highest level of Education		
No formal	10	5.3
Primary	39	20.5
Secondary	75	39.5
Tertiary	66	34.7
Family size		
Less than 5	51	26.8
5-10	136	71.6
More than 10	3	1.6
Mean ± SD	5.52 ± 1.86 size	
Range	Size 2 to 13	
Occupation		
Civil servants	29	15.3
Artisans	65	34.2
Trading	66	34.7
Retired	14	7.4
Unemployed	16	8.4
Monthly income (in naira-₦)		
Less than 50,000	101	53.2
50,000-100,0000	66	34.7
101,000-150,000	6	3.2

151,000-200,000	11	5.8
More than 200,000	6	3.2
Mean ± SD	₦67,165 ± 94,196.31	
Range	₦1300 to ₦1,000,500	

Findings: Table 4.1 above shows that 35 (18.4) of the respondents are within the age group of 20-29 years, 44 (23.2 %) of the respondents are of the age group 30-39 years, 40 (21.1 %) of the respondents are of the age group 40-49years, 34 (17.9%) of the respondents are of the age group 50-59 years and 37 (19.5%) of the respondents are within the age group 60 years and above. The average age of the respondents is 44 years. The table indicates that 119 (62.6%) of the respondents are male and 71 (37.4%) are female. It also indicates that 10 (5.3%) of the respondents have no formal education, 39 (20.5%) of the respondents have primary education, 75 (39.5%) have secondary education while 66 (34.7%) have tertiary education.

Also, 51 (26.8%) of the respondents have a family size less than 5, 136 (71.6%) of the respondents have a 5-10 family size and 3 (1.6%) of the respondents have more than 10 family size. The average family size is 2. It also indicates that 29 (15.3%) of the respondents are Civil Servants, 65 (34.2%) of the respondents are Artisans, 66 (34.7%) of respondents are Traders, 14 (7.4%) are Retired and 16 (8.4%) of the respondents are unemployed. Lastly, the table also indicates that 101 (53.2%) of the respondents have less than ₦50,000 as their monthly income, 66 (34.7%) of the respondents have ₦50,000-₦100,000 as their monthly income, 6 (3.2%) of the respondents have ₦101,000-₦200,000 as their monthly income, 11 (5.8%) of the respondents have ₦151,000-₦200,000 as their monthly income and 6 (3.2%) of the respondents have more than ₦200,000 as their monthly income. The mean monthly income is ₦67,165.

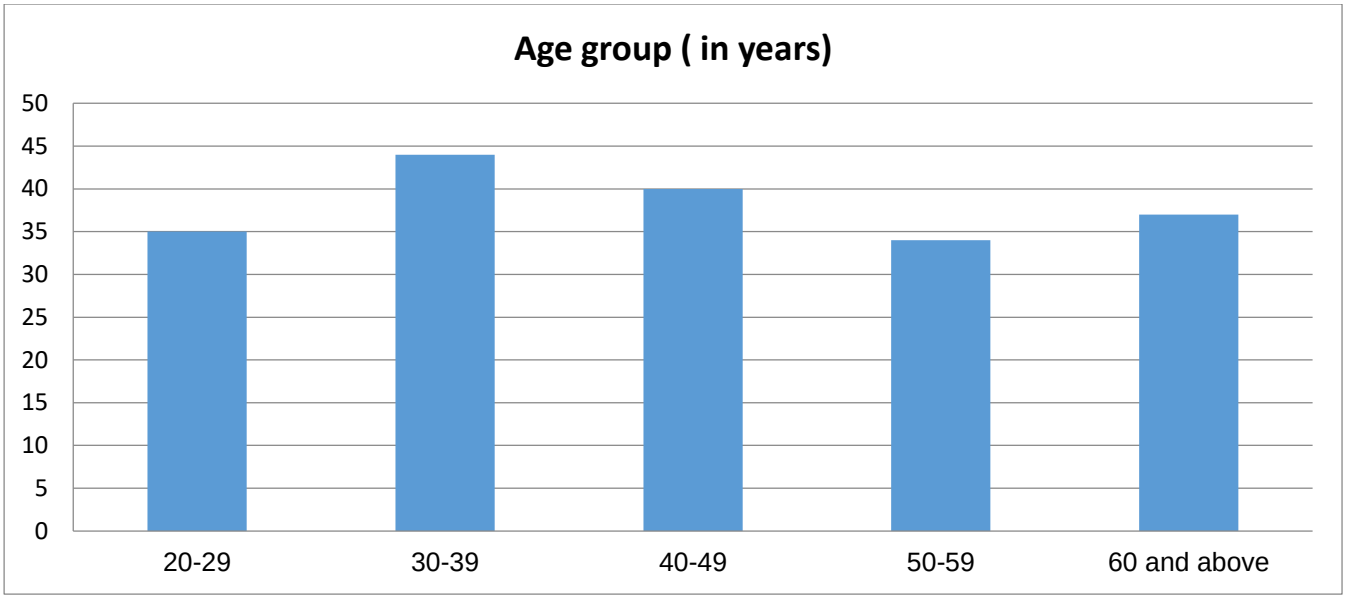


Figure 4.1: Bar chart showing the age-group of respondents

The figure above shows that most of the respondents fall between the age group 30-39 years and the least is 50-59 years.

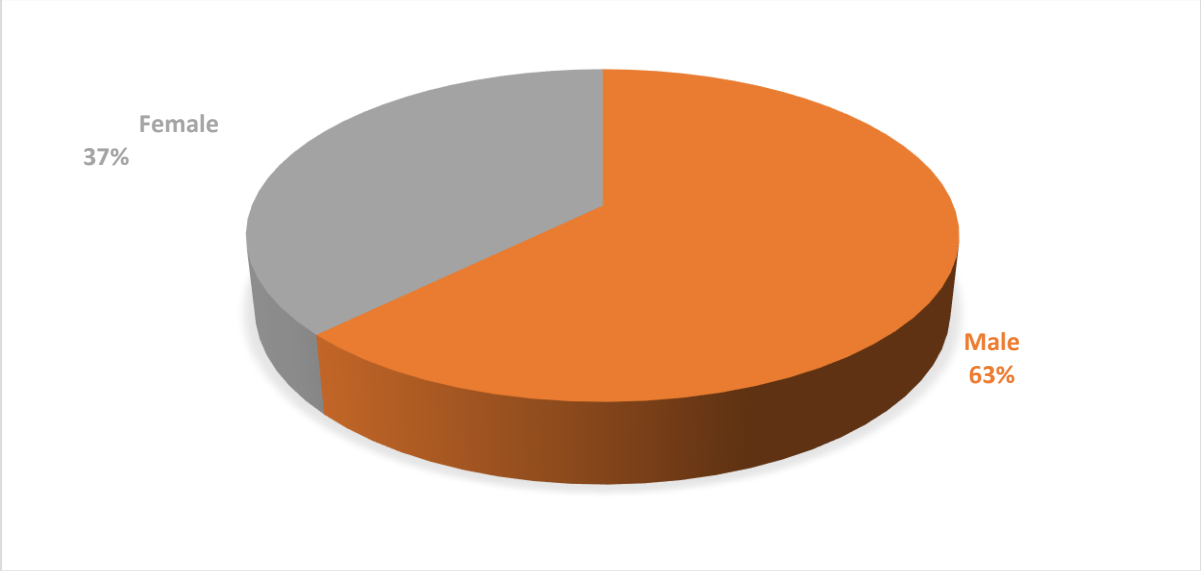


Figure 4.2: Pie chart showing the gender of respondents

The figure above shows that 63% of the respondents are male and 37% are female.

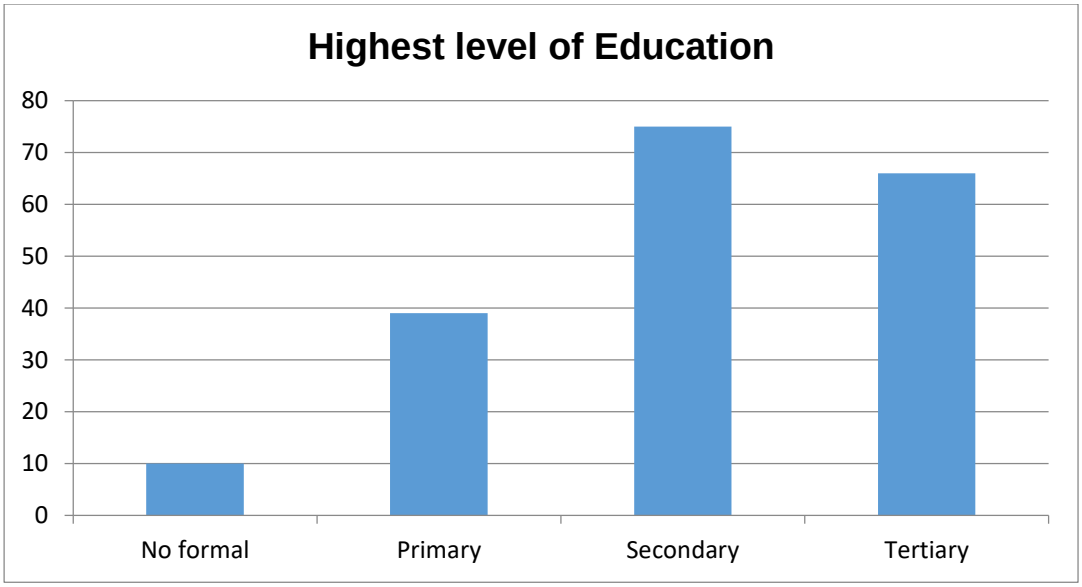


Figure 4.3: Bar chart showing the highest level of education of respondents

The chart above shows that most of the respondents' highest level of education is secondary school and just few of them have no formal education.

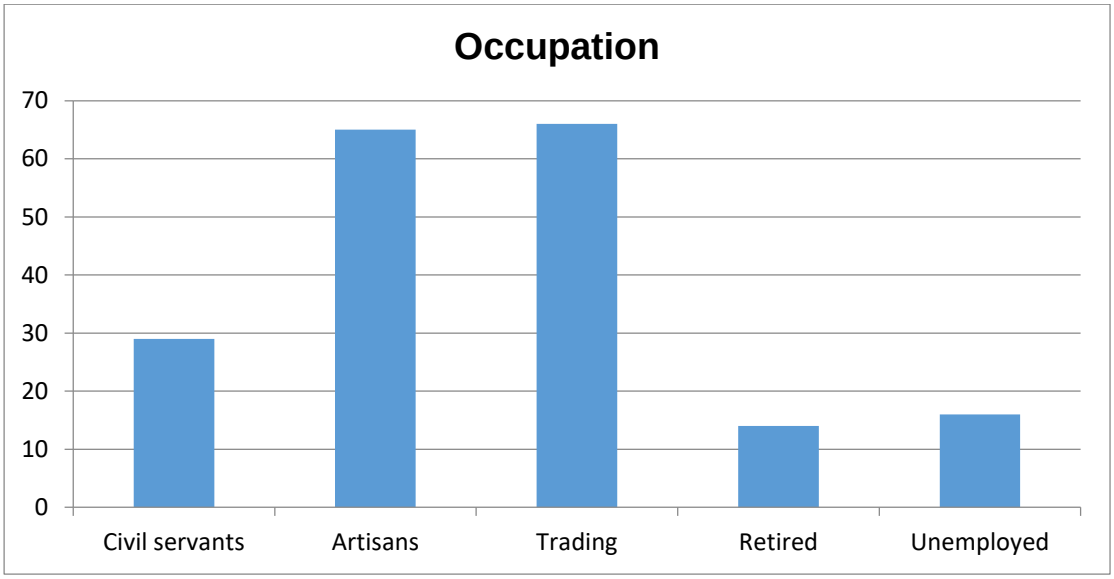


Figure 4.4: Bar chart showing the occupation of respondents

The bar chart above shows that about 65 of the respondents are into trading and 66 of them are artisans and only about 14 and 16 respondents are retired and unemployed respectively.

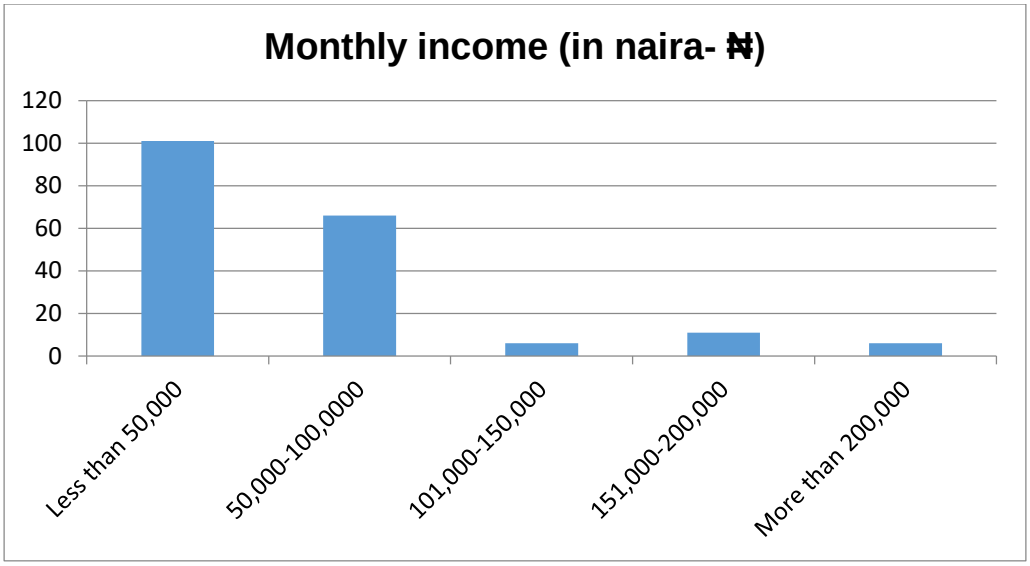


Figure 4.5: Bar chart showing the monthly income of respondents.

The figure above shows that about 100 of the respondents earn less than ₦50,000 and only 6 out of the respondents earn more than ₦200,000 as their monthly income.

TABLE 4.2: WOUND AND DRESSING CHARACTERISTICS

Aetiology	**Frequency**	**Percent (%)**
Road Traffic Accident	65	34.2
Cancer	43	22.6
Fall	13	6.8
Pathological	32	16.8
Traumatic injury	14	7.4
Burn injury	5	2.6
Occupational injury	6	3.2
Gunshot injury	7	3.7
Others	5	2.6
Mean ± SD	21.11 ± 21.17	
Diagnosis		
Tibiofibular fracture	35	18.4
Femoral fracture	31	16.3
Avulsion injury	24	12.6
Breast cancer	10	5.3
Cellulitis	15	7.9
Cervical cancer	8	4.2
Leg ulcer	8	4.2

Amputation	5	2.6
Head injury	6	3.2
Others	48	25.3
Mean± SD	19 ± 17.79	
Type of wound		
Open wound	58	30.5
Surgical wound	82	43.2
Burn injury	3	1.6
Leg Ulcer	9	4.7
Diabetic foot ulcer	6	3.2
Cancer wound	23	12.1
Pressure injury	9	4.7
Mean ± SD	27.14 ± 30.73	
Comorbidities		
None	151	79.5
Diabetes Mellitus	16	8.4
Hypertension	7	3.7
Diabetes and Hypertension	7	3.7
Anemia	3	1.6
Arthritis	2	1.1
Others	4	2.1
Mean ± SD	27.14 ± 54.81	
Frequency of wound dressing per week		
Two times	20	10.5
Alternate Day	73	38.4
Five times	18	9.5
Daily	79	41.6
Mean ± SD	47.5 ± 33.01	
Number and type of dressing packs used per week		
1-3 Minor	3	1.6
4-6 Minor	1	0.5
7 and Above Minor	12	6.3
1-5 Moderate	32	16.8
6-10 Moderate	28	14.7
21 and Above Moderate	1	0.5
1-5 Major	74	38.9

6-10 Major	35	18.4
11-15 Major	3	1.6
31 and Above Major	1	0.5
Mean ± SD	19 ± 27.72	
Length of hospital stay		
Less than 11 Weeks	162	85.3
11 - 20 Weeks	23	12.1
21 - 30 Weeks	2	1.1
31 - 40 Weeks	1	.5
51 - 60 Weeks	2	1.1
Mean ± SD	38 ± 69.93	

Findings: Table 4.2 above shows that 65 respondents (34.2%) had road traffic accidents followed by cancer (22.6%), fall (16.8%), traumatic injury (7.4%) and the rest of the aetiology accounting for less than 7%. It shows that tibiofibular fracture is 35 (18.4%), femoral fracture is 31 (16.3%), and avulsion Injury is 24 (12.6%) among others. It also indicates that surgical wound is the most common as reported by 82 respondents (42.3%), followed by open wound as reported by 58 respondents (30.5%), cancer wound as reported by 23 respondents (12.1%) and others.

It also shows that 151(79.5%) respondents do not have any comorbidities. It shows that 79 (41.6%) of the respondents dress their wounds daily, 373 (8.4%) for alternate days dressing, 20 (10.4%) two times per week while 18 (9.5%) are on dressing five times per week. Based on the number and type of dressing pack used per week, 74 (38.9) of the respondents are on 1-5 major dressing, 35 (18.4%) of the respondents are on 6-10 major dressing while 32 (16.8%) are on 1-5 moderate dressing packs. Majority of the respondents, 162 (85.3%) spent less than 11 weeks on admission while few of the respondents were admitted for 11 weeks and above.

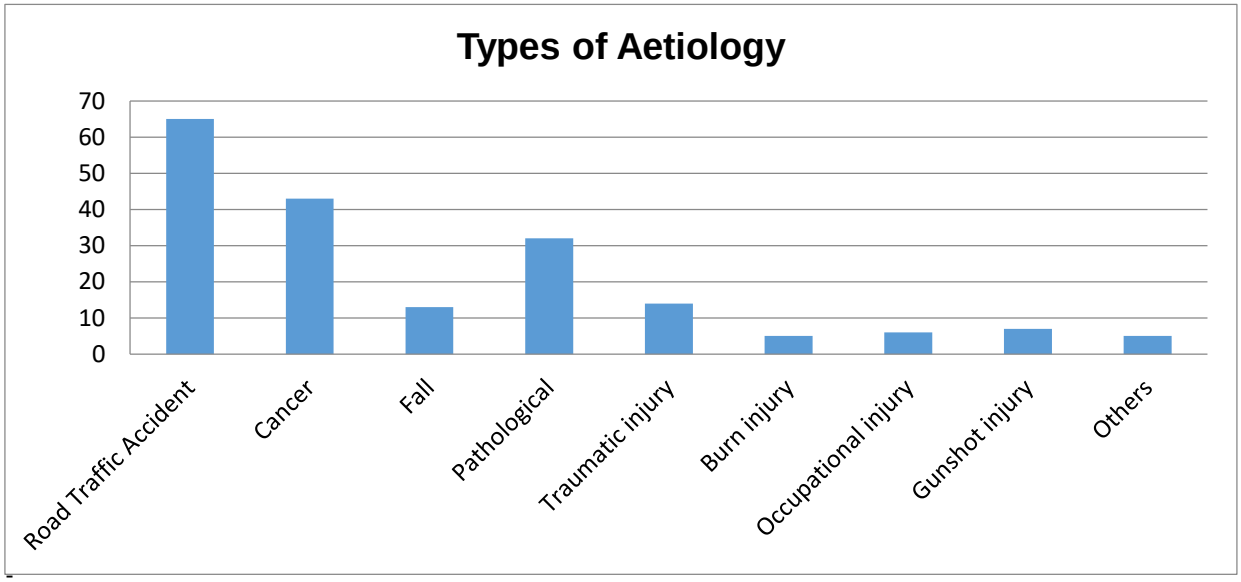


Figure 4.6: Bar chart showing the different type of wound aetiology

The chart above shows that 65 respondents (34.2%) had road traffic accidents followed by cancer with 22.6%, fall with 16.8%, traumatic injury with 7.4% and the rest of the aetiology with less than 7%.

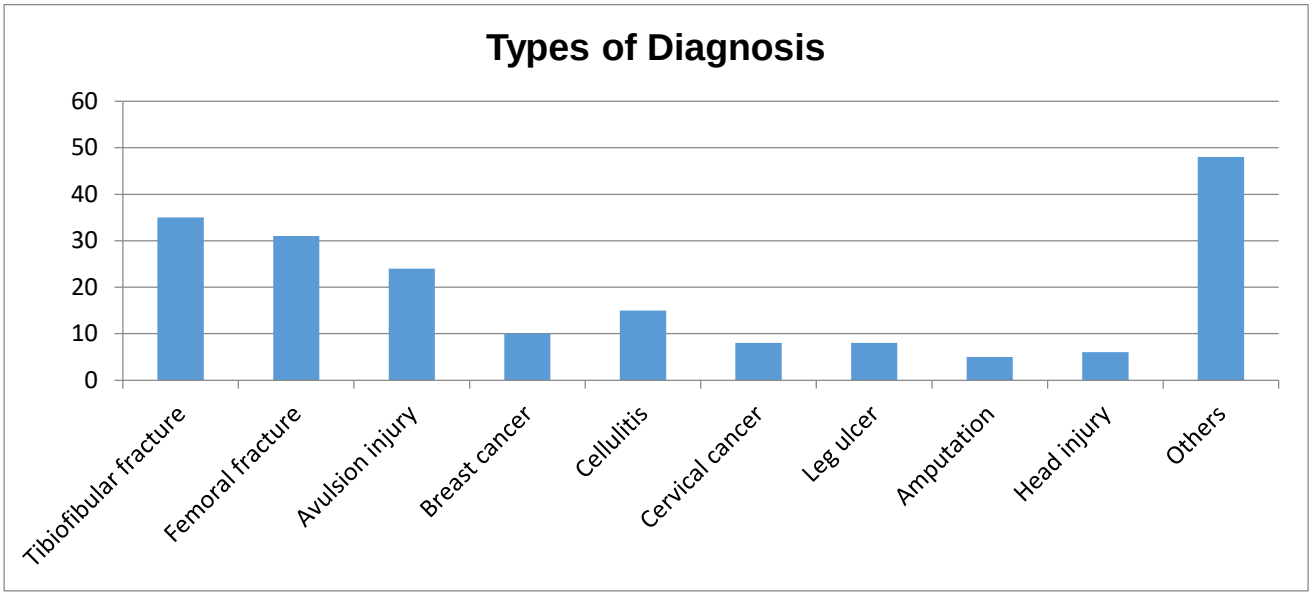


Figure 4.7: Bar chart showing types of respondents' diagnosis

The bar chart above shows that 48 respondents had other diagnoses, 35 had tibiofibular fracture, 31 had femoral fracture and 24 had avulsion injury.

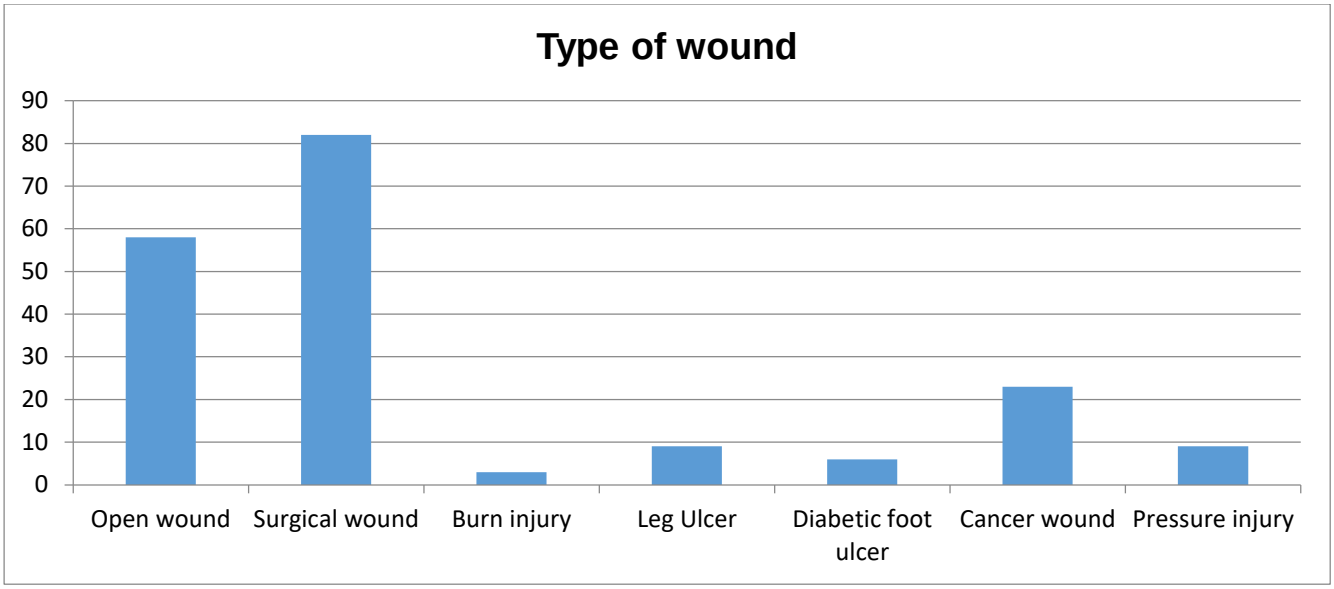


Figure 4.8: Bar chart showing the type of wound

The bar chart above shows that surgical wound is the most common among the respondents, followed by open wound with burn injury being the least.

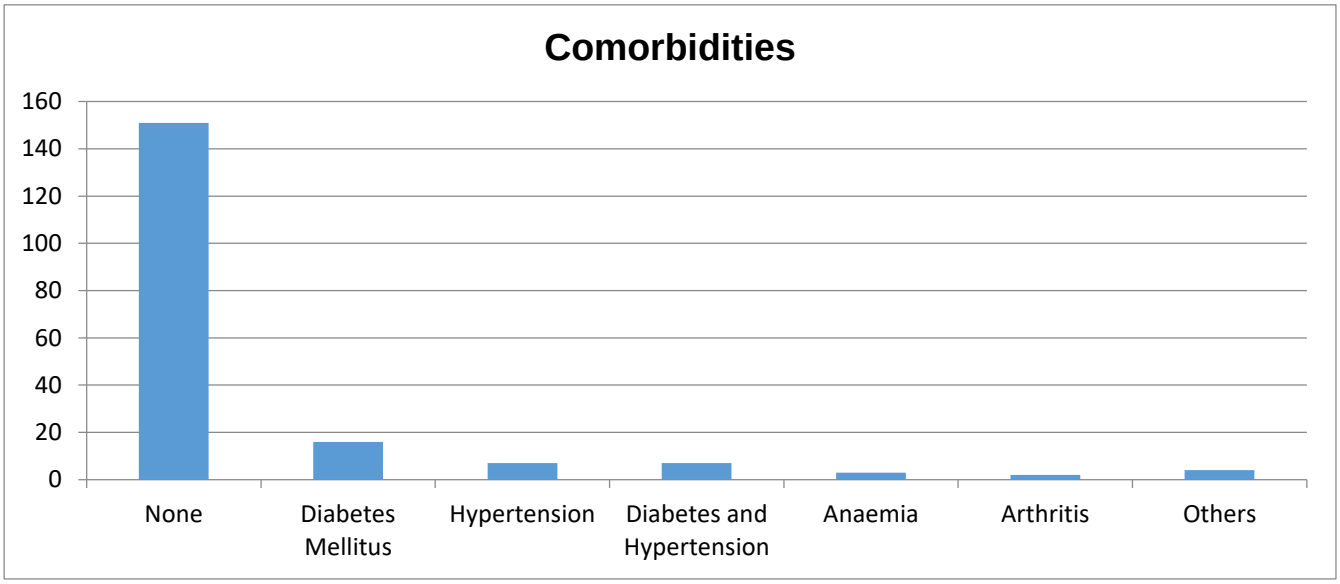


Figure 4.9: Bar chart showing the respondents' comorbidities

The figure above shows that most of the respondents do not have any comorbidities and only about 39 of them have one comorbidity or the other.

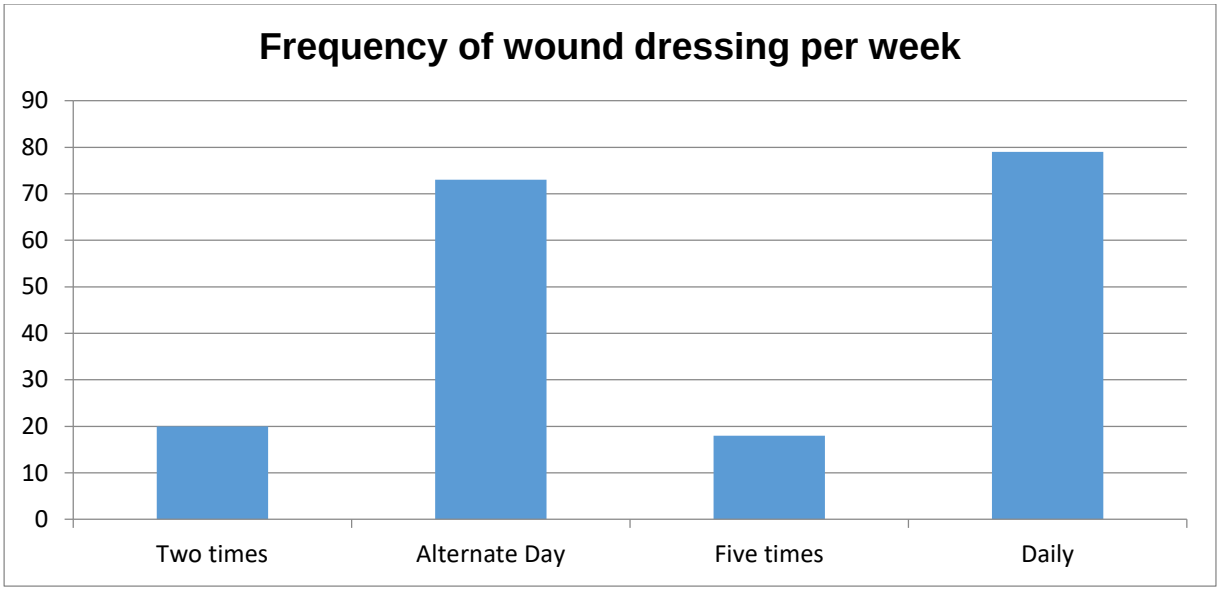


Figure 4.10: Bar chart showing the frequency of wound dressing per week

The chart above shows that most of the respondents dress their wounds daily and alternate days but few of them dress their wounds two times a day or five times a day.

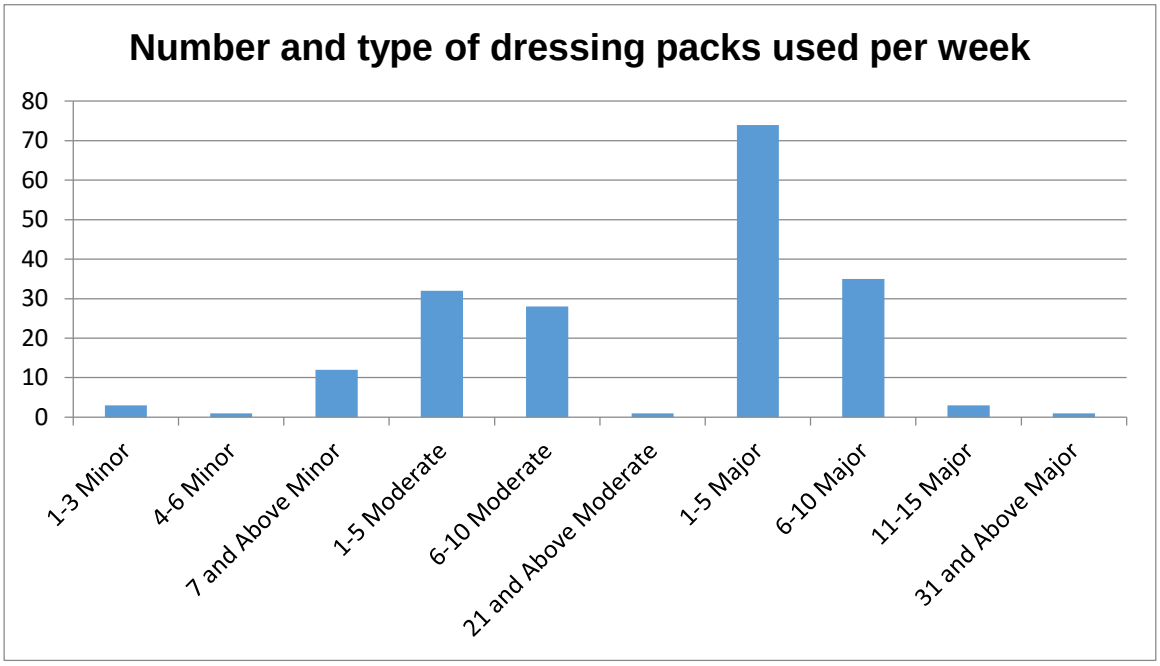


Figure 4.11: **Bar chart showing the number and type of dressing packs used per week**

The bar chart above shows that most of the respondents used 1-5 major dressing packs per week, followed by 6-10 major, 1-5 moderate and 6-10 moderate packs.

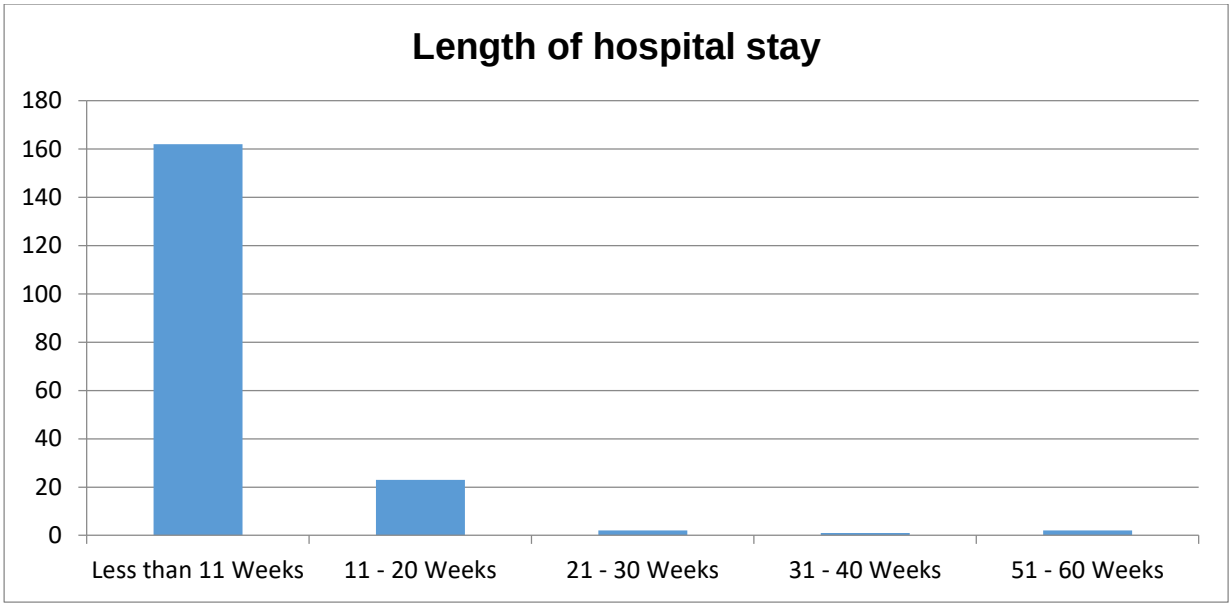


Figure 4.12: Bar chart showing the length of hospital stays by respondents

The bar chart above shows that 163 respondents stay in the hospital for less than 11 weeks while the few of the respondents stay for 11 weeks and above.

TABLE 4.3: HEALTHCARE INSURANCE COVERAGE RESPONSE RATE

Are you on any healthcare insurance coverage?	**Frequency**	**Percent (%)**
Yes	16	8.4
No	172	90.5
Type of health insurance scheme		
Public Health Insurance (NHIS)	8	4.2
Private	4	2.1
Duration of health insurance coverage		
Till my parent retires	6	3.2
Till my retirement	4	2.1
Do you personally pay for your wound dressing?		
Yes	47	24.7
No	143	75.3

Findings: Table 4.3 above shows that 16 (8.4%) of the respondents are on healthcare insurance coverage while 172 (90.5%) of the respondents are not. It also shows that 8 (4.2%) of the respondents are on the Public Health Insurance scheme (NHIS) while 4 (2.1%) of the

respondents are on the private healthcare insurance scheme. It indicates also that 6 (3.2%) of the respondents' duration of health insurance coverage is till their parent retirement while 4 (2.1%) are covered till they retire. It also shows that only 47 (24.7%) of the respondents pay personally for their wound care while 143 (75.3%) of the respondents do not.

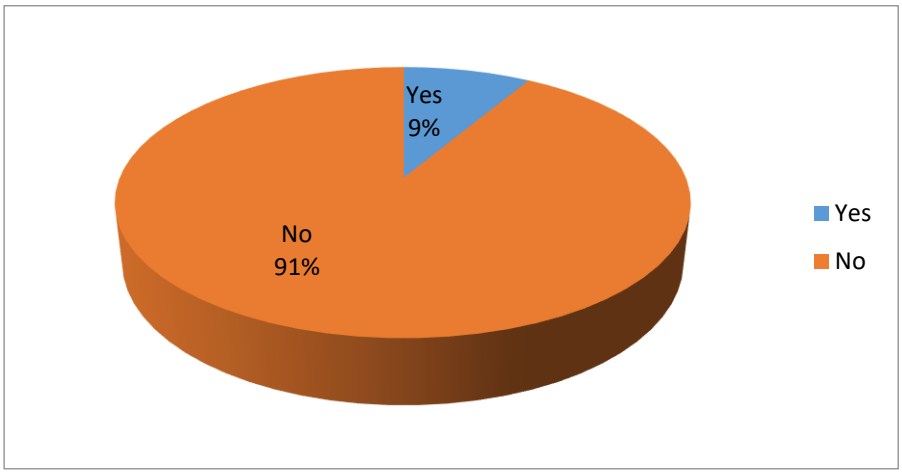


Figure 4.13: Pie chart showing the respondents' response about healthcare insurance coverage

The pie chart above shows that 172 (91) respondents are not under any healthcare insurance coverage while about 16 (9%) are under health care insurance coverage.

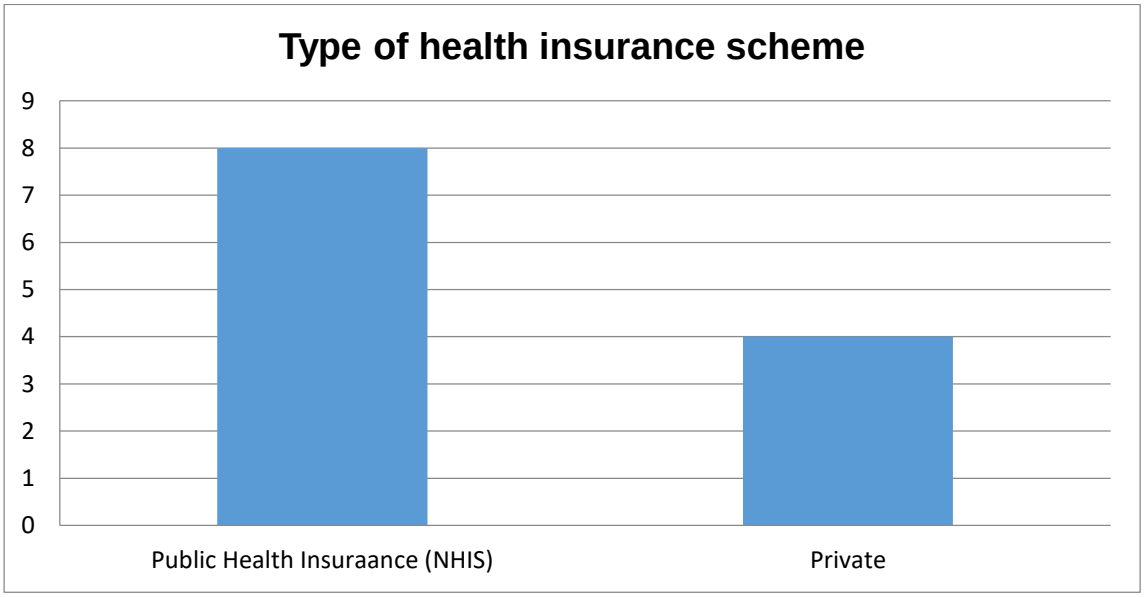


Figure 4.14: The bar chart shows the type of health insurance scheme

The bar chart above shows that only 8 patients are covered under the public health insurance scheme and 4 are covered under the private health insurance scheme and the remaining 178 respondents do not have a health insurance coverage.

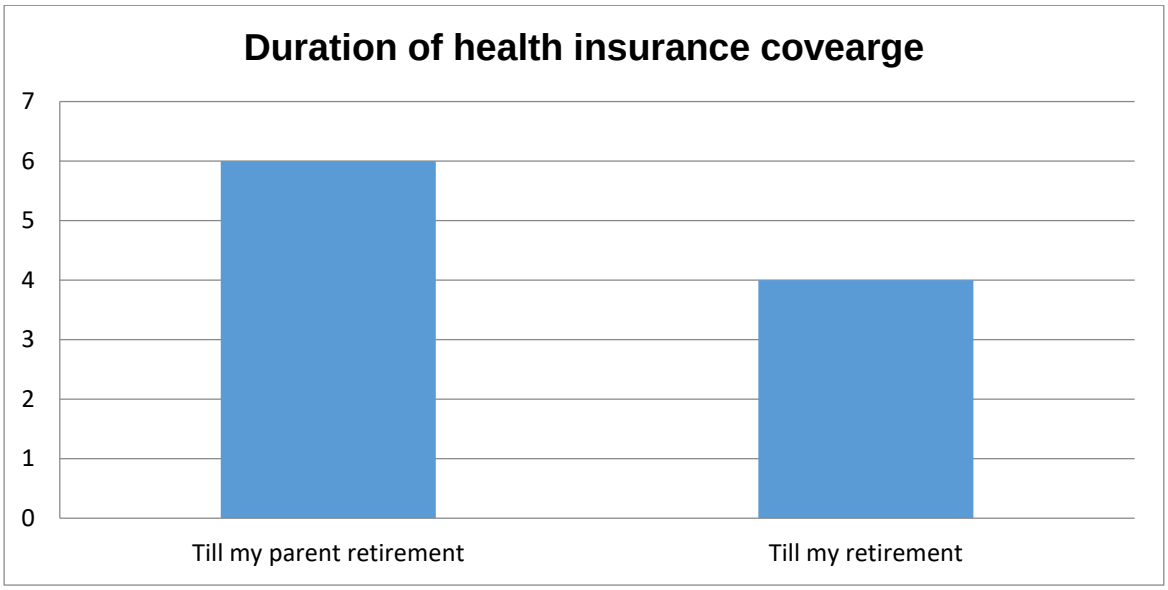


Figure 4.15: The bar chart shows the duration of health insurance coverage

The bar chart shows that 6 respondents are covered till their parents' retirement and 4 respondents are covered till their retirement while the remaining 180 respondents do not have any duration of health insurance coverage.

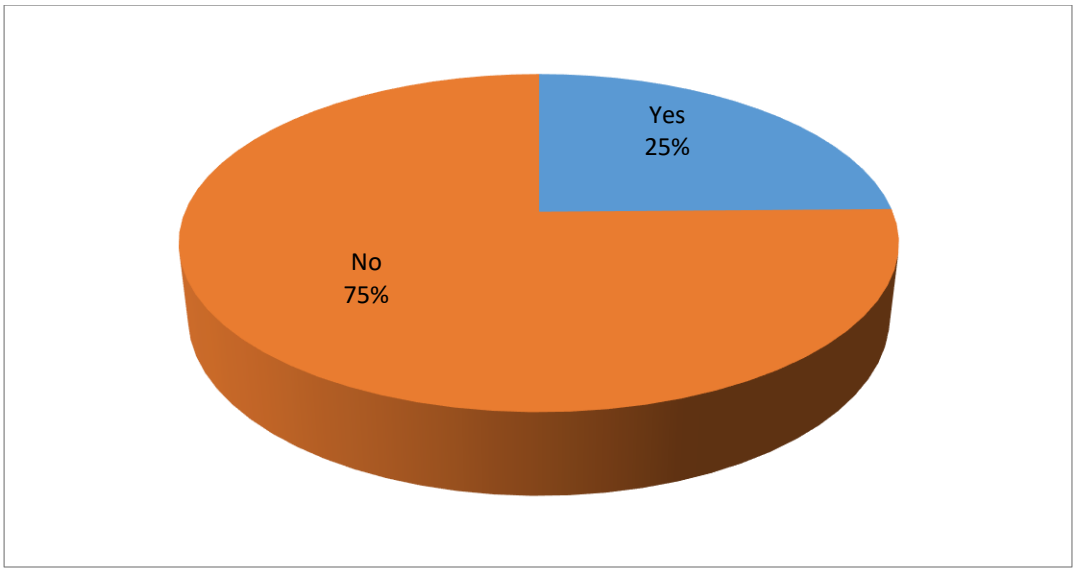


Figure 4.16: Pie chart showing respondents' responses on payment of wound dressing

The bar chart above shows that 25% (47) of the respondents pay personally for their wound dressing and 75% (143) of them do not pay personally for their wound dressing.

TABLE 4.4: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND WOUND AETIOLOGY

	Wound aetiology (mean and standard deviation)								
Direct cost of wound dressing- in naira (₦)	Road traffic accident	Cancer	Fall	Pathological	Traumatic injury	Burn injury	Occupational injury	Gunshot injury	Others
Cost of dressing consumables per week	5405.59± 741.579	2640± 718.610	8213.64± 3123.220	4320± 1066.385	3783.33± 2297.039	13010± 7763.253	5840± 3693.589	5795.71 ± 2123.170	2725.00± 1452.791
Cost of lotion used per week	5883.64± 1413.336	1784.38± 402.008	4582.73± 1514.829	4339.14 ± 647.794	2072.22± 776.956	3750± 1179.619	3570± 1157.108	2257.14 ± 856.195	2262.50± 1136.584
Total cost of dressing per week	16995.34± 3208.534	10162.50± 1507.689	16029.09 ± 2684.863	12236.90± 1531.563	11875.00 ± 3999.560	24400± 6618.969	14518.00± 5718.804	11892.86± 2198.756	7700.00± 1367.175
Total cost of dressing per acute care episode	158591.5254 ± 50091.34701	89967.50003± 38549.29683	99632.7273± 28613.88744	88820± 15201.90527	69888.8889± 28138.05571	97600± 26475.87581	86728± 35061.91643	59902.8571± 14078.52226	35525± 8618.71752
Total cost of other expenses during care episode	27073.73± 4153.576	21527.50± 11591.175	26563.64 ± 7899.221	21770.48± 5513.807	13933.33 ± 4256.890	40800± 29872.061	11600± 4739.198	14428.57± 2653.454	20825.00± 10916.988
Cost of hospitalization per week	29908.47± 1291.166	9362.50± 1250.362	30309.09 ± 3024.910	28442.86± 2872.883	23022.22 ± 4981.878	34580.00± 21613.570	15680.00± 5036.110	24200.00± 4680.456	18375.00± 8254.733
Total cost of hospitalization per acute care	175332.20± 14531.751	56712.00± 11247.562	167236.36± 28162.668	197609.32± 36149.946	141866.67± 48696.840	138320 ± 86454.279	101920.00± 39445.231	128800.00± 30648.110	94500± 53425.181

Findings: Table above shows the mean distribution of variables by direct cost of wound dressing and aetiology. The table shows the mean and standard deviation of the direct cost of wound dressing against wound aetiology. From the table, the average cost of dressing consumables for burn was estimated to be ₦13010. In addition, ±7763.253 for fall, ₦8213.64±3123.220 for occupational injury, ₦5840. ±3693.589 for gunshot injury and ₦5405.59±741.579 for road traffic accident. The average cost of lotion used for road traffic accident, fall and pathological factor amounted to ₦5883.64±1413.336, ₦4582.73±1514.829 and ₦4339.14±647.7941 respectively. The average cost of dressing per week was also estimated to be ₦16995.34±3208.534 for road traffic accident, ₦10162.50±1507.689 for cancer, ₦16029.09±2684.863 for fall, ₦12236.90±1531.563 for pathological condition, ₦11875.00±3999.560 for traumatic injury and ₦24400±6618.969 for burn injury. The average cost of dressing per acute care episode for road traffic accident amounted to ₦158591.5254±50091.34701 while the average cost of hospitalization per acute care episode for road traffic accident amounted to ₦175332.20±14531.751.

TABLE 4.5: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND DIAGNOSIS

	Wound diagnosis (mean and standard deviation)- in naira (₦)								
Direct cost of wound dressing (₦)	Tibiofibular fracture	Femoral fracture	Avulsion injury	Breast cancer	Cellulitis	Cervical cancer	Leg ulcer	Amputation	Others
Cost of dressing consumables per week	6517.35± 1291.597	3594.19± 678.155	7609.50± 2291.987	4537.50± 2766.871	4713.64± 1597.442	2333.33± 116.667	4289.29± 1761.407	1790.00± 292.575	4749.52± 1379.598
Cost of lotion used per week	5077.65± 1127.535	5958.87± 2416.802	3180.50± 690.026	1675.00± 603.290	4258.18± 860.597	1043.33± 43.333	3792.86± 1235.990	1372.00± 372.416	3546.19± 841.571
Total cost of dressing per week	18665.88 4770.777	11910.48 2900.476	14990.00 2527.413	9900.00 2075.653	14950.00 1963.330	10376.67 73.333	12042.14 3256.845	8602.00 1781.927	13839.76 2325.209
Total cost of dressing per acute care episode	184438.23 ± 77182.56	99747.09± 41192.12	69764.00± 12585.63	59850.00± 22131.33	89029.09± 19733.75	87500.00± 35762.59	82765.71± 27170.27	34408.00± 7127.70	102307.61 ± 32015.20
Total cost of other expenses during around care episode	27767.65± 5156.77	23223.55± 6031.54	23240.00± 7775.06	17380.00± 7976.99	19380.91± 3669.44	6000.00± 1154.70	12214.29± 2267.41	14200.00± 6748.33	30805.71± 10062.66
Cost of hospitalization per week	27155.88± 1416.36	27916.13± 2337.84	27090.00± 5485.32	8050.00± 350.00	23990.91± 3129.20	6409.52± 804.80	19400.00± 5877.92	22960.00± 6470.36	21842.86± 3224.50
Total cost of hospitalization per acute care episode	182947.06 ± 19978.23	185341.94 ± 26681.45	134960.00 ± 25843.96	46200.00± 12600.00	125236.36 ± 20723.58	44866.67± 5633.62	134400.00 ± 45809.46	91840.00± 25881.45	149342.86 ± 29947.03

Findings: Table above shows the mean distribution of variables by direct cost of wound dressing and diagnosis. The table shows the mean and standard deviation of variables by direct cost of wound dressing against diagnosis. The average cost of wound dressing consumables for tibiofibular fracture and avulsion injury estimated to be ₦6517.35±1291.597 and ₦7609.50±2291.987 respectively. The average cost of lotion used per week for tibiofibular fracture and femoral fracture amounted to ₦5077.65±1127.535 and ₦5958.87±2416.802. Also, the average cost of wound dressing per week for tibiofibular fracture, avulsion injury and cellulitis estimated to be ₦18665.88±4770.777, ₦14990.00±2527.413, ₦14950.00±1963.330. Furthermore, the cost of wound dressing per acute care episode estimated to be ₦184438.23±77182.56 while that of hospitalization per acute care episode estimated to be ₦182947.06±19978.23. Again, the cost of hospitalization per acute care episode for femoral injury, avulsion injury, and cellulitis and leg ulcer amounted to ₦185341.94±26681.45, ₦134960.00±25843.96, ₦125236.36±20723.58 and ₦134400.00±45809.46 respectively.

TABLE 4.6: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND TYPE OF WOUND

	Type of wound (mean and standard deviation)						
Direct cost of wound dressing- in naira (₦)	Open wound	Surgical wound	Burn injury	Leg Ulcer	Diabetic foot ulcer	Cancer wound	Pressure injury
Cost of dressing materials per week	5,994.14 ± 16,527.108	3,643.05 ± 2,568.682	5000 ± 4256.759	2731.11 ± 1,357.097	4899.17 ± 4158.366	5,474.35 ± 4,672.414	8,783.33 ± 8,364.919
Cost of other dressing consumables per week	5,165.18 ± 6,807.349	4,314.85 ± 4,703.572	18533.33 ± 21,979.612	4,047.22 ± 4185.885	2,075 ± 1706.678	3,786.88 ± 5,613.498	3700 ± 7,708.491
Cost of lotion used per week	4,099.22 ± 6,556.293	3,629.51± 81,143.607	3,250 ± 3,275.286	4,161.11 ± 3,185.665	3,3700 ± 3,180.307	1,468.70 ± 1,077.916	2,208.89 ± 3,634.603
Total cost of dressing per week	13,919.31 ± 22,087.649	10,867.87 ± 11,829.036	26,783.33 ± 19,625.642	10,717.22 ± 8,234.761	12,632.50 ± 11,030.159	9,473.04 ± 8,539.597	13,870 ± 17,662.923
Total cost of dressing per acute care episode	119,802.759 ± 347,128.475	89,501.463 ± 161,883.881	107,331.333 ± 78,502.569	70,413.33 ± 65,666.214	50,350 ± 44,120.638	67,874.783 ± 132,956.562	110.546.667 ± 218,720.163
Total cost of other expenses during wound care episode	25,684.31 ± 27,787.806	26,689.87 ± 39,741.668	61,333.33 ± 85,541.413	11,112.50 ± 4,186.863	12,400 ± 4,615.192	18,938.95 ± 42,343.871	14,000 ± 9,521.905
Cost of hospitalization per week	24,065.52 ± 12,788.818	21,517.07± 12,935.517	44,333.33 ± 64,663.230	19,366.67 ± 14,795.523	18,783.33 ± 11,446.945	7,921.89 ± 542.575	8,156.52 ± 542.575
Total cost of hospitalization per acute care episode	150.717.24 ± 124,708.975	152,617.07 ± 129,857.944	177,333.33 ± 258,652.921	120,866.67 ± 103,737.071	75,133.33 ± 45,783.782	49,730.43 ± 44,855.388	44,800 ±23,758.788

Findings: Table 4.4 above shows the mean distribution of variables by direct cost of wound dressing and type of wounds. The table shows the mean and standard deviation of the direct cost of wound dressing and the types of wounds. The table shows that the cost of dressing materials per week for pressure injury which amounted to ₦8783.33±8364.919 while the average cost of dressing materials for open wound, cancer wound, burn wound and diabetic foot ulcer amounted to ₦5994.14±16527.108, ₦5474.35±4672.414, ₦5000. ±4256.759 and ₦4899.17±4158.366 respectively.

Furthermore, table 4.4 above shows the average cost of dressing consumables for burn injury to be ₦18533.33±21979.612 while the average cost of consumable for open wound, surgical wound and leg ulcer amounted to ₦5165.18±6807.349, ₦4314.85±4703.527, and ₦4047.22±4185.885 respectively. The average cost of lotion used per week for open wound and leg ulcer also amounted to ₦4099.22±6556.293 and ₦4161.11±3185.665 respectively.

Collectively, the total cost of dressing per week averagely was ₦26783.33±19625.642, ₦13919.31±22087.649, ₦13870. ±17662.923, ₦12632.50±11030.159 for burn injury, open wound, pressure injury and diabetic foot ulcer respectively. Based on the findings on acute care episode, the average cost of wound dressing for open wound amounted to ₦119802.759±347128.475, pressure injury amounted to ₦110546.667±218720.163and burn injury amounted to ₦107331.333±78502.569.

Furthermore, the average cost of hospitalization per week for open wound amounted to ₦24065.52±12788.818, surgical wound amounted to ₦21517.07±12935.517, burn injury amounted to ₦44333.33±64663.230, leg ulcer amounted to ₦19366.67±14795.523 and diabetic foot ulcer was ₦18783.33±11446.945. Also, the average cost of hospitalization per acute care episode for open wound amounted to ₦150717.24±124708.975, surgical wound amounted to ₦152617.07±129857.944, burn injury amounted to ₦177333.33±258652.921 and leg ulcer was estimated to be ₦120866.67±103737.071.

TABLE 4.7: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND FREQUENCY OF WOUND DRESSING

	Frequency of wound dressing (mean and standard deviation)			
Direct cost of wound dressing (₦)	**Two times**	**Alternate day**	**Five times**	**Daily**
Cost of dressing consumables per week	5781± 2667.544	4356.67± 609.325	3075.00± 1286.593	6825.82± 1078.453
Cost of lotion used per week	2551.88± 753.816	4483.50± 1193.486	7351.67± 3672.772	4065.61± 532.687
Total cost of dressing per week	10346.25± 2952.122	12439.58± 1659.640	10851.67± 4049.177	19836.73± 3321.80
Total cost of dressing per acute care episode	50585.00± 12914.01674	92485.6667± 22357.14983	102308.333± 50087.7584	168192.2449± 54821.30245
Total cost of other expenses during wound care episode	26262.50± 9431.207	24180.00± 3589.814	14333.33± 3838.271	24857.96± 5326.549
Cost of hospitalization per week	35581.25± 6407.016	24745.00± 1361.893	17799.67± 4669.152	22489.80± 1809.325
Total cost of hospitalization per acute care episode	182012.50± 36317.4 73	166273.33± 17061.207	140000.00± 38292.139	131232.65± 14272.89

Findings: The table above shows the mean distribution of variables by direct cost of wound dressing and frequency of wound dressing for inpatients. The table shows the mean and standard deviation of the direct cost of wound dressing against frequency of wound dressing. The cost of dressing consumables for daily dressing amounted to ₦6825.82±1078.453 per week while the cost of dressing for two times, alternate days and five times per week were estimated to be ₦5781. ±2667.544, ₦4356.67±609.325 and ₦3075. ±1286.593 respectively.

In addition, cost of lotion used per week for two times, alternate days, five times and daily dressing amounted to ₦2551.88±753.816, ₦4483.50±1193.486, ₦7351.67±3672.772 and ₦4065.61±532.687 respectively. The total cost of dressing per week for two times, alternate days, five times and daily dressing are ₦10346.25±2952.122, ₦12439.58±1659.640,

₦10851.67±4049.177, ₦19836.73±3321.80 respectively. Furthermore, the total cost of daily dressing per acute care episode were estimated to be ₦168192.2449±54821.30245 while the cost for two times, alternate days and five times amounted to ₦50585.00±12914.01674, ₦92485.6667±22357.14983 and ₦102308.333±50087.7584 respectively. While the total cost of hospitalization per acute care episode for two times, alternate days, five times and daily dressing were estimated to be ₦182012.50±36317.473, ₦166273.33±17061.207, ₦140000.00±38292.139 respectively.

TABLE 4.8: MEAN DISTRIBUTIONS OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND LENGTH OF HOSPITAL STAY

	Length of hospital stay (mean and standard deviation)	
Direct cost of wound dressing- (₦)	**Less than 11weeks**	**11-20weeks**
Cost of dressing consumables per week	4729.15± 605.045	8750.26± 1678.360
Cost of lotion used per week	3449.44± 399.291	10,003.16± 3794.887
Total cost of dressing per week	12008.80± 774.980	30632.89± 9058.802
Total cost of dressing per acute care episode	61959.4872± 4647.80818	417286.3158 141027.9989
Total cost of other expenses during wound care episode	18746.50± 1966.424	46091.05± 11301.019
Cost of hospitalization per week	24934.19± 1406.693	23357.89 2724.905
Total cost of hospitalization per acute care episode	125452.99± 7923.892	322073.68 41270.811

Findings: The table above shows the mean distribution of variables by direct cost of wound dressing and length of hospital stay. The table shows the mean and standard deviation of the inpatient cost of wound dressing against the length of hospital stay. The table shows that the average cost of dressing consumables per week for patients who were hospitalized for less than 11 weeks amounted to ₦166273.33±17061.207 while the average cost of dressing consumables for patients hospitalized for11-20weeks amounted to ₦8750.26±1678.360.

Also, the average cost of dressing lotion used for patients hospitalized for less than 11weeks were estimated to be ₦3449.44±399.291 while the cost estimate for patients hospitalized for 11-20 weeks amounted to ₦10003.16±3794.887. Furthermore, total average cost of

dressing per week for less than 11 weeks hospitalization was, ₦12008.80±774.980 while the average cost of dressing per week for 11-20 weeks hospitalization was ₦30632.89±9058.802.

Again, the average cost of dressing per acute care episode for less than 11 weeks hospitalization amounted to ₦61959.4872±4647.80818. The average cost of hospitalization for less than 11 weeks amounted to ₦6125452.99±7923.892 while the average cost for 11-20 weeks hospitalization amounted to ₦322073.68±41270.811.

CHAPTER FIVE

PHASE II- OUTPATIENTS

DATA ANALYSIS AND INTERPRETATION

This is the analysis and interpretation of collected data for nursing care cost of out-patients wound dressing. Data was analyzed using Statistical Package for Social Sciences (SPSS) Version 23.0. The results are presented in frequency distribution tables and chi-square tables. The cost is in Nigeria naira (₦). 1 USD= ₦515 and 1 ZAR= ₦45 (August 2021).

TABLE 5.1: ANALYSIS OF DEMOGRAPHIC DATA OF RESPONDENTS

Respondents' Socio-demographic characteristics	Frequency	Percent (%)
Gender		
Male	69	53.1%
Female	61	46.9%
Age group (in Years)		
20-29	34	26.2%
30-39	24	18.5%
40-49	29	22.3%
50-59	22	16.9%
≥60	21	16.2%
Mean (±SD)	43.03 ± 15.47 years	
Range	20 to 86 years	
Highest Education Level		
No formal education	3	2.3%
Primary education	28	21.5%
Secondary education	49	37.7%
Tertiary	50	38.5%
Occupation		
Civil servants	18	13.8%
Artisans	48	36.9%
Trading	45	34.6%
Retired	4	3.1%
Unemployed	15	11.5%
Family size		
Less than 5	52	40.0%
5 – 10	74	56.9%
More than 10	4	3.1%
Mean (±SD)	5.37 ± 2.245 Size	
Range	2 to 17 Size	
Monthly Income		
Less than 50,000	94	72.3%
50,000 – 100000	29	22.3%
101,000 – 150,000	3	2.3%
151,000 – 200,000	1	0.8%
More than 200,000	3	2.3%
Mean (±SD)	₦47,123.08 ± 54,240.923	
Range	₦5,000 to ₦400,000	

Findings: Table 5.1 above shows that 69 (53.1%) of the respondents were male, 61(46.9%) of the respondents were female. The average age of the respondents is 43 years old. It also indicates that 34(26.2%) of the respondent are 20-29 years of age, 24 (18.5%) of the respondents are of the age range of 30-39 years, 29 (22.3%) respondents are of the age range of 40-49 years, while 21(16.2%) are 60 years and above. Most of the respondents, 50 (37.5%), have tertiary education while 3 (2.3%) respondents have no formal education.

Also, 18(13.8%) of the respondents are civil servants while 48(36.9%), 45(34.6%), 4(3.1%) and 15(11.5%) are artisans, traders, retired and unemployed respectively. The highest family size ranges from 5-10 as reported by 74(56.9%) respondents. The average family size was 5. The average income of the respondents is ₦47,123. Furthermore, 94 (72.3%) of the respondents receive ₦50,000-₦10000 as monthly income. From the findings, ₦5000 and ₦400,000 are the lowest and highest income of the respondents respectively.

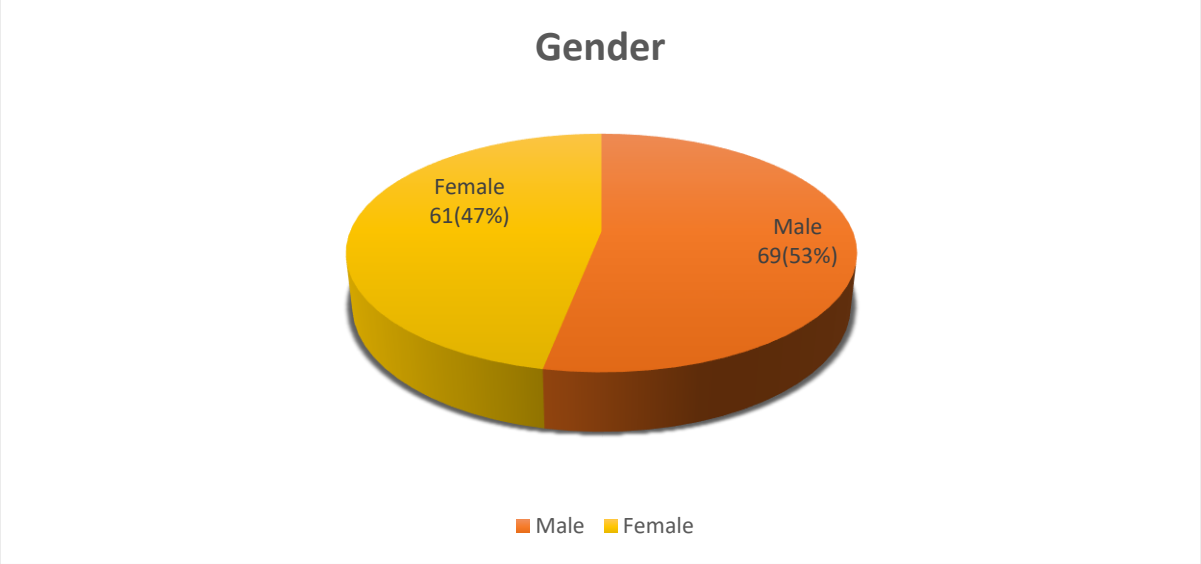


Figure 5.1: Gender of the respondents

Figure 5.1 above demonstrates that 69 (53.1%) of the respondents were male while 61(46.9%) of the respondents were female.

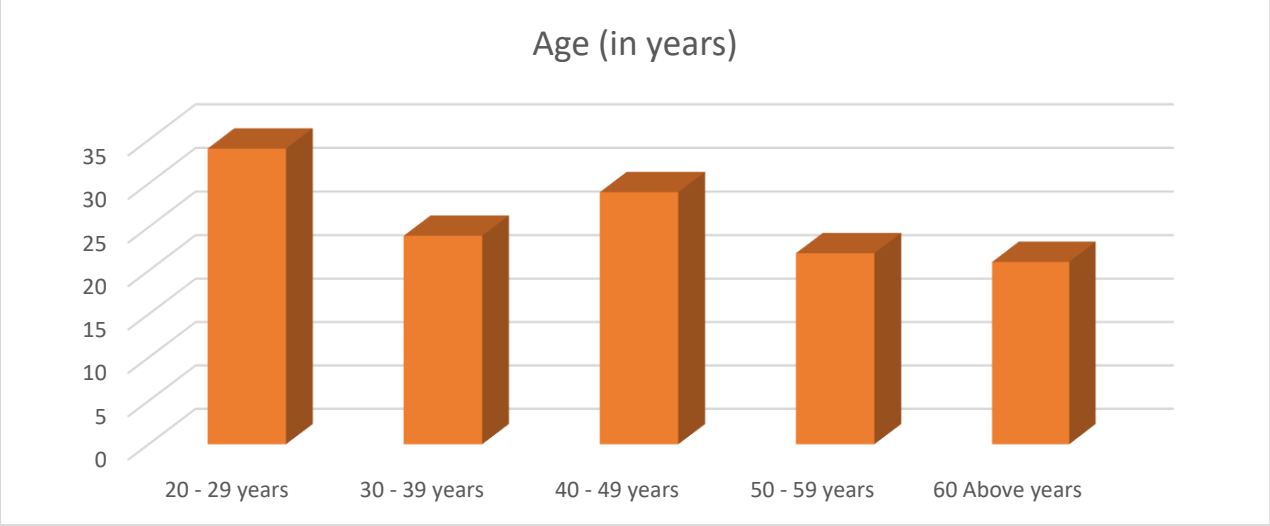


Figure 5.2: Age of the respondents in years

Figure 5.2 above demonstrates that 34 (26.2%) of the respondents are 20-29 years of age, 24 (18.5%) of the respondents are of the age range of 30-39 years, 29 (22.3%) respondents are of the age range of 40-49 years, while 21(16.2%) are 60 years and above.

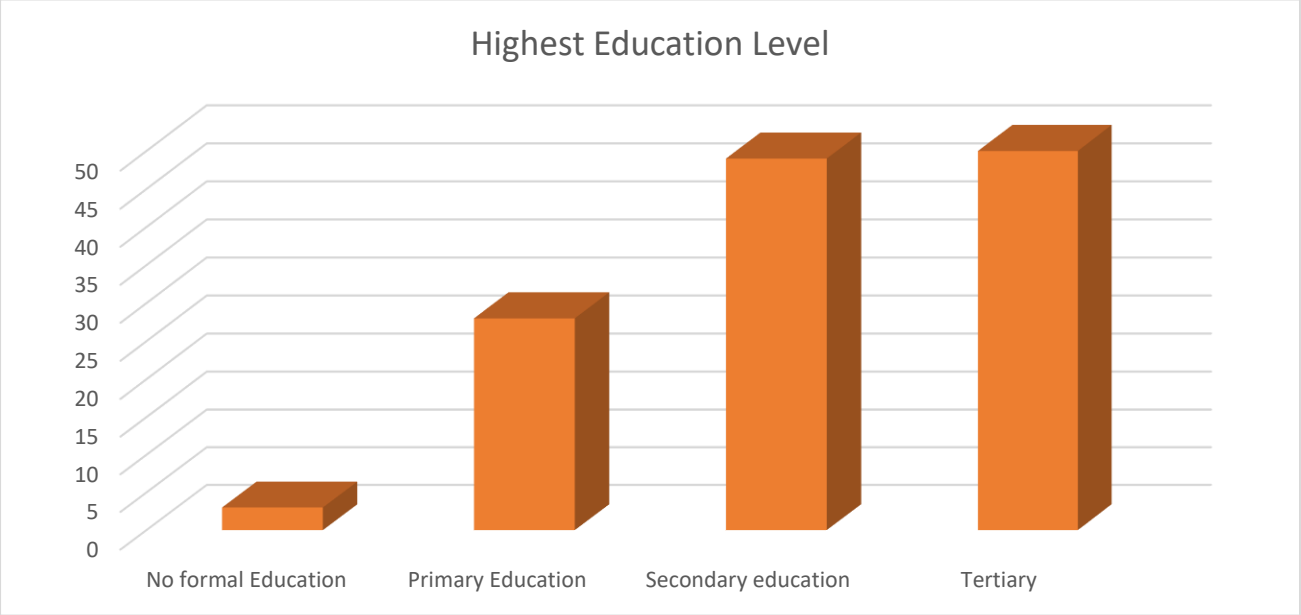


Figure 5.3: Highest education level

According to the figure 5.3, most of the respondents have tertiary education as reported by 50 (37.5%) respondents while 3 (2.3%) respondents have no formal education.

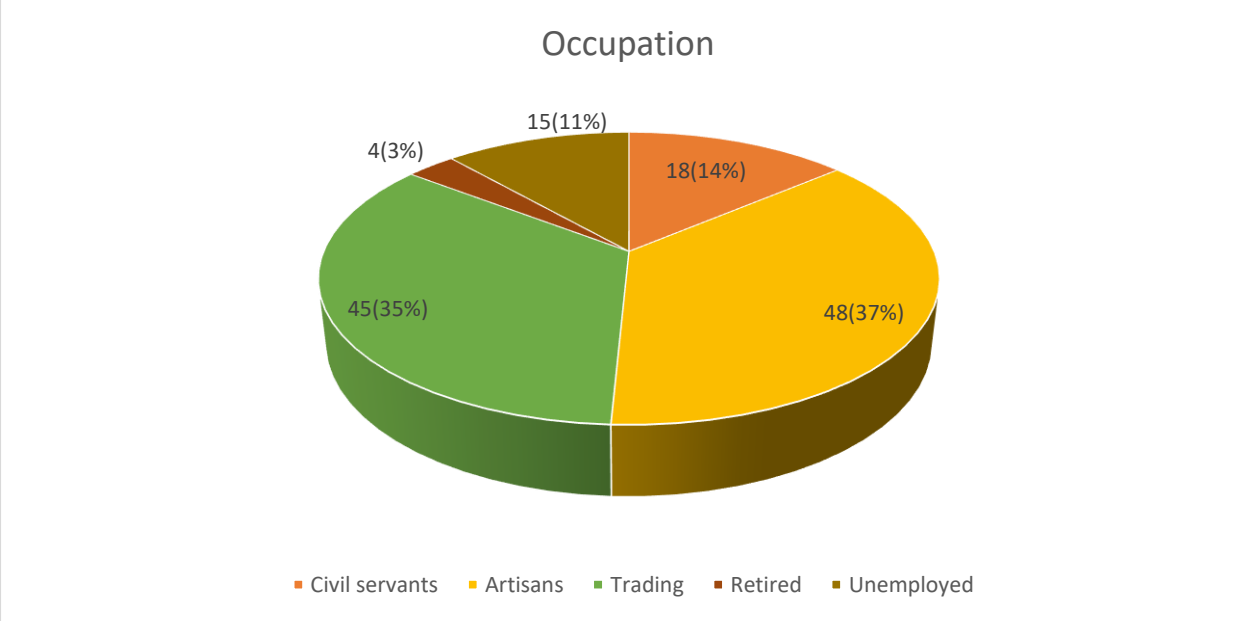


Figure 5.4: Occupation

Figure 5.4 demonstrates that 18 (13.8%) of the respondents are civil servants while 48 (36.9%), 45 (34.6%), 4 (3.1%) and 15 (11.5%) are artisans, traders, retired and unemployed respectively.

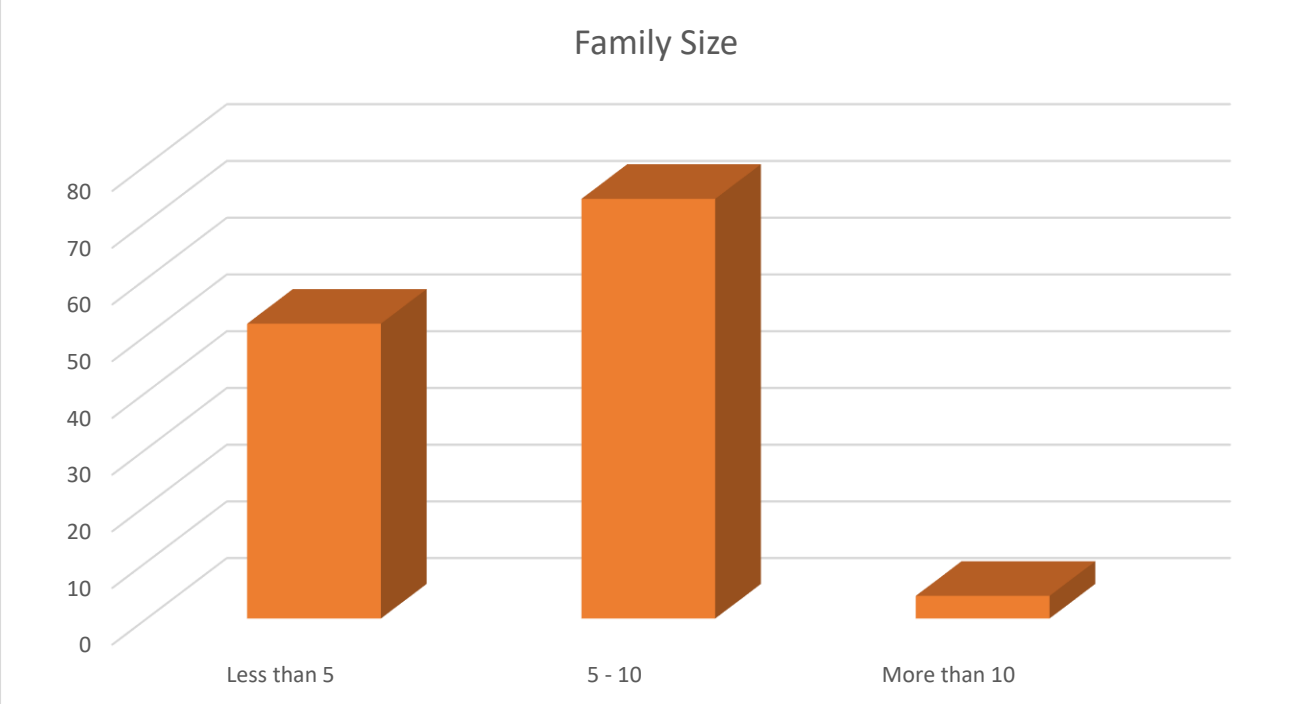


Figure 5.5: Family Size

Figure 5.5 demonstrates that 52 (40%) of the respondents fall between the range of a family size of less than five (5), while 74 (56.9) of the respondents are within the family size group of 5-10. More than 10 constitute the lowest as reported by 4 (3.1%) respondents.

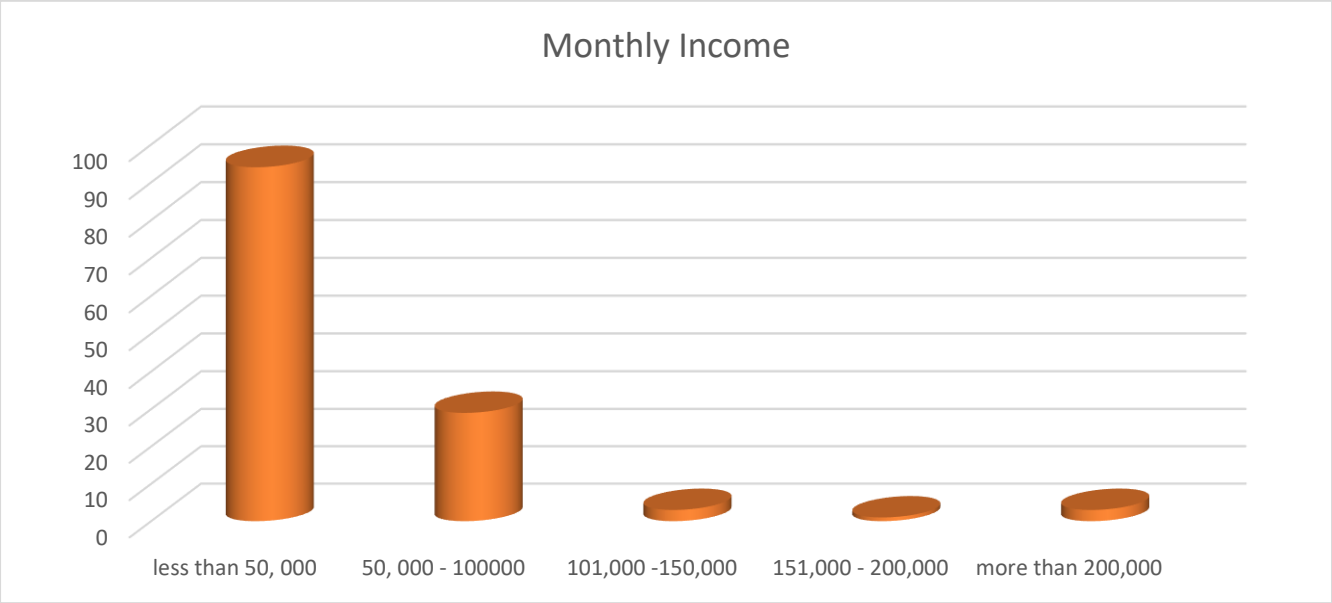


Figure 5.6: Monthly income

Figure 5.6 demonstrates that 94 (72.3%) of the respondents receive less than 50,000naira as monthly income. Furthermore, 101,000 -150,000 serves as salary to 3 (2.3%) of the respondents. As reported by the respondents, 5000 naira and 400,000 naira are the lowest and highest income respectively.

TABLE 5.2: WOUND CHARACTERISTICS

Aetiology	Frequency	Percentage (%)
Road Traffic Accident	45	34.6%
Cancer	20	15.4%
Traumatic injury	12	9.2%
Occupational injury	5	3.8%
Burn injury	5	3.8%
Cellulitis	16	12.3%
Fall	16	12.3%
Gunshot	4	3.1%
Diabetes Mellitus	4	3.1%
Insect bite	3	2.3%

Mean (±SD)	3.63± 2.734	
Diagnosis		
Leg Ulcer	44	33.8%
Tibiofibular Fracture	17	13.1%
Femoral Fracture	10	7.7%
Breast Cancer	11	8.5%
Traumatic Injury	13	10.0%
Burn Injury	5	3.8%
Lacerated Wound	5	3.8%
Radioulnar Fracture	4	3.1%
Diabetic Foot Ulcer	4	3.1%
Others	17	13.1%
Mean (±SD)	4.0 ± 3.208	
Type of wound		
Open wound	10	7.7%
Surgical wound	37	28.5%
Burn injury	5	3.8%
Leg Ulcer	52	40.0%
Diabetes foot ulcer	5	3.8%
Cancer wound	16	12.3%
Lacerated wound	5	3.8%
Mean (±SD)	3.56 ± 1.604	
Comorbidities		
None	107	82.3%
Diabetes Mellitus	3	2.3%
Hypertension	14	10.8%
Diabetes and Hypertension	4	3.1%
Others	2	1.5%
Mean (±SD)	1.393± 0.911	
how long have you been coming for dressing in the clinic (in weeks)		
Less than 20	97	74.6%
20 – 40	20	15.4%
41 – 60	8	6.2%
81 – 100	2	1.5%
Above100	3	2.3%
Mean (±SD)	1.454± 1.012	
Frequency of wound dressing per week		
Once	30	23.1%
Two times	34	26.2%
Three times	48	36.9%
Four times	13	10.0%

Daily	5	3.8%
Mean (±SD)	2.45± 1.072	
Type of dressing pack used		
Minor	28	21.5%
Moderate	66	50.8%
Major	36	27.7%
Mean (±SD)	2.06± 0.702	

Findings: Table 5.2 above indicates that road traffic accident constitutes the highest aetiology as reported by 45 (34.6%) respondents followed by cancer as reported by 24 (15.4%) respondents while insect bite constitutes the lowest as reported by 3 (2.3%) respondents. Based on diagnosis, 44 (33.8%) of the respondents had leg ulcers, 17 (13.1%) of the respondents had tibiofibular fracture while traumatic injury and breast cancer constitute 13 (10.0%) and 11 (8.5%) respondents respectively. On the type of wound, leg ulcer was the highest with 52 (40.0%) reports from respondents while 37 (28.5%) and 16 (12.3%) respondents indicated surgical wound and cancer wound respectively. Furthermore, 107 (82.3%) of the respondents have no comorbidities, 4 (3.1%) had diabetes and hypertension while 3 (2.3%) had diabetes alone.

Considering length of clinic visit, 97 (74.6%) of the respondents have been coming for dressing in the clinic for less than 20 weeks. While 20 (15.4%) of the respondents have been coming to clinic for 20 to 40 weeks, 8 (6.2%) respondents have been coming to the clinic for 41-60 weeks. Based on frequency of wound dressing per week, 48 (36.9%) of the respondents are on wound dressing three times per week, 34 (26.2%) on wound dressing two times per week while only 5 (3.8%) are on daily dressing. Furthermore, 66 (50.8%) of the respondents used moderate dressing pack, 36 (27.7%) used major dressing packs while 28 (21.5%) used minor dressing pack.

TABLE 5.3: HEALTHCARE INSURANCE COVERAGE

Do you personally pay for your wound care?	Frequency	Percent
Yes	55	42.3
No	75	57.7
Mean (±SD)	1.58± 0.496	
Who pays		
Family	62	47.7
Relative/friends	6	4.6
Employer	4	3.1
Total	72	55.4
Non-response	58	44.6
Mean (±SD)	1.1944± 0.52107	
Are you on any healthcare insurance coverage?		
Yes	12	9.2
No	118	90.8
Mean (±SD)	1.91± 0.291	
Type of health insurance scheme		
Public Health Insurance (NHIS)	8	6.2
Private	3	2.3
Total	11	8.5
Non-response	119	91.5
Mean (±SD)	1.27± 0.467	
Duration of health insurance coverage		
Annually	2	1.5
Till my parent retirement	5	3.8
Till my retirement	2	1.5
Total	9	6.9
Non–response	121	93.1
Mean (±SD)	2.00 ± 0.707	

Findings: Table 5.3 above indicates that 55 (42.3%) of the respondents personally pay for their wound care while 75 (57.7%) of the respondents did not pay for their wound care by themselves. Family pays for the wound care as reported by 62 (47.7%) respondents which accounted for the highest frequency. Furthermore, 58 (44.6%) respondents did not respond as they tend to keep it confidential while 6 (4.6%) and 4 (3.1%) of the respondents indicated that their relative/friends and employers pay for their wound care respectively.

In addition, 118 (90.8) of the respondents are not on health insurance while 12 (9.2%) of the respondents are on health insurance. Furthermore, 8 (6.2%) indicated that public health insurance scheme is the type of insurance scheme they enjoy while 3 (2.3%) indicated private. The findings further revealed that 5 (3.8%) enjoyed the insurance coverage till their parents' retirement. Lastly, 2 (1.5%) is for both annual and till retirement for the duration of health insurance coverage.

TABLE 5.4: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND WOUND AETIOLOGY

	Aetiology (mean and standard deviation)				
Direct cost of wound dressing- in naira (₦)	Road traffic accident	Cancer	Cellulitis	Fall	Diabetes mellitus
Cost of dressing material per week	2944.44± 882.564	7236.71± 2000.676	2540± 701.142	1865.00± 521.113	3500± 500.00
Cost of other dressing consumables per week	1383.33± 222.205	2421.43± 1100.100	1560.00± 481.498	2637.50± 1486.800	1725.00± 675.00
Cost of lotion per week	2124.44± 572.970	3450.00± 512.231	2172.00± 1082.402	3662.50± 2782.638	1740.00± 1240.00
Total cost of dressing per week	6674.44± 1124.742	13595.71± 3250.912	7270.00± 1942.187	8415.00± 3917.298	7465.00± 65.00
Total cost of dressing per care episode	231986.67± 99543.873	134400.00± 42386.757	192064.00± 125022.771	113420.00± 36557.394	29860.00± 260.000
Total cost of other expenses during wound care episode	10122.22± 83668.854	10571.43± 2571.49	13460.00± 6926.153	7490.00± 4257.554	2700.00± 2300.00

Findings: The table above shows the mean distribution of variables by direct cost of wound dressing and wound aetiology. The table shows the mean and standard deviation of the cost of wound dressing against the aetiology. The average cost of wound dressing materials per week for cancer was ₦7236.71±2000.676, the average cost for diabetes mellitus was ₦3500±500.00 while the average cost for road traffic accident per week was ₦2944.44±882.564. Also, the average cost of other dressing consumables per week for fall and cancer was ₦2637.50±1486.800 and ₦2421.43±1100.100 respectively.

For the average cost of lotion used per week, table 5.4 shows that the average cost of lotion used for fall amounted to ₦3662.50±2782.638 while the average cost for cancer was

₦3450.00±512.231 among others. The average cost of dressing per week for cancer was ₦13595.71±3250.912, the average cost for fall was ₦8415.00±3917.298 while the average cost for diabetes mellitus, cellulitis and road traffic accident amounted to ₦7465.00±65.00, ₦7270.00±1942.187 and ₦6674.44±1124.742 respectively.

Furthermore, the total cost of dressing per care episode for road traffic accident was ₦231986.67±99543.873, the average cost for cellulitis was ₦192064.00±125022.771 while the average cost per care episode for cancer, fall and diabetes mellitus amounted to ₦134400.00±42386.757, ₦113420.00±36557.394, ₦29860.00±260.000 respectively. Cost of other expenses during wound care episode ranges from ₦2000 to ₦13000.

TABLE 5.5: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND DIAGNOSIS

	Diagnosis (mean and standard deviation)						
Direct cost of wound dressing- in naira (₦)	Leg ulcer	Tibiofibular	Femoral	Breast Cancer	Traumatic injury	Diabetic foot ulcer	Others
Cost of dressing materials per week	2551.11± 868.812	2850.00± 739.932	850.00± 150.00	11250.00± 750	6300.00± 4392.038	3500.00± 500.00	5121.43± 1744.647
Cost of other dressing consumables per week	1622.22± 697.322	1825.00± 232.289	750.00± 250.00	5250.00± 3750.00	4516.67± 2773.435	1725.00± 675.00	1500.00± 266.145
Cost of lotion used per week	2866.67± 1175.774	1082.50± 28.395	750.00± 350.00	4200.00± 1200.00	2883.33± 1561.605	1740.00± 1240.00	3337.14± 715.295
Total cost of dressing per week	7717.78± 1901.179	5857.50± 891.332	2600.00± 200.00	22700.00± 5200.00	18366.67± 10869.274	7465.00± 65.00	9874.29± 2172.495
Total cost of dressing per care episode	289360.00 ± 111383.275	89290.00 ± 31912.340	94400.00 ± 51200.00	202400.00 ± 132400.00	148133.33 ± 19086.237	29860.00 ± 260.00	104617.14 ± 25836.364
Total cost of other expenses during wound care episode	97828.89± 83982.067	6450.00± 2703.547	24200.00 ± 23800.00	7000.00± 3000.00	11633.33± 4939.748	2700.00± 2300.00	15000.00± 4864.840

Findings: The table above shows the mean distribution of variables by direct cost of wound dressing and diagnosis. The table shows the mean and standard deviation of the cost of wound dressing against diagnosis. The average cost of wound dressing materials per week for breast cancer was ₦11250.00±750.00, the average cost for traumatic injury was ₦6300±4392.038 while the average cost for diabetic foot ulcers per week was ₦3500.00±500.00. Also, the average cost of other dressing consumables per week for breast cancer and traumatic injury was ₦5250.00±3750.00 and ₦4516.67±2773.435 respectively. For the average cost of lotion used per week, table 5.5 shows that the average cost of lotion used for breast cancer amounted to ₦4200.00±1200.00 while the average cost for traumatic injury and leg ulcer amounted to was ₦2883.33±1561.605 and ₦2866.67±1175.774 respectively. The average cost of dressing per week for breast cancer was ₦22700.00±5200.00, the average cost for traumatic injury was ₦18366.67±10869.274 while the average cost for leg ulcer, diabetic foot ulcer, tibiofibular fracture and femoral fracture was estimated to be to ₦7717.78±1901.179, ₦7465.00±65.00, ₦5857.50±891.332 and ₦2600.00±200.00 respectively.

Furthermore, the total cost of dressing per care episode for road leg ulcer was ₦289360.00±111383.275, the average cost for breast cancer was ₦202400.00±132400.00 and average cost for traumatic injury was ₦148133.33±19086.237 while the average cost per care episode for femoral fracture, tibiofibular fracture and diabetic foot ulcer amounted to ₦94400.00±51200.00, ₦89290.00±31912.340 and ₦29860.00±260.000 respectively. Cost of other expenses during wound care episode ranges from ₦2000 to ₦13000. The average cost of other expenses during wound care for leg ulcer was ₦97828.89±83982.067 while the average cost for tibiofibular fracture, femoral fracture and traumatic injury are ₦6450.00±2703.547, ₦24200.00±23800.00 and ₦11633.33±4939.748 respectively.

TABLE 5.6: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND TYPE OF WOUND

	Type of wound (mean and standard deviation)						
Direct cost of wound dressing- in naira (₦)	Open wound	Surgical wound	Burn	Leg Ulcer	Diabetes foot ulcer	Cancer wound	Lacerated wound
Cost of dressing materials per week	3852±4100.38	3096.35±3836.981	4180.00±2722.499	3112.69±2924.444	2080±1346.105	3885.63±4583.126	900±264.575
Cost of other dressing consumables per week (specify)	3114.29±3206.986	1894.14±2516.381	1862.50±1075.000	2851.09±4871.03	1316.67±977.667	2161.11±2639.325	625.00±250.00
Cost of lotion used per week (specify)	1770.00±1723.627	1459.46±1761.290	2098.00±974.510	4238.37±9346.496	1096.00±1067.628	2336.25±1378.196	1070.00±1041.393
Total cost of dressing per weeks	9452.00±11092.187	6472.70±5074.407	10048.00±3856.154	9272.88±6933.80	4986.00±2328.890	8432.50±7312.175	3010.00±758.617
Total cost of dressing per care episode	87066±96685.280	153840.54±249951.817	97656±97047.999	150142.98±207329.657	24224±15204.305	142797.50±128745.059	31560±43424.509
Total cost of other expenses during wound care episode	8533.33±6004.443	31442.31±65547.660	13000±4242.641	56622.94±184085.447	2700±3252.691	31428.57±54463.618	16000±16970.563

Findings: Table 5.6 indicates the mean distribution of variables by direct cost of wound dressing and type of wound. The table shows the mean and standard deviation of the cost of wound dressing against wound type. The average cost of wound dressing materials per week for burn was ₦4180.00±2722.499, average cost for cancer wound was ₦3885.63±4583.126, average cost for open wound was ₦3852±4100.38 while the average cost for leg ulcer, surgical wound and diabetic foot ulcer were ₦3112.69±2924.444, ₦3096.35±3836.981 and ₦2080±1346.105 respectively.

From table 5.6 above, the average cost of lotion used per week for leg ulcer was ₦4238.37±9346.496 while the average cost for cancer wound was ₦2336.25±1378.196 and the average cost for burn was ₦2098.00±974.510. On the account of cost of dressing per acute care episode, the average cost for surgical wound amounted to ₦153840.54±249951.817, leg ulcer amounted to ₦150142.98±207329.657 and cancer wound amounted to ₦142797.50±128745.059. Also, the cost of other expenses during wound care episode ranges from ₦1000 to ₦16000.

TABLE 5.7: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND COMORBIDITIES

	Comorbidities (mean and standard deviation)		
Direct cost of wound dressing- in naira (₦)	None	Hypertension	Diabetes and Hypertension
Cost of dressing materials per week	3648.33± 778.718	8687.50± 2564.207	2000± 1500
Cost of other dressing consumables per week	1893.75± 446.700	3300.00± 1901.315	1350.00± 1050.00
Cost of lotion used per week	2423.75± 526.092	4112.50± 537.112	925.00± 425.00
Total cost of dressing per week	8605.42± 1690.502	17365.00± 4149.788	5025.00± 2375.00
Total cost of dressing per care episode	182376.67± 45429.040	149320.00± 63775.352	36000.00± 6400.00
Total cost of other expenses during wound care episode	45252.50± 31573.759	10500.00± 3403.430	8500.00± 3500.00

Findings: Table 5.7 above shows the mean distribution of variables by direct cost of wound dressing and comorbidities. The table shows the mean and standard deviation of the cost of wound dressing against comorbidities. The average cost of wound dressing materials per week for patients with hypertension was ₦8687.50±2564.207 and the average cost for patients with both diabetes and hypertension amounted to ₦2000±1500 while the average cost of wound dressing materials per week for patients without comorbidities was ₦3648.33±778.718.

Also, the average cost of lotion for patients with hypertension was ₦4112.50±537.112, the average cost for both diabetes and hypertension were ₦925.00±425.00 while the average cost of dressing lotion per week for patients without any comorbidities was ₦2423.75±526.092. Collectively, the cost of dressing per week for patients with hypertension was ₦17365.00±4149.788 and the average cost for patients with both diabetes and hypertension was ₦5025.00±2375.00 while the average cost of wound dressing per week for patients without comorbidities was ₦8605.42±1690.502.

The total cost of dressing per care episode for patients without any comorbidities was ₦182376.67±45429.040. Furthermore, ₦149320.00±63775.352 was spent on wound dressing per care episode for patients with hypertension and ₦36000.00±6400.00 for

patients with both diabetes and hypertension. Furthermore, ₦45252.50±31573.759 was spent for other wound expenses per episode of care for patients without comorbidities, ₦10500.00±3403.430 for patients with hypertension while ₦8500.00±3500.00 was spent on wound dressing per care episode for patients with both diabetes and hypertension.

TABLE 5.8: MEAN DISTRIBUTION OF VARIABLES BY DIRECT COST OF WOUND DRESSING AND FREQUENCY OF WOUND DRESSING

	Frequency of wound dressing (mean and standard deviation)			
Direct cost of wound dressing- in naira (₦)	Once	Two times	Three times	Four times
Cost of dressing consumables per week	1655.50± 715.622	5250.00± 4750.00	1361.54± 161.935	1685.71± 188.261
Cost of lotion used per week	2828.89± 1271.948	1000.00± 500.00	2658.46± 452.637	1818.57± 467.172
Total cost of dressing per week	5713.33± 1948.425	21250.00± 18750.00	7635.38± 1016.837	11527.14± 1903.865
Total cost of dressing per care episode	154035.56± 689355.822	95000.00± 85000.00	207246.15± 70604.756	71988.57± 13225.035
Total cost of other expenses during wound care episode	11695.56± 4788.263	8000.00± 4000.00	74185.62± 58002.571	7185.71± 2712.092
Cost of dressing materials per week	1173.33± 230.675	5000.00± 7000.00	3542.31± 733.534	6885.71± 1763.037

Findings: Table 5.8 shows the mean distribution of variables by direct cost of wound dressing and frequency of wound dressing. The table shows the mean and standard deviation of the cost of wound dressing against frequency of wound dressing. The average cost of wound dressing materials for four times and two times a week are ₦6885.71±1763.037 and ₦5000.00±7000.00 respectively. Also, the average cost of wound dressing consumables for two times in a week was ₦5250.00±4750.00.

The average cost of lotion used for once and three times in a week are ₦2828.89±1271.948 and ₦2658.46±452.637 respectively. Furthermore, total cost of dressing for two times a week was ₦21250.00±18750.00 while the total cost for four times, three times and one dressing per week are ₦11527.14±1903.865, ₦7635.38±1016.837 and ₦5713.33±1948.425 respectively. Also, total cost of dressing per care episode for once and three times in a week amounted to ₦154035.56±689355.822 and ₦207246.15±70604.756 respectively.

CHAPTER SIX

PHASE III-MODELLING COST OF INPATIENTS WOUND DRESSING AND HOSPITALIZATION

6.1. INTRODUCTION

This chapter deals with the discussions of key findings from the analysis of data presented in chapter four. Key findings from inpatients study objectives were discussed and compared with findings from previous studies done within and outside Nigeria. It also shows the regression model between the costs of wound dressing per acute care episode, cost of hospitalization per acute care episode and factors that determine these costs. The cost of dressing per acute care episode is used as the dependent variable while factors such as occupation, family size, monthly income, age, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing per week, length of hospital stay, and health insurance coverage are the independent variables. Modelling was also done for the different types of wounds. The modelling is essential to predict the cost of wound dressing and hospitalization per acute care episode in southwest Nigeria. The cost estimation is given in Naira which is the Nigerian currency. Furthermore, 1 USD= ₦515, 1 ZAR= ₦45. The limitations and implications to nursing education and practice were discussed as well as summary and conclusion.

6.2. KEY FINDINGS AND RELATIONSHIP WITH PREVIOUS STUDIES

The results generally show that the working population within the age bracket of thirty and less than fifty years and dependent population who are sixty years and above (table 4.1, figure 4.1) are mostly patients who were hospitalized for various types of wound etiologies ranging from road traffic accident, occupational injuries, traumatic injuries, pathological conditions including cancer related wounds (table 4.2). The study finding is like studies which reported rising population of the elderly for wound related care. The findings are consistent with a Nigerian study by Rahman et al in Ogundeji et al (2018:141) which reported higher ages of sixty years and above among patients hospitalized for wound related diagnoses.

From the results, two-thirds of the studied population were men (table 4.1) which is like the results from a study conducted by Ogundeji et al (2018:150) which reported over sixty percent male respondents in a similar study in southwest Nigeria. This is not surprising

because certain high-risk jobs such as riding motorcycles, driving buses and cars for commercial purposes, factory work which may result to wound related injuries are reserved for male folks. Studies which examined the proportion of females in high-risk jobs and the incidence of traumatic injuries are sparse. Nonetheless, males are expected to be the breadwinners in their families in traditional African cultures. These people make up the workforce that propels the country's economy and meets the needs of their families. As a result, they are frequently admitted to hospitals for various wounds.

Findings also revealed that two-thirds of the patients were artisans and traders (table 4.1, figure 4.4) which makes them to be more prone to occupational injuries and road traffic accidents. Artisans work with various sharps, blunt instruments while some are employed in companies using heavy duty machines and instruments. Similarly, petty traders and hawkers form a significant percentage of the Nigerian economy and are found everywhere on the highways for businesses. This alone explains why road traffic accidents (34.2%) are the leading cause of wound related hospitalizations. Government employment is not easy to get in Nigeria partly due to overwhelming population of youth as well as systemic corruption and ethno-religion biases. Southwest Nigeria which is the study setting is an educationally developed geo-political zone of Nigeria. This is exemplified in the results (table 4.1). According to the study's findings, two-thirds of the population has at least a high school education (Table 4.1, figure 4.3). These findings are in line with results from a study conducted by Ogundeji et al. (2018:149), who found that over half of the survey respondents had completed university education.

In Nigeria, government jobs are highly preferred by most citizens from the perspective of job stability, good condition of service and other remunerations. However, very few graduates are employed by the government. Therefore, entrepreneurship is being promoted among Nigerian youth. In response, the government has organized various socio-economic programmes to wield youth to various artisanship's and businesses to boost local production of goods and services in the country. Socio-economic programmes such as N-power, trader monies, farmer monies, conditional cash transfer are ongoing in Nigeria. In all, workers are at high risk of accidents in their various activities whereas this study revealed that almost all

of them have not been enrolled under health insurance coverage in Nigeria and could not personally pay for their healthcare services (table 4.3, figure 4.13, 4.16).

This development was supported by extant Nigerian studies which posited that health insurance coverage is inadequate in Nigeria (Aregbesola, 2017:43; Aregbesola & Khan, 2017). It is also in consonance with a Nigerian study which concluded that seventy percent of patients who were hospitalized for wound related etiologies and diagnoses in Nigerian hospitals were petty traders and could not cope with the increasing financial implication of weekly wound dressing (Lotz 2018:29). Importantly, most artisans and traders live on daily income and being hospitalized is stressful with attendance economic, psychological, and emotional concern. This assertion corroborates with the findings of Lotz (2019: 29) that wounds affect the patient psychologically, socially, and emotional domain.

Nigeria government established the National Health Insurance Scheme (NHIS) on the 6th of June 2005 which commenced with the formal sector social health insurance programme (FSSHIP) and later, the informal sector social health insurance programme; however, findings suggest that many of the artisans, hawkers, traders are yet to be covered and usually pay out of pocket for healthcare services. These results are consistent with several studies which argue that out of pocket payment is still the common means of settling healthcare bills in Nigeria despite the commencement of National Health Insurance Scheme (NHIS), (Aregbesola, 2017:43; Aregbesola & Khan, 2017; Aregbesola & Khan 2018a: 1015; Aregbesola & Khan 2018b: 798; Namomsa, 2019; Adamu 2019:2).

Findings also revealed that over fifty percent of the population earn less than ₦50,000 as a salary (table 4.1, figure 5) and over seventy percent have a family size of more than 5. These findings are like the findings of Ogundeji et al. (2018:149-150) which revealed that same geo-political regions of Nigeria which reported over seventy five percent of the respondents have more than 5 family size and earn less than ₦50,000 per month. However, Odusan et al (2017:102) in a study on cost of managing diabetic foot ulcers in southwest Nigeria reported a salary of ₦20,000 for more than fifty percent respondents which is lower than the present finding.

Also, more than fifty percent are on daily or alternate day wound dressing requiring 1-5 moderate or major dressing materials per week for a period of about eleven weeks hospitalization. The results are consistent with the results from a similar study by Ogundeji et al (2018:152) where more than eighty percent of the patients were on daily wound dressing. These results are also in line with results from a study conducted by Builders and Oseni-Momodu (2018:14) in Bingham University teaching hospital Jos Nigeria where about ninety percent of the respondents were on alternate day wound dressing.

Furthermore, repeated dressing changes create a huge financial commitment and has a far-reaching effect on the family finances and thereby stretches the limit of the family wound care financial coping capacity. Often, families result into some bizarre coping strategies such as substitution of payment for family basic needs such as dairy products for daily wound dressing. Some went further to sell household materials and investment to meet the huge economic demands of continuous wound dressing making the family to become more impoverished. These findings are similar to findings from a study in Bangladesh which concluded that the cost of healthcare was much on the poor in the society and households spent about forty percent of their income on healthcare finances. Furthermore, the findings are like the outcome of a study conducted by Oreh (2017:159) and Aregbesola & Khan (2018b:798) where family impoverishment was associated with protracted healthcare expenses.

Again, findings also revealed a surge in the dependent population who are hospitalized for various types of wounds. About twenty percent of the studied population were elderly who are sixty-five years and above. This study does not specifically examine the type of wounds common among the elderly; however, it is known that malignancy and pathological conditions are common among the aged population. These findings are in tandem with a study conducted by Nussbaum (2017:1) and Guest et al (2017: 292a) which concluded that increased cost of wound care among the elderly is associated with comorbidities such as diabetes and hypertension. Worthy of note is the increased number of cases of breast cancer (23%, table 2).

Breast cancer wound is the second etiological factor after road traffic accident among hospitalized patients from the study findings. It follows that, as the population increases, the risk of fracture, pathological condition and malignancy increases and is consistent with results of the study conducted by Cheng et al (2018:1) and Narwade et al (2019: 2070). Although two-thirds of the study population are without comorbidities, the length of stay for most hospitalized patients was about eleven weeks and they are on daily or alternate day dressing (figure 10, 12). This finding is consistent with Cheng et al (2018:1) and Narwade et al's (2019: 2070) findings that increase in cost of wound care is related to aging population.

Also, most of the elderly people who are hospitalized were not enrolled under health insurance scheme and were unable to finance their healthcare bill. It is disheartening that many of these elderlies were left alone at old age and later discharged against medical advice (DAMA) by their relatives because they could not meet the healthcare economic demands of the orthodox care settings. Nigeria government has recently investigated this direction by a bill to establish Senior Citizen Commission which is yet to be in operation. Payment strategies were poor and payment coping strategies include selling investments of many years such as landed property to settle catastrophic healthcare bills (Ogundeji et al., 2020:1112). This phenomenon is supported by an argument by Karimo et al., (2017:25): Ogundeji, (2017:15); Aregbesola, (2017:43) that the poor in the society have become poorer due to prolonged healthcare expenditure.

6.2.1. Findings from direct cost of wound dressing and wound aetiology

The cost of wound dressing materials, wound consumables, cost of lotion used, cost of hospitalization and other wound dressing expenses on weekly basis and per acute care episode for various wound etiologies was determined. Differential cost of wound dressing materials/consumables varies across wound etiologies. The cost of procurement of wound dressing consumables per category of aetiology ranges from ₦2000-₦13000 per week with reference to the cost of dressing materials and consumables for burn injury dressing amounting to ₦13010 (table 4.4). The finding is like a UK retrospective study by Guest et al (2017: 292a) which reported higher costs of managing burn wounds as compared to other wound aetiologies. Similarly, Botman et al., (2019:29) and Ibeanusi & Kejeh (2018: 29)

exposited that burn injury management can be devastating and deleterious with dire consequences on the family scarce resources.

Findings also revealed that the cost of wound dressing materials/consumables for burn injury is about three times the cost of other wound aetiologies. This implies that cost expended on burn injury dressing is enormous and is considered expensive for average indigenous Nigerian family who are not enrolled under health insurance scheme. Technically, cost implication of burn injury dressing can pose such a serious challenge to the healthcare system in developing countries. Findings also revealed that most patients who are victims of burn and other traumatic injuries are mostly artisans and petty traders whose monthly income is less than ₦50000 and are therefore unable to cope with the escalating cost of wound dressing materials/consumables. This is consistent with Ogundeji et al (2018: 149) findings in a similar setting in southwest Nigeria. Consequently, the presence of fluid exudate, risk for infection, choice of dressing materials, repeated dressing changes are key drivers of the cost of burn injury dressing.

Findings also revealed that average cost of dressing lotion or gel per week was between ₦2000 and ₦6000 with the highest for road traffic accident (RTA)-₦5883.64. Findings revealed that normal saline and povidone iodine are the common lotions used for wound dressing in all the study settings. RTA constitutes of one-third of the wound aetiologies and may require continuous daily or alternate day dressing due to bone and soft tissue injuries. Frequency of wound dressing will influence the volume or quantity of the dressing lotion used and the cost. In a particular setting, the use of modern dressing materials and lotion is popular, and this increases the cost of dressing per care episode. On weekly basis, the total cost of wound dressing covering materials, consumables and lotion was examined and result shows that cost of wound dressing per week was between ₦10000 and ₦25000 with the cost of burn injury amounting to ₦24400. Similarly, cost of wound dressing per aetiology on acute care episode was between ₦60000 and ₦160000.

Again, cost of wound dressing per road traffic accident alone was ₦158591.5254 excluding the cost of other expenses during acute care episode. It follows that cost of providing daily or alternate day dressing for victims of road traffic accident and burn injury is enormous and

drain patient and family income leading to catastrophic household expenditure. This development supports Aregbesola & Khan (2018b:798); Orehs (2017:160) position that escalating cost of healthcare is infringing on the cost of providing some basic family needs such as dairy products and other household materials. The situation can result in emotional and psychological trauma where the family bread winner is hospitalized.

Furthermore, cost of hospitalization per wound aetiology was examined per weekly basis and per acute care episode. On weekly basis, it will require between ₦15000 and ₦35000 for hospitalization while per acute care episode, it requires between ₦50000 and ₦200000. This finding shows a higher amount than the amount highlighted in the findings reported by Ogundeji et al (2018:149) in a similar study setting in southwest Nigeria. The cost of wound dressing and hospitalization is expensive for an average Nigerian hospitalized for wound related etiologies and this can explain why patients are often discharged against medical advice (DAMA) or resulted into patronizing traditional bone setters, herbalists, and other traditional medical services as against Orthodox medicine services.

Again, cost of hospitalization per acute care episode was estimated which ranges from ₦40000- ₦178000. This finding shows a higher amount than the cost of hospitalization in a previous Nigerian study by Ogundeji et al (2018:149) on the economic burden of wound care among patients in a typical Nigeria teaching hospital where the cost of hospitalization ranges from ₦30000-₦100000 per acute care episode. The differences in the cost over a period can be attributed to economic recession complicated by the COVID-19 pandemic. The study findings are also consistent with a UK study where the cost of hospitalization was as high as £400 per day. From findings, differential cost of hospitalization per acute care episode per wound type amounted to ₦177,333.33; ₦152,617.07; ₦150.717.24 and ₦120,866.67 for burn injury, surgical wound, open wound, leg ulcer respectively (table 4). The cost may be influenced by continuous wound dressing and care unit. Burn injury dressing will require much nursing intensity for continuous wound assessment and care thereby increasing the cost of hospitalization.

6.2.2. Findings from direct cost of wound dressing and diagnosis

The cost of wound dressing materials, wound consumables, cost of lotion used, cost of hospitalization and other wound dressing expenses on weekly basis and per acute care episode for various types of wounds was determined. Differential cost of materials and consumables used per wound related diagnoses include ₦7609.50 for avulsion injury and ₦6517.35 for tibiofibular fracture. Also, the mean cost of dressing lotion per diagnoses and per week is between ₦1000 and ₦6000. Significantly, the total cost of dressing per week was high for tibiofibular fracture which amounted to ₦18665.88.

This is probably due to higher incidence of road traffic accidents in metropolitan cities in Nigeria. This is also indicated in the differential cost of wound dressing per diagnoses per acute care episode. From table 4.5, the mean cost of tibiofibular fracture per acute care episode was ₦184438.2353. Furthermore, cost of hospitalization per acute care episode for fracture related diagnosis was closer to ₦200000 per acute care episode. Findings are like other previous studies which also reported high cost of wound dressing. There is geometric rise in the cost of wound dressing materials and product which has been associated with repeated dressing changes, severity of the wound, comorbidities, and the choice of the type of dressing materials and lotion used.

6.2.3 Findings from direct cost of wound dressing and type of wound

The cost of wound dressing materials, wound consumables, cost of lotion used, cost of hospitalization and other wound dressing expenses on weekly basis and per acute care episode for various types of wounds was determined. Cost analysis for wound dressing materials varies across wound types. Cost of wound dressing materials per week ranges from ₦2000- ₦9000 with cost for pressure injury amounting to ₦8,783.33, open wound amounting to ₦5,994.14, cancer wound amounting to ₦5,474.35 and burn wound amounting to ₦ 5000. The cost of procurement of dressing material per week is high for an average Nigerian family. Most of them earn less than ₦50,000 per month and are not under health insurance coverage. The finding is consistent with findings from a study conducted by Ogundeji et al (2018: 149) in a similar centre in southwest Nigeria. Most of the hospitalized patients could not cope with the escalating cost of dressing materials.

Importantly, this high cost of dressing materials can be traceable to repeated dressing changes and usage of modern dressing materials and is consistent with a UK study by Gray et al (2018:6) where the mean cost of small silver dressing per two weeks acute care episode amounted to £32. This study finding was also supported by Cheng et al., (2018:1) who reported an increasing cost of wound dressing due to repeated dressing changes. Dressing materials imported from abroad are quite expensive due to currency exchange rate, though patients have a choice to make on the type of dressing materials to be used, clinicians do advice on modern dressing to promote tissue healing and reduce timing of wound healing. This was also reported by Lotz (2019: 29) and Brain et al., (2019:2).

The researcher also examined the cost borne by the patients and their families on consumables used for wound dressing. These consumables may include clinical and non-clinical dressing materials and examples are bandages, surgical gloves, plaster, bactigras or sofrattlle, polymer, kitokit and underlay. Most are modern materials and are considered very expensive by patients hospitalized for wound care. They are either procured directly from the hospital or from supermarkets outside the hospital. From the findings, the cost ranges from ₦2000-₦19000 with the average cost for burn injury, open wound, surgical wound, and leg ulcers amounting to ₦18533.33; ₦5,165.18; ₦4,314.85; ₦4,047.22 respectively. Significantly, the cost of dressing materials and consumables for acute burn injury is high due to exudate of fluid and plasma from compartments and the risk for infection.

Burn injury dressing contributes a huge economic burden to patients and families. Findings show that most patients are on daily or alternate day dressing and in the case of burn injury, payment of about ₦19,000 for dressing consumables per week apart from cost of direct wound dressing materials, lotion, hospitalization, and other direct cost is quite expensive for indigenous Nigerian family who are ultra-poor. This development supports the position of Aregbesola & Khan (2018b:798); Narwade et al (2019:2071) that attributable cost of providing healthcare services in Nigeria is high and push an average Nigerian family to a poverty state. In essence, catastrophic healthcare expenditure is noted to grossly affect the patient's quality of life and reduces the family to penury and this is also in line with a South Africa study by Lotz (2019: 29) which concluded that the huge cost of wound dressing is a

concern to both patient and the healthcare professionals. It is sad that patient and family pass through this horrifying situation which an enrollment into health insurance scheme can protect.

Findings also revealed that average cost of dressing lotion or gel per week was between ₦1000 and ₦4000. Cost of lotion per wound type include ₦4,161.11 for leg ulcer, ₦4,099.22 for open wound, ₦3,629.51 for surgical wound, ₦3, 3700 for diabetic foot ulcer and ₦3,250 for burn injury. The type of lotion used can be determined by the type of wound, the depth of the injury, location of the injury, severity, whether infected or not including the financial capacity of the patient. Obviously, frequency of wound dressing has greater influence on wound dressing lotion/gel consumption especially for patient on daily wound dressing. Most patients are placed on normal saline and povidone iodine with or without flagyl (Drez) while others include, honey, methylated spirit, dermazine cream and hydrogen peroxide. Eusol dressing appears to be getting out of use. Eusol was only use in one centre. Some patients: however, use imported lotion which include biodress, protosan, and intrasite gel.

More so, honey dressing has become a mainstay in acute wound care although its mechanism of action is yet to be fully understood. Honey is taught to promote laying down of collagen fibers and essentially important for healing by secondary intention with continuous wound assessment. Interestingly, a study setting has a ‘wound care bay’ and uses a blend of traditional and modern dressing lotion/gel. In the centre, patients were placed on traditional sulphur and steroid dressing (dexamethasone). It is taught that sulphur is of two types (yellow and while/black). Black sulphur for wound dressing while the yellow sulphur for eczema. This brand of sulphur is historically known to reduce over- granulation of tissues in some patients. It is reported that the sulphur can burn granulation tissue and allows for healing by secondary intention. While the use of sulphur for wound dressing is not the focus of this study, the researcher found it interesting in the study setting and therefore advocated for further study about sulphur dressing. Consequently, cost of dressing lotion does not pose significant economic challenges unlike the dressing materials and consumables except for patients using imported dressing lotion/gel.

Collectively, the total cost of wound dressing per week (materials, consumables, and lotion) was determined. On a weekly basis, the average cost of wound dressing ranges from ₦9000 - ₦27000 with the highest cost for burn injury dressing amounting to ₦26,783.33. Other cost of wound dressing per wound types are ₦13,919.31 for open wound, ₦13,870 for pressure injury, ₦12,632.50 for diabetic foot ulcers, ₦10,867.87 for surgical wound, ₦10,717.22 for leg ulcer and ₦9,473.04 for cancer wound. This finding supports the inference that there is a geometric increase in the cost of wound dressing per week. In comparison with a previous Nigerian study, in 2010, participants spent ₦500 on wound dressing per week (Lotz 2019:32), in 2018, according to Ogundeji et al (2018), participants spent about ₦3000 on wound dressing per week while the current study revealed a minimum of ₦9000 per week. A possible explanation for this escalating cost of wound dressing per week in Nigeria is the economic recession complicated by global COVID-19 pandemic.

The cost of dressing per week for burn injury is about three times the cost of dressing other wound types. Burn injury dressing has a significant economic impact on the patient and family finances and it is a major breed of catastrophic healthcare expenditure where insurance coverage is lacking. This is supported by several Nigerian studies which posited that patient and family members pay out of pocket to finance healthcare services (Raheem et al 2019:2; Ogundeji et al 2018: 150; Aregbesola 2017:43; Grace et al 2017:2; Nshakira-Rukundo et al 2019:594; Aregbesola & Khan 2017b:194; Aregbesola & Khan 2018b: 798; Oreh 2017:159. This is inaccurate with modern society as unplanned healthcare finances will lead to catastrophic household expenditure and situation can be worsened for those families with a large family size.

Furthermore, findings revealed that most of the patients are artisans and petty traders with daily income and may not be able to cope with the escalating cost of weekly dressing. This is in line with a Nigerian study reviewed by Lotz (2019:32) which reported that seventy percent of patients are petty traders, and they are incapacitated in meeting the financial requirement of wound dressing. Indeed, the average Nigerian family cannot cope with the financial implication of burn wound care and government is not focusing on this side. Burn injury care should be treated as a public health emergency and financial aids should be given to victims of burn injury. In solidarity, a coalition of concern medical practitioners under the

umbrella of Nigeria Burn Injury Society (NBS) do organize an annual programme for sensitization on safety from any form of explosions from fluid, materials, or gadgets such as cooking gas, fuel tanker or bush burning.

Conclusively, the total cost of wound dressing per acute care episode was found to be ₦50000- ₦120000 on the average with a minimum of four weeks acute care episode. Findings show that over eighty percent of the patients spent about eleven weeks on hospitalization. Average cost of wound dressing per acute care episode for open wound, pressure injury, burn injury, surgical wound, leg ulcer, cancer wound, and diabetic foot ulcer is ₦119,802.759; ₦110.546.667; ₦107,331.333; ₦89,501.463; ₦70,413.33; ₦67,874.783; ₦50,350 respectively. Globally, there is paucity of studies that specifically examined the cost of wound dressing. Study conducted in the United States, United Kingdom and Australia by Etafa et al (2018:1), Guest et al (2017: 292) and Cheng et al (2018:1) respectively examined the gross estimate of the wound care. Nevertheless, these studies are consistent with the present study on the high cost of wound dressing as part of the wound care protocol. In this cost, the cost of dressings and consumables contribute a greater proportion and is consistent with Narwade et al's (2019:2071) findings in India.

A retrospective study also conducted outside Nigeria estimated the mean cost of dressing diabetes related wound to be $2884 and this finding is in consonance with mean cost of diabetic foot ulcer which amounted to ₦50,350 which in this study is considered high for an average patient in Nigeria. Daily or alternate day wound dressing drains the family finances and it is worse when the bread winner is hospitalized. It is imperative for government to organize a low-income earners friendly health insurance scheme to galvanize support for patients hospitalized for wound related diagnosis.

Also, the researcher took an inventory of other wound related expenses during an acute care episode. Findings revealed that the cost of other expenses such as latex (conform)/ elbow-length gloves was high. Based on cost per wound type, other expenses on burn injury dressing were the highest amounting to ₦61,333.33 while the cost for surgical wound was ₦26,689.87 and open wound was ₦25,684.31. It is worthy to note that economic downturn due to coronavirus pandemic affects expenses on wound dressing. A possible explanation

for escalating cost of material such as conform (latex) gloves is the regular usage of the gloves by nurses and other medical staff. Nurses must protect themselves from contacting COVID-19 and prevent cross infection whereas the patients bear the costs.

Again, cost of hospitalization per acute care episode was estimated which ranges from ₦40000- ₦178000. This finding is higher than the cost of hospitalization in a previous Nigerian study by Ogundeji et al (2018:149) on the economic burden of wound care among patients in a typical Nigeria teaching hospital where the cost of hospitalization ranges from ₦30000-₦100000 per acute care episode. The differences in the cost over a period can be attributed to economic recession complicated by COVID-19 pandemic. The study finding is also consistent with a UK study where the cost of hospitalization was as high as £400 per day. From findings, differential cost of hospitalization per acute care episode per wound type amounted to ₦177,333.33; ₦152,617.07; ₦150.717.24 and ₦120,866.67 for burn injury, surgical wound, open wound, leg ulcer respectively (table 4). The cost may be influenced by continuous wound dressing and care unit. Burn injury dressing will require much nursing intensity for continuous wound assessment and care thereby increasing the cost of hospitalization.

There is a correlation between continuous wound dressing and increasing length of hospitalization. The cost also depends on the care unit. In the study settings, especially those in metropolitan cities, social class was identified, and patients occupied different rooms which also call for differences in cost per bed space or accommodation. Consequently, the researcher also feels that wound aetiology, diagnosis, wound type, presence of infection and comorbidities can also influence length and cost of hospitalization. Findings also suggest that cost of hospitalization for chronic wounds such as pressure injury may be reduced as compared to acute wounds such as burn injury, open wound and surgical wound. A possible explanation is that the patients with pressure injury can be discharged if there is no infection where they can continue the dressing on outpatients' basis.

6.2.4. Findings from direct cost of wound dressing and frequency of wound dressing

The frequency of wound dressing was also assessed in line with the cost of wound dressing materials, consumables, cost of lotion used, cost of hospitalization and other wound

expenses per acute care episode. Specifically, the mean cost of wound dressing per week was between ₦10000 and ₦20000 while the differential cost of wound dressing materials/consumables per week and per frequency of wound dressing are: two times per week amounting ₦10346.25, alternate day amounting to ₦12439.58, five times amounting to ₦10851.67, and daily amounting to ₦19836.73. For an acute care episode, the cost of wound dressing ranges from ₦50000 to ₦170000.

The cost of providing wound dressing is quite high for an average Nigerian hospitalized for wound care. This is higher than a similar study by Ogundeji et al (2018: 149) in a similar setting. Again, considering cost of hospitalization, the cost per acute care episode, the mean cost was between ₦130000 to over ₦180000. A possible explanation for geometric rise in the cost of wound dressing and hospitalization is that Nigeria entered recession which was complicated by global COVID-19 pandemic. Also, clinicians now advocated for the use of modern dressing materials as against the traditional gauze and cotton wool which in turn increases the cost of wound dressing (Lowin et al., 2019: 225). Furthermore, frequency of wound dressing can be influenced by type of wound, wound severity, comorbidities, and presence of infection.

6.2.5. Findings from direct cost of wound dressing and length of hospital stay

The cost of wound dressing materials/consumables, cost of lotion used, cost of hospitalization and other wound dressing expenses on weekly basis and per acute care episode was determined against the length of hospital stay. Findings suggest a progressive increase in the cost of wound dressing with increasing length of hospital stay. The total cost of dressing per acute care episode was ₦61959.4872 for less than 11weeks and ₦417286.3158 for 11-20weeks. Similarly, cost of hospitalization per acute care episode was ₦125452.99 for less than 11weeks and ₦322073.68 for 11-20 weeks. Again, this cost is on the high side and poses great threat to the healthcare system and family income. Except insurance scheme is instituted and utilized, many of the Nigerian families will not be able to cope with the escalating cost of wound dressing.

6.3 MODELLING COST OF WOUND DRESSING AND HOSPITALIZATION PER ACUTE CARE EPISODE

The cost expended on the provision of wound dressing per week and per acute care episode in terms of wound aetiology, diagnosis, wound type, comorbidities, frequency of wound dressing and length of hospital stay as compared to previous studies were discussed above. This section discussed the regression modelling for the cost of wound dressing and the inferences drawn from modelling the cost of wound dressing in southwest Nigeria, enumerate the variables affecting the cost of wound dressing and how the variables affect the cost per acute care episode.

The model revealed the influence of independent variables such as age, occupation, family size, monthly income, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing per week, length of hospital stay and health insurance coverage on the cost estimates of inpatients wound dressing and hospitalization in teaching hospitals in southwest Nigeria. The regression model is essential to determine and predict the cost of wound dressing and hospitalization and the influence of these factors on the cost of wound dressing. At first, the researcher models the cost of wound dressing and hospitalization per acute care episode irrespective the type of wound to give a holistic nature of the cost of wound dressing and hospitalization, then model the cost of wound dressing for each of the wound type.

TABLE 6.1: PARAMETER ESTIMATES FOR THE COST OF WOUND DRESSING PER ACUTE CARE EPISODE MODEL

		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	54909.364	140202.197		.392	.696
	Age	-4715.294	12480.327	-.029	-.378	.706
	Occupation	-7443.943	14580.122	-.035	-.511	.610
	Family size	-75775.882	35484.748	-.156	-2.135	.034
	Monthly income	-10492.935	17122.163	-.044	-.613	.541
	Aetiology	-7662.369	7329.370	-.072	-1.045	.297
	Diagnosis	-11204.347	4932.513	-.171	-2.272	.024
	Type of wound	-7643.175	9286.406	-.063	-.823	.412
	Comorbidities	45119.892	12531.303	.248	3.601	.000
	Frequency of wound dressing per week	31226.556	14636.880	.149	2.133	.034
	Length of hospital stay	113463.838	23959.609	.326	4.736	.000

	Healthcare insurance coverage	15188.171	57821.936	.018	.263	.793
a. Dependent Variable: Total cost of dressing per acute care episode						

Table 6.1 above shows the regression analysis result of the cost of wound dressing per acute care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing per week, length of hospital stay, and healthcare insurance coverage produce -4715.294, -7443.943, -75775.882, -10492.935, -7662.369, -11204.347, -7643.175, 45119.892, 31226.556, 113463 and 15188.171 respectively. Family size, diagnosis, comorbidities, and length of hospital stay are the significant variables with p-values less than 0.05. This implies that these variables are the variables that most contribute to the cost of wound dressing per acute care episode. The mathematical model for the result above is written below:

*Total cost of dressing per acute care episode = 54909.364 -4715.294*Age -7443.943*occupation -75775.882* family size -10492.935* monthly income -7662.369* aetiology -11204.347* diagnosis -7643.175* type of wound + 45119.892* comorbidities + 31226.556* frequency of wound dressing per week +113463* length of hospital stay + 15188.171* healthcare insurance coverage.*

The model gave parameter estimates of cost of wound dressing for all types of wounds requiring hospitalization. This is essential to predict the estimated cost of dressing across wound etiologies, diagnosis, and type across southwest Nigeria to develop working tariffs for cost of wound dressing. Significantly, at no contribution of other variables, the cost of wound dressing is estimated to be ₦54909.36 per acute care episode across the three purposively selected hospitals in southwest Nigeria. Findings show that this estimated cost of wound dressing per acute care episode is mostly influenced by family size, diagnosis, comorbidities, and length of hospital stay- p- value < 0.05 (table 6.1). Family size and diagnosis show a negative relationship with the cost and will reduce the cost of wound dressing by ₦75775.88 and ₦11204.35 respectively.

Family size has greater influence on the ability of the indigenous family to finance the wound care of the victim. Findings reveal that most of the respondents have between five to ten

family sizes and could not personally finance their medical bills (table1, 3) and this result is like another study conducted by Ogundeji et al (2018:150) in the same geographical location which reported that about seventy percent of the respondents have a family size between five to ten with a ripple effect on the ability of the family to finance the medical bill. According to Ogundeji et al., the situation is worsened where the bread winner of the family is hospitalized.

Conversely, comorbidities and length of hospital stay shows positive relationship with the cost and therefore will increase the cost of wound dressing per acute care episode by ₦45119.89 and ₦113463.84 respectively. The patients, families and health maintenance organizations can be worried with the presence of comorbidities and length of hospital stay due to escalating cost of wound dressing. This finding is consistent with Nussbaum (2017:1) and Guest et al (2017: 292a) which exposited that increased cost of wound care especially among the elderly is associated with comorbidities such as diabetes and hypertension.

Findings also revealed that about twenty percent of the studied population are elderly of sixty years and above (table 1) with or without comorbidities. It implies that as the population increases, the risk of patients who may be hospitalized for wound related diagnoses to present with comorbidities increases and can influence the frequency and cost of wound dressing. This is consistent with Cheng et al (2018:1) and Narwade et al's (2019: 2070) conclusion that an increase in cost of wound dressing is associated with increased population of elderly hospitalized for care. The study finding also corroborated a UK study by Guest et al., (2017:292) where the cost of managing wounds due to associated comorbidities was as high as £5.3billion. Similarly, an analysis of National Health Service (NHS) cost of managing chronic wound by Guest, et al (2017a:292) is consistent with the finding of the current study. Guest et al reported that cost of managing chronic wound increased to over £5 yearly due to associated comorbidities. Measures aim at reducing the length of hospital stay will reduce the cost of wound dressing among the hospitalized patients.

TABLE 6.2: PARAMETER ESTIMATES FOR THE COST OF HOSPITALIZATION PER ACUTE CARE EPISODE

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	144693.647	68071.167		2.126	.035
	Age	305.318	6059.466	.003	.050	.960
	Occupation	-2509.321	7078.962	-.022	-.354	.723
	Family size	198.668	17228.604	.001	.012	.991
	Monthly income	3729.250	8313.177	.030	.449	.654
	Aetiology	-1798.264	3558.566	-.032	-.505	.614
	Diagnosis	-6055.074	2394.841	-.173	-2.528	.012
	Type of wound	-13820.060	4508.749	-.212	-3.065	.003
	comorbidities	6505.238	6084.216	.067	1.069	.286
	Frequency of wound dressing per week	-11978.777	7106.519	-.107	-1.686	.094
	Length of hospital stay	93705.882	11632.903	.503	8.055	.000
	Healthcare insurance coverage	-17226.770	28073.787	-.039	-.614	.540
a. Dependent Variable: Total cost of hospitalization per acute care episode						

Table 6.2 above shows the regression analysis results for the cost of hospitalization per acute care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing per week, length of hospital stay, and healthcare insurance coverage produce 305.318, -2509.321, 198.668, 3729.250, -1798.264, -6055.074, -13820.060, 6505.238, -11978.777, 93705.882 and 93705.882 respectively. Diagnosis, type of wound and length of hospital stay are the significant variables with p-values less than 0.05. This implies that these variables are the variables that most contribute to the cost of hospitalization per acute care episode in this study. The mathematical model for the result above is written as below:

*Cost of hospitalization per acute care episode = 144693.647 + 305.318*Age - 2509.321*occupation +198.668* family size +3729.250* monthly income -1798.264* aetiology -6055.074* diagnosis -13820.060* type of wound + 6505.238* comorbidities - 11978.777* frequency of wound dressing per week +93705.882* length of hospital stay + 93705.882* healthcare insurance coverage*

The estimated cost of hospitalization per acute care episode across all types of wounds in the three hospitals was found to be ₦144693.64 at no contribution from all variables. This is the bench fee which is highly influenced by wound diagnosis, type of wound and length of

hospital stay (P- value < 0.05). These variables are the variables that most contribute to the cost of hospitalization per acute care episode. Statistically, diagnosis and type of wound have a negative relationship with cost of hospitalization per acute care episode and therefore will reduce costs by ₦6055.07 and ₦13820.06 respectively whereas length of hospital stay has a positive relationship and therefore will increase the unit cost of hospitalization per acute care episode by ₦93705.88. Patients with chronic wounds can be discharged earlier to continue outpatients' basis or home care to reduce cost of hospitalization.

6.3.1 Modelling cost of dressing and hospitalization for different type of wound

The specific cost of wound dressing and hospitalization per acute care episode becomes imperative for cost calculation per wound type. Therefore, the researcher models the cost for different type of wounds among the hospitalized patients. This covers both the acute wound and chronic wounds. The variables which can reduce or increase the unit cost per acute care episode were also identified. This specific cost of type of wound is essential to formulate tariffs for wound care. For instance, findings repeatedly show a geometric increase in the cost of burn wounds among other wound types, and it is known to drain huge healthcare resources. The model was done for the cost of wound dressing and cost of hospitalization per acute care episode of different type of wounds.

TABLE 6.3: PARAMETER ESTIMATES FOR THE COST OF DRESSING PER ACUTE CARE EPISODE (OPEN WOUND)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	-521801.918	316077.053		-1.651	.105
	Age	-36311.862	28961.371	-.142	-1.254	.216
	Occupation	-20895.282	34797.086	-.062	-.600	.551
	Family size	-123766.321	78631.900	-.171	-1.574	.122
	Monthly income	3081.344	43931.214	.008	.070	.944
	Aetiology	927.212	14280.808	.007	.065	.949
	Diagnosis	-11478.051	11089.430	-.107	-1.035	.306
	Comorbidities	150289.658	30193.698	.527	4.978	.000
	Frequency of wound dressing per week	71988.775	31878.816	.221	2.258	.029
	Length of hospital stay	352765.592	122563.688	.312	2.878	.006
	Healthcare insurance coverage	130904.864	105985.353	.131	1.235	.223

Table 6.3 above shows the regression analysis results of the cost of open wound dressing per acute care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, comorbidities, frequency of wound dressing per week, length of hospital stay, and healthcare insurance coverage produce -36311.862, -20895.282, -123766.321, 3081.344, 927.212, -11478.051, 150289.658, 71988.775, 352765.592 and 130904.864 respectively. Comorbidities, frequency of wound dressing per week and length of hospital stay are the significant variables with p-values less than 0.05. This implies that these variables are the variables that most contribute to the cost of dressing per acute care episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing open wound per acute care episode = -521801.918 -36311.862*Age -20895.282*occupation -123766.321* family size +3081.344* monthly income + 927.212* aetiology -11478.051* diagnosis + 150289.658* comorbidities +71988.775* frequency of wound dressing per week +352765.592* length of hospital stay + 130904.864* healthcare insurance coverage*

Open wound is an acute wound and major wound type for hospitalization. Essentially, at no contribution of other variables which can affect the cost of wound dressing, the unit cost for open wound dressing per acute care episode is estimated to ₦521801.92. These costs can increase or decrease depending on the interaction with other variables per acute care episode. Comorbidities, frequency of wound dressing per week and length of hospital stay are variables that most contribute to the cost of dressing per acute care episode (P-value< 0.05).

The regression model shows that comorbidities, frequency of wound dressing and length of hospital stay have a positive relationship with the cost of wound dressing and therefore will increase the cost of wound dressing per acute care episode by ₦150289.66, ₦71988.78, and ₦352765.59 respectively. This implies that increased frequency of wound dressing will lead to an increase in the costs of wound dressing per acute care episode. This result is in consonant with Narwade et al's (2019:2071) finding in India on the contribution of cost of wound dressings and consumables to total cost of dressing per acute care episode. The finding is also in line with a UK study by Gray et al (2018:6) which reported high cost of dressing material due to repeated dressing changes.

It is also consistent with Lotz (2019: 29) and Brain et al., (2019:2) which underlines that the choice of wound dressing materials and the procurement cost will influence the total cost of wound care per acute care episode. Furthermore, differential cost of dressing per wound care per acute care episode increases with repeated dressing changes and the timing of wound healing. Again, findings revealed that majority of the respondents are on daily or alternate wound dressing and uses about five moderates to major dressing packs per week. This is also in line with Oseni-Momodu (2018:14) and Odhiambo et al (2019:34) who concluded that continuous daily or alternate wound dressing will increase the cost of wound dressing per acute care episode.

TABLE 6.4: PARAMETER ESTIMATES FOR THE COST OF HOSPITALIZATION PER ACUTE CARE EPISODE (OPEN WOUND)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	11830.095	120678.882		.098	.922
	Age	-12765.071	11057.512	-.139	-1.154	.254
	Occupation	-12325.798	13285.600	-.102	-.928	.358
	Family size	-7310.259	30021.824	-.028	-.243	.809
	Monthly income	24714.853	16773.030	.174	1.473	.147
	Aetiology	-4525.134	5452.442	-.089	-.830	.411
	Diagnosis	-1647.324	4233.968	-.043	-.389	.699
	Comorbidities	6100.242	11528.017	.060	.529	.599
	Frequency of wound dressing per week	-16310.246	12171.399	-.140	-1.340	.187
	Length of hospital stay	260194.079	46795.073	.641	5.560	.000
	Healthcare insurance coverage	-27546.520	40465.430	-.077	-.681	.499

Table 6.4 above shows the regression analysis results of the cost of hospitalization for open wound care per acute care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, comorbidities, frequency of wound dressing per week, length of hospital stay, and healthcare insurance coverage produce -12765.071, -12325.798, -7310.259, 24714.853, -4525.134, -1647.324, 6100.242, -16310.246, 260194.079 and -27546.520 respectively. Length of hospital stay is the significant variable with p-values less than 0.05. This implies that this variable is the variable that most contribute to the cost of hospitalization for open wound dressing per acute care episode in this study. The mathematical model for the result above is written as below:

*Cost of hospitalization for open wound per acute care episode = 11830.095 -12765.071*Age -12325.798*occupation -7310.259* family size +24714.853* monthly income -4525.134* aetiology -1647.324* diagnosis + 6100.242* comorbidities -16310.246* frequency of wound dressing per week +260194.079* length of hospital stay -27546.520 * healthcare insurance coverage*

The regression analysis shows the estimated cost of hospitalization for open wound to be ₦11830.10 per acute care episode without contribution from other variables. Statistically, length of hospital stay is the variable that most contribute to the cost of hospitalization for open wound dressing per acute care episode (P-value < 0.05). Therefore, length of hospital stay will increase the unit cost of hospitalization by ₦260194.08 per acute care episode. Ogundeji et al (2018:149) exposited that increased length of stay will increase the cost of hospitalization per acute care episode. Invariably, reducing the length of hospital stay will reduce the cost of hospitalization per acute care episode.

TABLE 6.5: PARAMETER ESTIMATES FOR THE COST OF DRESSING PER ACUTE CARE EPISODE (SURGICAL WOUND)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	140885.195	150315.389		.937	.352
	Age	1970.019	13059.173	.017	.151	.881
	Occupation	-12725.008	18101.563	-.083	-.703	.484
	Family size	-99458.806	45056.498	-.273	-2.207	.031
	Monthly income	8867.879	16907.783	.061	.524	.602
	Aetiology	-3682.634	8193.167	-.052	-.449	.654
	Diagnosis	-10799.568	5553.273	-.238	-1.945	.056
	Comorbidities	-15037.072	19938.133	-.094	-.754	.453
	Frequency of wound dressing per week	15391.190	17789.065	.105	.865	.390
	Length of hospital stay	80392.670	20394.153	.450	3.942	.000
	Healthcare insurance coverage	35507.239	67197.416	.062	.528	.599

Table 6.5 above shows the regression analysis result of the cost of dressing for surgical wound care per acute care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, comorbidities, frequency of wound dressing per week, length

of hospital stay, and healthcare insurance coverage produce 1970.019, -12725.008, -99458.806, 8867.879, -3682.634, -10799.568, -15037.072, 15391.190, 80392.670 and 35507.239 respectively. Family size and length of hospital stay are the significant variables with p-values less than 0.05. This implies that these variables are the variables that most contribute to the cost of dressing per acute care episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing Surgical wound per acute care episode= 140885.195 + 1970.019*Age -12725.008*occupation -99458.806* family size +8867.879* monthly income -3682.634* aetiology -10799.568* diagnosis -15037.072* comorbidities +15391.190* frequency of wound dressing per week +80392.670* length of hospital stay +35507.239 * healthcare insurance coverage.*

The regression model analysis shows that the estimated cost of surgical wound dressing per acute care episode amounted to ₦140885.20 with no contribution from other variables. This cost is highly influenced by the family size and length of hospital stay. It implies that these variables are the variables that most contribute to the cost of dressing per acute care episode (P-value < 0.05). Specifically, family size demonstrated a negative relationship while length of hospital stay demonstrated a positive relationship with the cost of wound dressing per acute care episode.

Statistically, family size will reduce cost of dressing by ₦99458.81 while length of hospital stay will increase cost of wound dressing by ₦80392.67 per acute care episode. Findings show that most of the study respondents have a family size between five and ten and could not cope with the family expenses together with escalating costs resulting from protracted cost of wound dressing per acute care episode. Oreh (2017:159) and Aregbesola & Khan (2018b:798) posited that family impoverishment was associated with protracted healthcare expenses. Length of hospital stay is primarily known to be associated with frequency and cost of wound dressing per acute care episode.

TABLE 6.6: PARAMETER ESTIMATES FOR THE COST OF HOSPITALIZATION PER ACUTE CARE EPISODE (SURGICAL WOUND)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	67694.899	110259.573		.614	.541
	Age	8251.060	9579.184	.091	.861	.392
	Occupation	1433.425	13277.886	.012	.108	.914
	Family size	18334.303	33049.911	.063	.555	.581
	Monthly income	-2418.004	12402.223	-.021	-.195	.846
	Aetiology	1889.206	6009.864	.033	.314	.754
	Diagnosis	-6617.644	4073.445	-.181	-1.625	.109
	Comorbidities	-4547.179	14625.050	-.035	-.311	.757
	Frequency of wound dressing per week	-8079.567	13048.662	-.068	-.619	.538
	Length of hospital stay	84732.645	14959.550	.590	5.664	.000
	Healthcare insurance coverage	-16735.180	49290.751	-.036	-.340	.735

Table 6.6 above shows the regression analysis results of the cost of hospitalization for surgical wound dressing per acute care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, comorbidities, frequency of wound dressing per week, length of hospital stay, and healthcare insurance coverage produce 8251.060, 1433.425, 18334.303, -2418.004, 1889.206, -6617.644, -4547.179, -8079.567, 84732.645 and -16735.180 respectively. Length of hospital stay is the significant variable with p-values less than 0.05. This implies that this variable is the variable that most contribute to the cost of hospitalization per acute care episode in this study. The mathematical model for the result above is written as below:

*Cost of hospitalization for Surgical wound per acute care episode = 67694.899 + 8251.060*Age + 1433.425*occupation +18334.303* family size – 2418.004* monthly income + 1889.206* aetiology – 6617.644* diagnosis -4547.179* comorbidities -8079.567* frequency of wound dressing per week +84732.645* length of hospital stay -16735.180 * healthcare insurance coverage.*

The cost of hospitalization per acute care episode for surgical wound was estimated to be ₦67694.90. Length of hospital stay contributed mostly to the cost of hospitalization per acute care episode. Length of hospital stay demonstrated a positive relationship with the cost of hospitalization per acute care episode and will increase the unit cost by 84732.65.

TABLE 6.7: PARAMETER ESTIMATES FOR THE COST OF DRESSING PER ACUTE CARE EPISODE (CANCER WOUND)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-332271.979	193376.329		-1.718	.109
	Age	6526.893	14673.623	.056	.445	.664
	Occupation	6242.419	19396.786	.044	.322	.753
	Family size	4814.422	32325.804	.018	.149	.884
	Monthly income	-3452.506	17477.246	-.025	-.198	.846
	Aetiology	12092.599	21221.339	.057	.570	.579
	Diagnosis	6922.694	5587.043	.147	1.239	.237
	Comorbidities	7542.666	14154.644	.056	.533	.603
	Length of hospital stay	261156.498	30312.685	.964	8.615	.000
	Healthcare insurance coverage?	-18940.041	71276.730	-.030	-.266	.795

Table 6.7 above shows the regression analysis results of the cost of dressing for cancer wound per acute care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, comorbidities, frequency of wound dressing per week, length of hospital stay, and healthcare insurance coverage produce 6526.893, 6242.419, 4814.422, -3452.506, 12092.599, 6922.694, 7542.666, 261156.498 and -18940.041 respectively. Family size and length of hospital stay are the significant variables with p-values less than 0.05. This implies that these variables are the variables that most contribute to the cost of dressing per acute care episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing Cancer wound per acute care episode = -332271.979 + 6526.893*Age + 6242.419*occupation +4814.422* family size -3452.506* monthly income + 12092.599* aetiology +6922.694* diagnosis +7542.666* comorbidities +261156.498* length of hospital stay -18940.041 * healthcare insurance coverage.*

The regression analysis for the cost of wound dressing for patients with cancer related wounds was also estimated. At no contribution from other variables which can increase or decrease the cost of cancer wound dressing, the cost of cancer wound dressing per acute care episode was estimated to be ₦332271.98. Family size and length of hospital stay are the variables that most contribute to the cost of dressing per acute care episode for patients with cancer wounds (P-value= 0.05). These variables have a positive relationship with the unit cost of wound dressing and will increase the cost by ₦4814.42 and ₦261156.50 respectively. Patients with malignant tumors with wounds can be hospitalized for a long period which will influence the cost of dressing and hospitalization per acute care episode.

TABLE 6.8: PARAMETER ESTIMATES FOR THE COST OF HOSPITALIZATION PER ACUTE CARE EPISODE (CANCER WOUND)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-26065.441	63008.459		-.414	.686
	Age	-2372.528	4781.156	-.060	-.496	.628
	Occupation	-4586.794	6320.120	-.097	-.726	.481
	Family size	2288.858	10532.825	.026	.217	.831
	Monthly income	2079.004	5694.670	.044	.365	.721
	Aetiology	21.778	6914.620	.000	.003	.998
	Diagnosis	-297.599	1820.445	-.019	-.163	.873
	Comorbidities	-1755.129	4612.055	-.039	-.381	.710
	Length of hospital stay	82508.187	9876.884	.903	8.354	.000
	Healthcare insurance coverage?	-2041.470	23224.336	-.009	-.088	.931

Table 6.8 above shows the regression analysis results of the cost of hospitalization for cancer wound per acute care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, comorbidities, frequency of wound dressing per week, length of hospital stay, and healthcare insurance coverage produce -2372.528, -4586.794, 2288.858, 2079.004, 21.778, -297.599, -1755.129, 82508.187 and -2041.470 respectively. Length of hospital stay is the significant variable with p-values less than 0.05. This implies that this variable is the variable that most contribute to the cost of hospitalization per acute care episode in this study. The mathematical model for the result above is written as below:

*Cost of hospitalization for cancer wound per acute care episode= -26065.441 -2372.528*Age -4586.794*occupation +2288.858* family size +2079.004* monthly income + 21.778**

aetiology -297.599 diagnosis -1755.129* comorbidities +82508.187* length of hospital stay -2041.470 * healthcare insurance coverage.*

From the model analysis, the cost of hospitalization for patients with cancer wound was estimated to be ₦26065.44 at no contribution from all other variables. Length of hospital stay has a positive relationship with the cost of cancer wound dressing per acute care episode (P-value = 0.05). Length of hospital stay is the variable that contributes mostly to the cost of hospitalization per acute care episode for patients with cancer related wounds. It increases the unit cost of cancer wound dressing by ₦82508.19 per acute care episode.

6.4. SUMMARY OF MODELLING COST OF WOUND DRESSING AND HOSPITALIZATION PER ACUTE CARE EPISODE

The regression analysis models the cost of wound dressing and hospitalization per acute care episode. The cost of wound dressing and hospitalization per acute care episode were estimated to ₦54909.364 and ₦144693.647 respectively at no contribution from other variables. There are variables that interact with the cost of dressing and hospitalization which can either increase or decrease the cost of dressing and hospitalization per acute care episode. These variables include age, occupation, family size, monthly income, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing per week, length of hospital stay and health insurance coverage.

Significantly, length of hospital stay has the highest influence on the cost of wound dressing and hospitalization per acute care episode. The length of hospital stay was found to affect all the costs irrespective of the type of wounds. It follows that any manipulation at reducing the length of hospital stay will reduce the cost of wound dressing and hospitalization per acute care episode. Studies have consistently reported a strong positive relationship between cost of wound dressing and length of hospital stay (Ogundeji et al, 2018:149). Conversely, regression analysis revealed that health insurance coverage does not influence the cost of wound dressing and hospitalization per acute care episode. This is so because majority of the patients paid out of pocket, and they were not enrolled under health insurance scheme. Extant studies exposited that most patients hospitalized in Nigeria teaching hospital

are not under health insurance coverage (Aregbesola, 2017:43; Aregbesola & Khan, 2017; Ogundeji et al., 2018: 149).

6.5. LIMITATIONS OF THE STUDY

The major limitations of this study are related to patient's recall of wound dressing expenses and industrial action in Nigeria. Firstly, there were situations where the patients or the members of the family could not recall the prices of some dressing consumables and lotion used, receipts not properly kept, and cost of wound expenses not recorded on case file or on electronic data devices. It is important to state here that documentation is still a major challenge in healthcare delivery system in Nigeria. A particular study centre gravitates to electronic record system. However, patient socio-demographic data, diagnosis and drug therapy were majorly captured. Information on cost of wound dressing, consumables, products used including types of wounds, frequency of wound dressing and comorbidities were inadequate. Nevertheless, the researcher was able to resolve the nothing issue by simply rescheduling the meeting with the patients when relatives and receipts for procurement of wound expenses are available. Also, available information was assessed from case file and from nurses on duty.

Secondly, some materials were brought from home or bought outside the hospital pharmacy or shops, and this poses a challenge in estimating the true cost of the materials. However, the researcher/assistants were able to resolve this by visiting the hospital service, central sterile storage department (CSSD) and pharmacy to elicit information on the current prices of dressing materials, consumables, and products. Thirdly, there were industrial action during the data collection. The resident doctors were on strike at the time. The common challenge during strike in Nigeria is that hospitalized patients will be discharged, and new admissions will not be accepted. This happened during the period. The researcher considered this as a limitation. Again, the researcher scheduled another visit after the strike was called off. Another limitation was restriction of movement in some sites due to COVID-19. This was also resolved when the restriction was lifted. Consequently, the data was collected in a section of Nigeria which is southwest geo-political region of Nigeria, and it is not scientifically appropriate for generalization to all teaching hospitals in Nigeria.

Nonetheless, the researcher still feels that similar results may be obtainable in other geo-political regions of Nigeria.

6.6. IMPLICATION FOR NURSING EDUCATION AND PRACTICE

Nurses are the front liners in wound assessment and care. Therefore, because of this unique position the occupied nurses need to step up their service delivery to commensurate with the huge financial contributions from patients and their families to wound dressing. From the study, the cost of providing wound dressing materials, consumables, product used, and hospitalization per week and per acute care episode is enormous and beyond the family coping capacity, hence, nurses need to ensure that proper service delivery is upheld so that huge wound dressing finances commensurate with the quality of service rendered. Critically, it is important to point out that apart from burn and plastic nursing, there is no certification, licensure, and training programme for wound care nurses in Nigeria. Sadly, all nurses across levels of care are involved in wound dressing.

This is an area the Nursing and Midwifery Council of Nigeria (N&MCN) must examine. Also, nurses are reputed to be patient teachers, counsellors, and advocates. Therefore, nurses need to scale up information dissemination to patients and family on the enrollment into Voluntary Contribution Social Health Insurance Programme (VCSHIP). It has also been recommended that content on healthcare financing and health policy and management should be included into school of nursing curriculum. Furthermore, nurses should continue with the campaign on safety and first aid with regards to roads, households, occupational safety from road traffic accidents, fire incidents, gas explosions and screening to rule out pathological and malignant conditions. The recommendations for hospital services and policies, health maintenance organizations, government parastatals and the international donor agencies are presented in chapter eight.

6.7. SUMMARY AND CONCLUSION

The study brought to the fore the economic burden faced by patients who are hospitalized for wound related diagnosis in Nigerian hospitals. It also uncovered the precarious healthcare financing challenges in Nigeria. Findings revealed an overwhelming economic burden of daily or alternate day wound dressing on the inpatients and their families. The cost implications of providing wound dressing materials, consumables, lotion used for wound dressing per week and per acute care episode is urge leading to catastrophic healthcare expenditure which can pose threats to other family daily needs. The study examined wound dressing and hospitalization cost differentials per week and per acute care episode across wound aetiology, diagnosis, wound type, and comorbidities. Majority of the patients were on daily or alternate day dressing using moderate-major dressing packs each dressing period.

Significantly, the cost incurred from repeated dressing changes is urge beyond the coping capacity of the indigenous Nigerian families who are ultra-poor. The escalating costs of providing daily wound dressing materials, consumables in Nigerian hospitals breed catastrophic household expenditure making the family to be more impoverished. The literature is replete with family impoverishment resulting from out-of-pocket healthcare financing on the Africa continent and the posture is not changing. From the study, majority were artisans, petty traders and business people who earn less than fifty thousand naira per month as income. The individuals are not enrolled in health insurance scheme and therefore, incapacitated in financing the cost of daily or alternate day wound dressing.

The National Health Insurance Scheme (NHIS) was established in 2005 to protect the Nigerian citizens irrespective of their social class and geo-political affiliation from protracted healthcare finances. However, as the programme was laudable, low-income earners in the society in the cohort of artisans and petty traders have not been fully covered. The voluntary contribution social health insurance programme (VCSHIP) was birthed to cover the low-income earners in Nigeria however, the programme was stalked by poor awareness and bureaucratic bottleneck. In all, the poor individuals in the society were not enlisted into the scheme, widening the gap between the rich and the poor and is a menace that has ravaged an array of developing countries. Furthermore, traumatic injuries were noted to be associated with some jobs such as driving and factory work including artisanship. It is recommended

that nurses who are patients advocate, educators and counsellors should join the campaign aimed at reducing the incidence of occupational and road traffic accidents in Nigeria. Consequently, patients and families pay for wound dressing out of the limited scarce resources therefore, it is imperative that nurses should step up their service delivery on wound care to ensure wound care services commensurate with the patients' financial commitment. Based on this premise, it is worth noting that despite the enormous economic implications for wound dressing in Nigeria, sadly, there are no wound specialized professionals in Nigeria. Wound assessment, diagnosis and care is left in the jurisdiction of all categories of nurses and this call for review in Nigeria's healthcare delivery system. Nurses need to demonstrate effectiveness, efficiency, and professionalism to show-case strength and eligibility to provide needed wound care services to hospitalized patients in their custody.

CHAPTER SEVEN

PHASE III- MODELLING COST OF OUTPATIENTS WOUND DRESSING

7.1. INTRODUCTION

This chapter deals with the discussions of key findings from the analysis of data presented in chapter five. Key findings from outpatients' study objectives were discussed and compared with findings from previous studies done within and outside Nigeria. It also shows the regression model between the costs of wound dressing per outpatients' care episode and explain the factors that determine these costs. The cost of dressing is used as the dependent variable while factors such as occupation, family size, monthly income, age, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing per week, length of hospital stay, and health insurance coverage are the independent variables. Firstly, the regression model estimated the cost of wound dressing per week and per wound care episode irrespective of the type of wound. Then also estimated the differential cost of wound dressing across different types of wounds. The cost estimation is given in Naira which is the Nigeria currency.1 USD= ₦515, 1 ZAR= ₦45. The limitations and implications to nursing education and practice were discussed as well as summary and conclusion.

7.2. KEY FINDINGS AND RELATIONSHIP WITH PREVIOUS STUDIES

The results show that respondents were mostly adults who are the working population driving the economy of Nigeria. They are well educated individuals, less than fifty years and actively involved in businesses, trading, or artisanship (table 1). They are being managed for various wound etiologies ranging from road traffic accidents (RTA), cancer, cellulitis, fall, traumatic injuries, occupational injuries, and others. This finding is inconsistent with studies which reported that wound related etiologies and diagnoses are mainly common among the elderly. Rahman et al in Ogundeji et al (2018:141) reported higher ages of sixty years and above for patients with wound related diagnoses whereas, about forty percent of the study population who are less than fifty years are managed for leg ulcers resulting mostly from road traffic accident on outpatient's basis. Also, finding is dissimilar with Cheng et al (2018:1) and Narwade et al (2019: 2070) which posited that escalating cost of wound dressing is traceable to rising population of the elderly.

Furthermore, there was a surge in the prevalence of cancer among the studied population which is also parallel to previous studies which associated the occurrence of cancer mainly to aging population. The researcher summits that in a changing world, disease demography and epidemiological assessment is changing. From finding cancer (15.45%) is the second etiological factor after road traffic accident in the current study. Therefore, the finding of this study is inconsistent with studies which associated the development of malignancy solely with aging population. Finding is inconsistent with Guest et al (2017: 292a) which asserted that acute wound is associated with younger population while chronic wound is associated with aged population. This is a mentality the government and medical practitioners in sub-Saharan Africa must change in that it has implications for eligibility criteria, assessment, and screening of patients for cancer related etiologies and diagnoses. The study inference underlines that incidence of malignancy is not age dependent. Therefore, researcher recommends histopathological assessment for all suspected cases of malignancy at outpatients visit.

Surprisingly, findings revealed a near equilibrium between the population of male and female respondents (table 1). This finding is inconsistent with Ogundeji et al (2018:150) which reported over sixty percent male proportion in a similar study in southwest Nigeria. From traditional African cosmology, men are known to work to fend for the needs of the family while women settled at home front to take care of the children and home. Male folks are generally eligible for recruitment into factory work, heavy duty machine services, transport business and the likes which are associated with wound related diagnoses. This perspective appears to be changing as women now engaged in similar jobs. Studies which examined the proportion of females in high-risk jobs and the incidence of traumatic injuries are sparse. This study will therefore serve as a baseline for further studies to investigate female involvement in trauma related employment. Again, a perspective is also that technological advancement has reduced male gender dominance in some of these trauma risk jobs. A female with intrigue technical knowledge can also be employed to control the machine and the factors of production. Nevertheless, there remains the fact that female involvement in trauma risk jobs has not been well studied.

Furthermore, findings revealed that two-thirds of the respondents engaged in businesses, trading, or artisanship despite their higher educational qualifications (table 1). Findings

revealed that more than seventy percent of the respondents have secondary and post-secondary education, and this is also consistent with Ogundeji et al (2018:149) which reported similar findings in southwest Nigeria. In essence, the study setting was in southwest Nigeria which is reputed to be educationally advanced geo-political zone of Nigeria. Importantly, government employments is highly competitive in this region of Nigeria partly due to immense population of graduates and partly due to socio-political biases. Therefore, apart from western education, further enrollment to learn handwork, how to do business or trading is the order of the day.

This simply explains why majority of the respondents are found in such occupations with high risk for occupational injuries, traumatic injuries including road traffic accidents. In fact, trauma related to pedestal motorbike accidents is the leading cause that bring patients for regular surgical outpatient (SOP) clinics in Nigeria. These Nigerian workforces are prone to varied degree of trauma in day to day running of businesses or handwork. Sadly, findings revealed that almost all of them are not on any healthcare insurance scheme and could not personally finance their healthcare bill (table 5). This development is consistent with several studies which argued that out of pocket payment is the leading means of settling healthcare bills in Nigeria and breeds catastrophic household expenditure (Aregbesola, 2017:43; Aregbesola & Khan, 2017; Aregbesola & Khan 2018a: 1015; Aregbesola & Khan 2018b: 798; Namomsa, 2019; Adamu 2019:2).

Furthermore, findings revealed that more than seventy percent of the studied population earn less than ₦50000 per month (table 1) and are incapacitated in financing their healthcare needs. This is a situation that has bedeviled many families in low- and middle-income countries especially in the African continent. This finding is also in tandem with Odusan et al (2017:102) and Ogundeji et al (2018:149) which argued that most of the patients with wounds in a typical Nigeria teaching hospital are low-income earners and could not meet the financial requirement of continuous wound dressing despite their level of education. Sadly, despite the take-off of National Health Insurance Scheme about two decades ago, the artisans, traders, hawkers, market women and other low-income earners in the cohort have not been covered and consistent with Ogundeji, (2017:15; Ogundeji et al., 2017: 42). It is a social crisis and foster continuous disparity between the rich and the poor.

Typically, continuous wound dressing drains much of the family finances and is worsened among patients with higher family sizes. Findings suggest that sixty percent of the study population have a family size between five and ten which is like Ogundeji et al (2018:149-150) which reported that about seventy percent of the study participants have more than five family size with less than ₦50000 monthly income. Furthermore, forty percent of the studied population are on wound dressing three times per week and will require moderate dressing pack at each visit (table 2). This finding is like Builders and Oseni-Momodu (2018:14) findings in Bingham University teaching hospital Jos Nigeria where about ninety percent of the participants were on 3-4 day wound dressing per week. Again, finding is also similar to the findings of Odhiambo et al (2019:34) in Country hospital in Kenya which revealed that patients go for wound dressing three times per week.

Significantly, cost expended on weekly wound dressing is on the high side for an average Nigerian family who are ultra-poor except health insurance scheme is instituted and in operation. Patients who are unable to cope with three times clinic visits often resulted into local herbs and other traditional forms of wound care. Voluntary Contributor Social Health Insurance Programme (VCSHIP) is thought to bridge the gap. The VCSHIP was organized under the National Health Insurance Scheme (NHIS) to provide health insurance coverage for individual who are not enrolled into the Formal Sector Social Health Insurance Programme (FSSHIP), Ogundeji (2017:14). This was applauded and was seen as crucible of social justice and development. The VCSHIP covers an individual not the family and requires a premium payment of ₦15000 for enrollment into the scheme. Consequently, the VCSHIP is considered a low-income friendly health insurance scheme, however, researchers' opinion is divided on the ability of the individual who earn daily meagre income to pay the minimum premium required. This alone has generated heated debate and requires further assessment.

7.2.1. Findings from direct cost of wound dressing and wound aetiology/diagnosis

The cost of wound dressing materials, wound consumables, cost of lotion used, cost of hospitalization and other wound dressing expenses on weekly basis and per acute care episode for various wound etiologies was determined. Differential cost of wound dressing materials varies across wound etiologies. The cost of procurement of wound dressing

material per category of aetiology ranges from ₦1000- ₦7000 per week with reference to the cost of dressing materials for cancer dressing amounting to ₦7236.71. Findings suggest that the cost of procurement of dressing materials for cancer wound is 2-3 times the cost of procurement of other wound etiologies. There is paucity of literature that examined the cost implication of providing wound dressing materials for cancer wounds.

The cost of dressing per week ranges from ₦6000-₦13000 which include ₦13595.71 for cancer wound, ₦8415 for fall and ₦7270 for cellulitis. Also, the cost of dressing per wound care episode ranges from ₦29000 – ₦232000 with the highest cost for road traffic accident amounting to ₦231986.67. The escalating cost is also due to frequency of wound dressing and the choice of dressing materials. The cost is high for an average Nigerian family and is consistent with Aregbesola & Khan (2018b:798); Oreh (2017:160) assertion that escalating cost of healthcare is high and compete with the cost of providing other family needs such as food supplies.

The cost of wound dressing materials, wound consumables, cost of lotion used, cost of hospitalization and other wound dressing expenses on weekly basis and per acute care episode for various types of wounds was also determined. Differential cost of materials used per wound related diagnoses ranges between ₦800 and ₦11000 and include ₦11250 for breast cancer and ₦6300 for traumatic injury. Similarly, average cost of wound dressing per week for breast cancer and traumatic injury totally amounted to ₦22700 and ₦18366.67 respectively. This is also related to repeat dressing changes, severity of the condition and the choice of dressing materials. Increased cost of traumatic injury can be related to increased cases of road traffic accident while the surge in the increase of breast cancer is yet to be understood.

7.2.2. Findings from direct cost of wound dressing and type of wound

The cost of wound dressing materials, wound consumables, cost of lotion used and other wound dressing expenses on weekly basis and per care episode for various types of wounds was determined. Cost analysis for wound dressing materials varies across wound types. Cost of wound dressing materials per week ranges from ₦900- ₦4000 with the highest for burn wound amounting to ₦4180 and the lowest for lacerated wound amounting to ₦900.

The financial commitment for providing wound dressing materials for burn wound alone has a multiplier effect on the patient and family finances. Findings revealed that more than seventy percent of the respondents have been coming for wound dressing for about five months, three times per week and uses a moderate dressing pack.

The cumulative cost of wound dressing per month and per care episode of five months is enormous. The average Nigerian family cannot foot such financial expenses, and this pushes the indigenous family to catastrophic household expenditure in that the cost of regular wound dressing now competes with the costs of providing basic family needs such as dairy products and other food supplies. This finding is consistent with Oreh (2017:159) and Aregbesola & Khan (2018b:798) assertion that family impoverishment was associated with protracted healthcare expenses. Clearly, the escalating cost of providing wound dressing materials for burn and other wound types can be due to repeated dressing changes, choice of dressing materials and duration of clinic visit. This is also consistent with Cheng et al., (2018:1) that repeated dressing changes contributes greatly to increased cost of wound dressing.

Furthermore, the choice of modern, imported dressing materials and consumables is also a major determinant of the cost of wound dressing. The cost of lotion used per week ranges from ₦1000- ₦4000 (table 6) and is also considered expensive for an average Nigerians who are petty traders or artisans to pay per week together with the cost of dressing materials and consumables. Significantly, the cost for chronic leg ulcer alone amounted to ₦4238.37 which is more than twice the cost of providing lotion/gel for other wound types. This is not surprising because of extended usage of honey in addition to other products. From field experience, the cost of honey dressing outweighs the cost of using mainly normal saline or povidone iodine. The use of Eusol is noted to becoming obsolete as it was only used in one of the centres. Generally, chronic wounds which do not heal by primary intention demands for more financial commitment than acute wound on outpatient basis.

Interestingly, a particular study centre is reputed to use a blend of traditional and modern dressing materials depending on the type of wound, the patient choice and financial capacity. Worthy to note is the use of sulphur to break down over granulation tissue before other remedies are applied. The use of steroid (dexamethasone) was also enlisted with a certain

eligibility criterion. In the centre, nurses who work in the purported “wound care bay” furnished that there are two types of sulphur. The white/black sulphur for wound dressing while the yellow sulphur for treatment of eczema. Furthermore, the nurses emphasized that individual patient idiosyncrasies do occur on the use of sulphur to “burn” granulation tissue. One suggestion is to further investigate the use of sulphur dressing among patients with chronic non-healing wounds considering the various extraneous variables.

Also, the total cost of wound dressing per week (materials, consumables, and lotion) ranges from ₦3000-₦10000 with the cost for burn wound, open wound and leg ulcer amounting to ₦10048, ₦9452, ₦9272.88 respectively. The total cost of wound dressing at care episode ranges from ₦30000- ₦160000 apart from the cost of other expenses during wound care episode. The cost is quite high for indigenous Nigerian families to cope with and can be associated with Nigeria’s economic recession complicated by global COVID-19 pandemic.

7.2.3. Findings from direct cost of wound dressing and frequency of wound dressing

The frequency of wound dressing was also assessed in line with the cost of wound dressing materials, consumables, cost of lotion used, cost of hospitalization and other wound expenses per acute care episode. Specifically, the mean cost of wound dressing per week was between ₦10000 and ₦20000 while the differential cost of wound dressing materials/consumables per week and per frequency of wound dressing are: two times per week amounting to ₦10346.25, alternate day amounting to ₦12439.58, five times amounting to ₦10851.67, and daily amounting to ₦19836.73. For an acute care episode, the cost of wound dressing ranges from ₦50000 to ₦170000.

The cost of providing wound dressing is quite high for an average Nigerian hospitalized for wound care. This is higher than a similar study by Ogundeji et al (2018: 149) in a similar setting. Again, considering cost of hospitalization, the cost per acute care episode, the mean cost was between ₦130000 to over ₦180000. A possible explanation for geometric rise in the cost of wound dressing and hospitalization is that Nigeria entered recession which was complicated by global COVID-19 pandemic. Also, clinicians now advocated for the use of modern dressing materials as against the traditional gauze and cotton wool which in turn increases the cost of wound dressing (Lowin et al., 2019: 225). Furthermore, frequency of

wound dressing can be influenced by type of wound, wound severity, comorbidities, and presence of infection.

7.3 MODELLING COST OF OUTPATIENTS WOUND DRESSING

The cost expended on the provision of outpatients wound dressing per week and per care episode in terms of wound aetiology, diagnosis, wound type, frequency of wound dressing as compared with previous studies were discussed above. Essentially, the estimated cost of providing wound dressing in relationships with the determinant factors is required to determine and predict the financial implications of wound dressings in outpatients' clinics of teaching hospitals in southwest Nigeria. This section provided the information on modelling the cost of outpatients wound dressings. Firstly, we model the cost of wound dressing irrespective of the type of wound. The model was done generally for the cost of wound dressing per week and per outpatients' care episode.

TABLE 7. 1: ESTIMATES FOR COST OF WOUND DRESSING PER OUTPATIENTS CARE EPISODE

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	176109.478	139486.578		1.263	.209
	Age	5853.052	12926.278	.042	.453	.652
	Occupation	535.287	15829.443	.003	.034	.973
	Family size	-32273.585	32640.258	-.089	-.989	.325
	Monthly income	-36242.583	22722.108	-.144	-1.595	.113
	Aetiology	-13071.275	6515.273	-.182	-2.006	.047
	Diagnosis	-13055.178	5364.950	-.213	-2.433	.016
	Type of wound	-8273.985	10565.643	-.067	-.783	.435
	Comorbidities	41053.223	19725.631	.190	2.081	.040
	Frequency of wound dressing per week	42825.397	16409.802	.233	2.610	.010
	Healthcare insurance coverage?	5201.773	61467.216	.008	.085	.933
a. Dependent Variable: Total cost of dressing per care episode						

Table 7.1 above shows the regression analysis results of the cost of wound dressing per outpatients' care episode. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing per week and healthcare insurance coverage produce 5853.052, 535.287, -32273.585, -36242.583, -13071.275, -13055.178, -8273.985, 41053.223, 42825.397 and 5201.773 respectively. Aetiology, diagnosis, comorbidities, and frequency of wound dressing per week are the significant variables with p-values less than 0.05. This implies that these variables are the

variables that most contribute to the cost of wound dressing per outpatients' care episode in this study. The mathematical model for the result above is written as below:

*Total cost of dressing per outpatients' care episode = 176109.478 + 5853.052*Age + 535.287*occupation -32273.585* family size -36242.583* monthly income -13071.275* aetiology -13055.178* diagnosis -8273.985* type of wound + 41053.223* comorbidities + 42825.397* frequency of wound dressing per week + 5201.773* healthcare insurance coverage.*

The regression model estimated the cost of wound dressing on outpatient's basis to develop working tariffs for wound dressing in southwest Nigeria. Specifically, the estimated cost of wound dressing for the three selected hospitals was ₦176109.48 at no contribution from other variables that can influence the cost of wound dressing. The cost of outpatients wound dressing is highly influenced by aetiology, diagnosis, comorbidities, and frequency of wound dressing per week (table 7.1). These variables are the variables that mostly contribute to the cost of wound dressing per outpatients' care episode (P-value < 0.05). Regression analysis shows that aetiology and diagnosis have a negative relationship with the cost of wound dressing and therefore reduce the cost of wound dressing by ₦13071.28 and ₦13055.18 respectively.

Conversely, comorbidities and frequency of wound dressing per week have a positive relationship with the cost of wound dressing and therefore will increase the cost of wound dressing by ₦41053.22 and ₦42825.40 respectively. Studies have identified the relationship between cost of wound dressing and presence of comorbidities. The finding corroborates a UK study by Guest et al., (2017b:245) where the cost of managing wounds due to associated comorbidities was as high as £5.3billion. Also, Guest, et al (2017a:292) reported that cost of managing chronic wounds increased to over £5 yearly due to associated comorbidities. Frequency of wound dressing also increase the cost of wound dressing per care episode. This is like Lowin et al., (2019:222) where the costing model was sensitive to frequency of wound dressing.

TABLE 7.2: ESTIMATES FOR COST OF WOUND DRESSING PER WEEK

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	5210.520	4478.477		1.163	.247
	Age	58.880	415.022	.013	.142	.887
	Occupation	143.443	508.234	.024	.282	.778
	Family size	-1173.129	1047.976	-.096	-1.119	.265
	Monthly income	-668.526	729.536	-.078	-.916	.361
	Aetiology	-214.498	209.185	-.088	-1.025	.307
	Diagnosis	-402.130	172.252	-.193	-2.335	.021
	Type of wound	-178.071	339.230	-.043	-.525	.601
	Comorbidities	1110.013	633.328	.151	1.753	.082
	Frequency of wound dressing per week	2729.323	526.867	.438	5.180	.000
	Healthcare insurance coverage	-63.885	1973.520	-.003	-.032	.974
a. Dependent Variable: Total cost of dressing per week						

Table 7.2 above shows the regression analysis results of the cost of wound dressing per week for out-patients. The variables like age, occupation, family size, monthly income, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing per week and healthcare insurance coverage produce 58.880, 143.443, -1173.129, -668.526, -214.498, -402.130, -178.071, 1110.013, 2729.323 and -63.885 respectively. Diagnosis and frequency of wound dressing per week are the significant variables with p-values less than 0.05. This implies that these variables are the variables that most contribute to the cost of wound dressing per week in this study. The mathematical model for the result above is written as below:

*Total cost of dressing per week = 5210.520 + 58.880*Age – 143.443*occupation – 1173.129* family size – 668.526* monthly income -214.498* aetiology -402.130* diagnosis -178.071* type of wound + 1110.013* comorbidities + 2729.323 * frequency of wound dressing per week -63.885* healthcare insurance coverage.*

The outpatients cost of wound dressing was estimated to ₦5210.52 per week at no contribution from other variables which can reduce or increase the cost. Statistically, diagnosis and frequency of wound dressing per week have a relationship with the cost of wound dressing per week (Table 7.2). These variables are the variables that most contribute to the cost of wound dressing per week. Finding suggest that diagnosis will reduce the cost

of wound dressing by ₦402.13 while frequency of wound dressing will increase the cost by ₦2729.32. It implies that a continuous weekly wound dressing will continue to increase the cost of wound dressing per week and corroborates Gray et al's (2018:6) study which reported high costs of dressing material due to repeated dressing changes.

7.3.1. Modelling cost of outpatients wound dressing for different type of wound

Modelling was done for different types of wounds per week and per outpatients' care episode. This is imperative to specifically estimate the differential cost of each type of wound to facilitate the design of working tariffs. The model can also predict the future cost of wound dressing in southwest Nigeria. Also, variables which have a negative or positive effect on the cost of wound dressing were identified and discussed.

TABLE 7.3: ESTIMATES FOR COST OF DRESSING PER CARE EPISODE FOR OPEN WOUND

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-28847.943	130783.608		-.221	.846
Occupation	-32135.627	13138.257	-.359	-2.446	.134
Family size	-6774.446	40758.230	-.037	-.166	.883
Monthly income	30550.689	33287.983	.200	.918	.456
Age	30165.322	14177.272	.514	2.128	.167
Diagnosis	-23043.870	12842.776	-.506	-1.794	.215
Comorbidities	121295.351	50136.987	.793	2.419	.137
Frequency of wound dressing per week	39814.478	35265.519	.288	1.129	.376

Table 7.3 above shows the regression analysis results of the cost of dressing open wound care per episode for out-patient. The variables like age, occupation, family size, monthly income, age, diagnosis, comorbidities, and frequency of wound dressing per week produce -28847.943, -32135.627, -6774.446, 30550.689, 30165.322, -23043.870, 121295.351 and 39814.478 respectively. None is significant with p-values greater than 0.05. This implies that none of these variables are the variables that most contribute to the cost of open wound dressing per care episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing per care episode for Open Wound = -28847.943 -32135.627*occupation -6774.446* family size -30550.689* monthly income + 30165.322*Age -23043.870* diagnosis + 121295.351* comorbidities + 39814.478 * frequency of wound dressing per week*

Open wound is a common type of wound among patients visiting outpatient's clinic in teaching hospitals in southwest Nigeria. At no contribution of other variables, the estimated cost of wound dressing per care episode for open wound was ₦28847.94. Interestingly, the cost of dressing for open wound was not influenced by most other variables such as aetiology, diagnosis, and frequency of wound dressing. The cost of dressing is applicable at the same unit cost irrespective of the wound aetiology, diagnosis, or comorbidities.

TABLE 7.4: ESTIMATES FOR COST OF DRESSING PER WEEK FOR OPEN WOUND

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	36921.878	52086.997		.709	.552
Occupation	-7670.526	5232.554	-.747	-1.466	.280
Family size	-1065.492	16232.721	-.051	-.066	.954
Monthly income	4317.082	13257.557	.246	.326	.776
Age	4967.273	5646.361	.737	.880	.472
Diagnosis	-4767.154	5114.874	-.912	-.932	.450
Comorbidities	-1584.307	19967.985	-.090	-.079	.944
Frequency of wound dressing per week	3373.723	14045.147	.213	.240	.833

Table 7.4 above shows the regression analysis result of the cost of dressing per week for open wound care per episode for out-patient. The variables like occupation, family size, monthly income, age, diagnosis, comorbidities, and frequency of wound dressing per week produce -7670.526, -1065.492, 4317.082, 4967.273, -4767.154, -1584.307, 6100.242 and 3373.723 respectively. There is no significant variable with p-values greater than 0.05. This implies that none of these variables are the variables that most contribute to the cost of open wound per week in this study. The mathematical model for the result above is written as below:

*Cost of dressing per week for open wound = 36921.878 -7670.526*occupation -1065.492* family size+ 4317.082* monthly income + 4967.273*Age – 4767.154* diagnosis - 1584.307*comorbidities + 3373.723* frequency of wound dressing per week.*

The estimated cost of open wound dressing per week was ₦36921.88 at no contribution from other variables that affect the cost of wound dressing. Again, most variables that influence the cost of wound dressing do not practically affect the estimated cost of dressing per week for open wound. The unit cost of open wound applied to all irrespective of the age, diagnosis, or comorbidities.

TABLE 7.5: ESTIMATES FOR COST OF DRESSING PER CARE EPISODE FOR SURGICAL WOUND

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-33772.329	216537.65	0	-.156	.877
	Occupation	69075.960	40566.813	.289	1.703	.099
	Family size	-107393.158	87185.593	-.214	-1.232	.228
	Monthly income	-50661.096	40440.129	-.195	-1.253	.220
	Age	5788.002	30140.706	.031	.192	.849
	Diagnosis	-13505.554	13825.682	-.157	-.977	.337
	Comorbidities	104418.618	50260.553	.325	2.078	.047
	Frequency of wound dressing per week	71863.819	36270.793	.332	1.981	.057

Table 7.5 above shows the regression analysis results of the cost of dressing for surgical wound care per episode for out-patient. The variables like occupation, family size, monthly income, age, diagnosis, comorbidities, and frequency of wound dressing per week produce 69075.960, -107393.158, -50661.096, 5788.002, -13505.554, 104418.618 and 71863.819 respectively. There is no significant variable with p-values greater than 0.05. This implies that none of these variables are the variables that most contribute to the cost of surgical wound care per episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing per care episode for Surgical Wound = -33772.329 + 69075.960*occupation -107393.158* family size – 50661.096* monthly income + 5788.002*Age -13505.554**

*diagnosis +104418.618 * comorbidities + 71863.819* frequency of wound dressing per week.*

The regression analysis shows that the estimated cost of surgical wound among the outpatients in southwest Nigeria was ₦33772.33 at no contribution from other variables that can reduce or increase the cost. Variables such as age, occupation, frequency of wound dressing, comorbidities, health insurance scheme were not found to influence the cost of surgical wound dressing per care episode.

TABLE 7.6: ESTIMATES FOR COST OF DRESSING PER WEEK FOR SURGICAL WOUND

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	609.488	3748.735		.163	.872
	Occupation	1890.730	702.299	.389	2.692	.012
	Family size	-1010.618	1509.371	-.099	-.670	.508
	Monthly income	-784.333	700.106	-.148	-1.120	.272
	Age	-148.512	521.801	-.039	-.285	.778
	Diagnosis	-434.405	239.352	-.248	-1.815	.080
	Comorbidities	1274.576	870.119	.195	1.465	.154
	Frequency of wound dressing per week	1899.846	627.926	.433	3.026	.005

Table 7.6 above shows the regression analysis results of the cost of dressing per week for surgical wound care for out-patient. The variables like occupation, family size, monthly income, age, diagnosis, comorbidities, and frequency of wound dressing per week produce 1890.730, -1010.618, -784.333, -148.512, -434.405, 1274.576 and 1899.846 respectively. There is no significant variable with p-values greater than 0.05. This implies that none of these variables are the variables that most contribute to the cost of hospitalization for surgical wound per week in this study. The mathematical model for the result above is written as below:

*Cost of dressing per care episode for Surgical Wound = 609.488 + 1890.730*occupation - 1010.618* family size – 784.333* monthly income – 148.512*Age – 434.405* diagnosis + 1274.576 * comorbidities + 1899.846* frequency of wound dressing per week.*

From regression modelling, the cost of wound dressing per week on outpatients' basis was estimated to be ₦609.49 per week at no contribution from other variables such as age, occupation, family size, comorbidities, frequency of wound dressing, health insurance scheme. Finding shows that none of these wound related variables contribute to the cost of surgical wound dressing per week.

TABLE 7.7: ESTIMATES FOR COST OF DRESSING PER CARE EPISODE FOR LEG ULCER

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	267751.140	168215.806		1.592	.119
	Occupation	-46016.810	23767.027	-.304	-1.936	.059
	Recoded family size	-3985.469	52906.498	-.011	-.075	.940
	Monthly income	-77090.290	66217.683	-.182	-1.164	.251
	Age	-6313.564	23450.568	-.041	-.269	.789
	Diagnosis	-8600.899	14589.174	-.087	-.590	.559
	Comorbidities	45327.585	32904.846	.205	1.378	.175
	Frequency of wound dressing per week	36959.153	27096.887	.199	1.364	.180

Table 7.7 above shows the regression analysis result of the cost of leg ulcer wound dressing per care episode for out-patient. The variables like occupation, family size, monthly income, age, diagnosis, comorbidities, and frequency of wound dressing per week produce -46016.810, -3985.469, -77090.290, -6313.564, -8600.899, 45327.585 and 36959.153 respectively. None of the variables is the significant variable with p-values greater than 0.05. This implies that these variables are the variables that most contribute to the cost of leg ulcer dressing per care episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing per care episode for Leg Ulcer = 267751.140 -46016.810*occupation -3985.469* family size -77090.290* monthly income -6313.564*Age -8600.899* diagnosis + 45327.585* comorbidities + 36959.153* frequency of wound dressing per week.*

The outpatients cost of wound dressing for leg ulcer was also examined. The regression analysis revealed that at no contribution of other variables, the estimated cost of outpatients cost of wound dressing for leg ulcer per care episode was ₦267751.14. Finding suggests

that variables such as age, aetiology, occupation, family size and comorbidities does not influence the cost of wound dressing for leg ulcer per outpatients' care episode.

TABLE 7.8: ESTIMATES FOR COST OF DRESSING PER WEEK FOR LEG ULCER

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	6010.831	5195.420		1.157	.254
	Occupation	-527.772	734.055	-.104	-.719	.476
	Family size	-1476.588	1634.041	-.126	-.904	.371
	Monthly income	-2429.859	2045.162	-.172	-1.188	.241
	Age	352.770	724.281	.068	.487	.629
	Diagnosis	402.822	450.593	.122	.894	.376
	Comorbidities	1920.166	1016.281	.259	1.889	.065
	Frequency of wound dressing per week	2614.514	836.899	.422	3.124	.003

Table 7.8 above shows the regression analysis results of the cost of dressing per week for leg ulcer wound for out-patient. The variables like occupation, family size, monthly income, age, diagnosis, comorbidities, and frequency of wound dressing per week produce -527.772, -1476.588, -2429.859, 352.770, 402.822, 1920.166 and 2614.514 respectively. Frequency of wound dressing per week is the significant variable with p-values less than 0.05. This implies that this variable is the variable that most contribute to the cost of leg ulcer care per episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing per week for Leg Ulcer = 6010.831 – 527.772*occupation – 1476.588* family size -2429.859* monthly income + 352.770*Age + 402.822* diagnosis + 1920.166*comorbidities + 2614.514* frequency of wound dressing per week.*

The estimated cost of wound dressing per week for leg ulcer was ₦6010.83 at no contribution from other variables. This cost can be increased or reduced depending on the interaction with these other variables that can affect the cost of wound dressing. Regression analysis shows that frequency of wound dressing had a positive relationship with cost of wound dressing for leg ulcer and will increase the unit cost by ₦2614.51 per week.

Table 7.9: Estimates for cost of dressing per care episode for Diabetes Foot Ulcer

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	102640.000	51141.545		2.007	.294
	Occupation	-22320.000	14763.292	-.804	-1.512	.372
	Monthly income	-9160.000	19329.687	-.330	-.474	.718
	Frequency of wound dressing per week	-2520.000	14763.292	-.117	-.171	.892

Table 7.9 above shows the regression analysis results of the cost of diabetes foot ulcer wound dressing per care episode for out-patient. The variables like age occupation, monthly income, and frequency of wound dressing per week produce -22320.000, -9160.000 and -2520.000 respectively. None of the variables is the significant variable with p-values less than 0.05. This implies that none of these variables are the variables that most contribute to the cost of diabetes foot ulcer wound dressing per episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing per care episode for Diabetes Foot Ulcer = 102640.000 – 22320.000*occupation – 9160.000 * monthly income – 2520.000* frequency of wound dressing per week.*

The outpatients cost of wound dressing per care episode for diabetic foot ulcer was estimated to be ₦102640.00 at no contribution from other variables. Finding suggests that most variables do not contribute to the cost of outpatients wound dressing for diabetic foot ulcer per care episode.

TABLE 7.10: ESTIMATES FOR COST OF DRESSING PER WEEK FOR DIABETES FOOT ULCER

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	2785.000	8317.375		.335	.794
	Occupation	-1442.500	2401.019	-.339	-.601	.656
	Monthly income	-3265.000	3143.672	-.768	-1.039	.488
	Frequency of wound dressing per week	3507.500	2401.019	1.065	1.461	.382

Table 7.10 above shows the regression analysis results of the cost of diabetes foot ulcer wound care per week for out-patient. The variables like age occupation, monthly income, and frequency of wound dressing per week produce -1442.500, -3265.000 and 3507.500 respectively. None of the variables is the significant variable with p-values greater than 0.05. This implies that none of these variables are the variables that most contribute to the cost of diabetes foot ulcer per week in this study. The mathematical model for the result above is written as below:

*Cost of dressing per week for Diabetes Foot Ulcer = 2785.000 – 1442.500*occupation – 3265.000 * monthly income + 3507.500* frequency of wound dressing per week.*

The cost of wound dressing for diabetic foot ulcer per week was estimated to be ₦2785.00 at no contribution from other variables. Most identified variables such as age, occupation, family size, comorbidities are not variables that contribute to the cost of wound dressing for diabetic foot ulcer per week.

TABLE 7.11: ESTIMATES FOR COST OF DRESSING PER CARE EPISODE FOR CANCER WOUND

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	390328.724	300582.320		1.299	.230
	Occupation	-47431.472	65264.427	-.233	-.727	.488
	Family size	-38053.383	96763.730	-.151	-.393	.704
	Monthly income	539.536	42050.106	.005	.013	.990
	Age	14400.081	33987.350	.158	.424	.683
	Diagnosis	-20537.037	13393.108	-.494	-1.533	.164
	Comorbidities	-46706.656	35585.633	-.408	-1.313	.226
	Frequency of wound dressing per week	37024.441	53169.273	.267	.696	.506

Table 7.11 above shows the regression analysis results of the cost of cancer wound care per episode for out-patient. The variables like occupation, family size, monthly income, age, diagnosis, comorbidities, and frequency of wound dressing per week produce -47431.472, -38053.383, 539.536, 14400.081, -20537.037, -46706.656 and 37024.441 respectively. None of the variables is the significant variable with p-values greater than 0.05. This implies that

none of these variables are the variables that most contribute to the cost of cancer wound care per episode in this study. The mathematical model for the result above is written as below:

*Cost of dressing per care episode for Cancer wound = 390328.724 – 47431.472*occupation -38053.383* family size + 539.536* monthly income +14400.081*Age – 20537.037* diagnosis -46706.656*comorbidities + 37024.441* frequency of wound dressing per week.*

The cost of outpatients wound dressing for cancer patients was estimated to be ₦390328.72 per care episode. This cost estimated by regression model analysis is at no contribution from other variables that can increase or decrease the cost of cancer wound dressing. Finding suggests that there is no contribution to the cost of wound dressing for cancer wound from variables such as age, family size, aetiology, diagnosis, comorbidities, and health insurance scheme.

TABLE 7.12: ESTIMATES FOR COST OF DRESSING PER WEEK FOR CANCER WOUND

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-3768.135	7056.135		-.534	.608
	Occupation	-2738.460	1532.075	-.237	-1.787	.112
	Family size	1428.391	2271.517	.100	.629	.547
	Monthly income	-310.757	987.121	-.051	-.315	.761
	Age	-128.534	797.849	-.025	-.161	.876
	Diagnosis	-313.285	314.402	-.133	-.996	.348
	Comorbidities	345.799	835.369	.053	.414	.690
	Frequency of wound dressing per week	6621.926	1248.143	.841	5.305	.001

Table 7.12 above shows the regression analysis results of the cost of cancer wound care per week for out-patient. The variables like occupation, family size, monthly income, age, diagnosis, comorbidities, and frequency of wound dressing per week produce -2738.460, 1428.391, -310.757, -128.534, -313.285, 345.799 and 6621.926 respectively. None of the variables is the significant variable with p-values greater than 0.05. This implies that none of these variables are the variables that most contribute to the cost of cancer wound care per week in this study. The mathematical model for the result above is written as below:

*Cost of dressing per week for Cancer wound = -3768.135 -2738.460*occupation +1428.391* family size -310.757* monthly income -128.534*Age -313.285* diagnosis 345.799*comorbidities + 6621.926* frequency of wound dressing per week.*

The estimated cost of wound dressing for cancer wound dressing per week was estimated to be ₦3768.135 at no contribution from other variables. Regression analysis shows that variables such as age, occupation, family size, comorbidities, frequency of wound dressing and health insurance coverage have no relationship with the cost of dressing for cancer wound.

7.4. SUMMARY OF MODELLING COST OF OUTPATIENTS WOUND DRESSING

The regression analysis shows the modelling of the cost of outpatients wound dressing per care episode and per week. The cost was estimated to be ₦176109.48 and ₦5210.52 per care episode and per week respectively at no contribution from other variables. On outpatient's basis, little relationship exists between cost of wound dressing and variables such as age, occupation, family size, monthly income, aetiology, diagnosis, type of wound, comorbidities, frequency of wound dressing and health insurance coverage.

Regression model analysis revealed that frequency of wound dressing is the only variable that contribute to the cost of wound dressing per care episode. Typically, none of these variables have a relationship with the different types of wounds at outpatients' basis. This finding is unlike wound dressing among the hospitalized patients where most of these variables have a relationship with the cost of wound dressing and hospitalization. In essence, frequency of wound dressing is the major determinant of the cost of wound dressing and is consistent with other previous studies. The finding is in support of a UK study by Gray et al (2018:6) which reported high cost of wound dressing due to repeated dressing changes.

7.5. LIMITATIONS OF THE STUDY

The limitations of the study are closely related to patient inadequate recall of wound dressing expenses, inadequate electronic data/case file documentation of wound characteristics and wound dressing expenses as well as strike action by the resident doctors in teaching hospitals: There were situations where the patients or the members of the family could not recall the prices of some dressing consumables and lotion used, receipts not properly kept and cost of wound expenses not recorded on case file or on electronic data devices.

Proper documentation of the cost of care in case file or electronic data set is still undermined in Nigeria. Also, some dressing consumables were brought from home or bought outside the hospital pharmacy or shops, and this poses a challenge in estimating the true cost of the materials. However, to resolve such nothing issues, the researcher and/or assistant usually visit the hospital service, central sterile storage department (CSSD) and such other departments where tariffs of wound expenses can be obtained.

There was strike action by resident doctors at two intervals period during the data collection which affected the researcher' schedule. Usually, patients are not also attended to at the outpatient's departments until the strike action was over. There was rescheduling of visits after the strike was called off. The study was conducted at the height of COVID-19 pandemic, and this also affects the data collection in that few high-profile patients did not grant the interview.

Consequently, the data was collected in a section of Nigeria which is southwest geo-political region of Nigeria, and it is not scientifically appropriate for generalization to all teaching hospitals in Nigeria. Nonetheless, the researcher still feels that similar results may be obtainable in other geo-political regions of Nigeria.

7.6. IMPLICATIONS FOR NURSING EDUCATION AND PRACTICE

Nurses are the glue of healthcare delivery system and play a vital role in patient recovery (Ogundeji 2020:1463). Therefore, because of this unique position occupied by nurses, it is recommended that nurses should scale up evidenced base nursing practice which ensures quality care commensurable to patients and family financial commitment to continuous wound dressing expenses. From the study, the cost of providing wound dressing materials, consumables, product used per week and per care episode is enormous and beyond the family coping capacity, hence, nurses need to ensure that proper service delivery is upheld so that huge wound dressing finances commensurate with the quality of service rendered.

Importantly, there is no educational preparation and licensure examination for wound care nurses in Nigeria. All nurses at all levels of care are involved in wound assessment and care which have implications for quality wound care service delivery in the face of escalating cost of care and scarce resources. This lack of categories of wound care nurses was noted by some extant studies to contribute to poor management of patients with wounds. Also, clinical nursing specialties are not well defined and are left at diploma level. The clinical nursing practice are not placed at the postgraduate level unlike the clinical nurse specialist (CNS), nurse practitioner (NP) and Doctor of Nursing practice (DNP) which are recognized nursing professional specialties in the United States.

Furthermore, clinical nursing experience in Nigeria is also pinned mainly on years of service without further educational preparation. The literature is replete with evidence that Nigeria nurses are deficient in critical knowledge to support their practice and services to clients. The nurses' in-service training and the mandatory continuing professional development programme (MCPDP) for nurses have not helped much. The researcher advocated that the regulatory body which is the Nursing and Midwifery Council of Nigeria should liaise with the National Universities Commission (NUC) to organize a clinical based postgraduate educational preparation for nurses covering diverse specialties to reflect the need of the modern societies. The recommendations for hospital services and policies, health maintenance organizations, government parastatals and the international donor agencies are presented in chapter eight.

7.7. SUMMARY AND CONCLUSION

The study examined contemporary financial challenges confronting patients with wounds who are Outpatient's clinic attendees. The cost implication for procurement of wound dressing materials, consumables and lotion used for wound care per week and per care episode were assessed. The study examined the cost of wound dressing of various wound aetiology, diagnosis, wound type, comorbidities as well as frequency of wound dressing. Most patients use moderate dressing pack for wound dressing averagely three times per week. Significantly, findings suggest an escalating cost of wound dressing beyond the coping capacity of indigenous Nigerian family who live on daily income.

The cost of providing wound care per care episode is enormous and can result into catastrophic household expenditure. Sadly, in Nigeria, healthcare insurance coverage is abysmally low. Despite the take-off of National Health Insurance Scheme (NHIS) since 2005, there is low coverage of the scheme among the illiterate- poor-rural dwellers. Finding revealed that majority of the patients who are clinic visitors for wound care are artisans and traders, not enrolled into any health insurance scheme, earn meagre salary, and therefore incapacitated in financing their healthcare bill.

Furthermore, regression model analysis revealed that frequency of wound dressing is the main determinant of the cost of wound dressing on outpatient basis, therefore, it is imperative for nurses to render high quality wound care to match-up with the urge financial commitment for wound dressing from patients and families in the face of scarce resources. Consequently, individuals who engaged in trauma risk vocations in Nigeria are mostly clinic visitors for wound dressing. Thus, nurses who are patients' counsellors, educators and advocates should join safety at work and on road crusade to forestall and nip the incidence of occupational, road traffic traumatic injuries in most part of Nigeria. Finally, health policy makers should utilize findings on modelling the cost of wound dressing to design working tariffs for costing wound dressing in Nigeria hospitals.

CHAPTER EIGHT
CONCLUSION, CONTRIBUTION, RECOMMENDATIONS AND DISSEMINATION OF RESULTS

8.1. INTRODUCTION

This chapter discusses the study conclusion, contribution, recommendations and how the results will be disseminated. The conclusion of the study is based on the data collected from the study respondents in the three purposively selected hospitals in southwest Nigeria. The data was collected via interview administered questionnaires and information from case file to serve as supporting source of information. The data collected focused on the study objectives and questions. The positivism paradigm gives a philosophical stance for the quantitative study while the conceptual model was based on the system research organizing model (SROM).

Descriptive statistics and inferential statistics of chi-square were utilized for the main statistical analysis while regression analysis was utilized for modelling the cost of wound dressing both for inpatients and outpatients. Findings of the study were compared with similar previous studies and inferences were drawn. The researcher identified the major gap in the previous studies on cost of wound dressing which the current study was able to fill. Also, the study contribution and recommendations were derived from findings based on the actual statistical analysis and modelling.

8.2. CONCLUSION OF THE STUDY

This study uncovered the economic burden faced by patients who were victims of various wound etiologies, diagnosis, and wound types. It is to reposition and bring to limelight the menace associated with catastrophic healthcare expenditure which have bedeviled the Nigerian healthcare system. Findings revealed an overwhelming burden of protracted healthcare financing emanating from continuous wound dressing among hospitalized patients and those on outpatients visit.

The cost of procurement of wound dressing materials, lotion used, and cost of hospitalization were the contributing factors to the escalating cost of wound dressing. The unending

healthcare finances compete with other family needs which are the most important in the family hierarchy of needs. Most of the patients were petty traders and artisans and findings revealed that they were not enrolled in health insurance scheme and could not meet the healthcare expenses of successful wound care. This usually explains why most patients were discharged against medical advice (DAMA) for treatment to continue at home front.

8.3. CONTRIBUTION OF THE STUDY

This study has contributed immensely to the costing of wound dressing both among the hospitalized patients and patients visiting clinics. This study identified and filled gaps common in most studies across the globe. Firstly, the study examined the mean cost of providing wound dressing among inpatients and outpatients in Nigeria. Often, in most previous studies, the cost of wound dressing as part of the entire wound care protocol was never identified. The cost of wound dressing is usually subsumed into the medical treatment or surgical procedural bill (Ogundeji 2020: 1464).

Furthermore, the cost of wound dressing is treated as board and room rate without any estimation whereas this study discovered that the cost of wound dressing alone is a major cost contribution to the total wound care cost. This is so because wound dressing is a major care need for patients with varied wound etiologies and diagnoses. Secondly, the researcher assessed the specific mean cost of providing dressing for various acute and chronic wounds in southwest Nigeria. This again is a major drawback in most studies which the current study has filled the gap. Cost differentials of wound dressing for the various type of wounds was also identified and particularly, the cost of wound dressing for burn injury was often high.

Thirdly, regression analysis was computed for modelling the cost of wound dressing for inpatients and outpatients to facilitate the design of working tariffs for wound dressing costing in southwest Nigeria. To the best of the researcher's knowledge, this is the first study on modelling the cost of wound dressing in West Africa sub-region and it is believed to serve as the baseline data and important resource for future studies on cost of wound dressing across the region and beyond. Typically, the patients, families, health policy makers, health maintenance organizations (HMOs) and international health agencies will find the published articles which will emanate from this study interesting and can guide their opinion and policy formulation on cost of wound dressing.

8.4. RECOMMENDATIONS

The following recommendations were drawn based from the study findings:

Area for future research

- The study examined the mean cost of various types of wounds as well as modelling the cost of the types of wounds for the three selected hospitals in southwest Nigeria. However, due to economic variation across the hospitals in southwest Nigeria, the researcher opined that future studies should model the cost of wound dressing for each hospital.

- The data was collected in a section of Nigeria which is southwest geo-political zone of Nigeria, and it is not scientifically appropriate for generalization to all teaching hospitals in Nigeria. The researcher recommends multi-centre studies to capture other geo-political zones of Nigeria. This will also ensure the design of national tariffs for wound dressing in Nigeria.

Patient and family

- The patient and family should strive to register and enroll in the voluntary contribution social health insurance programme (VCSHIP) which is low-income earners social health insurance programme to escape catastrophic healthcare expenditure.

- The family should also make use of available data on cost of wound dressing while managing wounds to have insight into the expected cost of wound dressing in the health facilities. This will ultimately aid planning and prevent catastrophic household expenditure.

Nursing practice

- Nurses are the front liners in wound assessment and care. Therefore, because of this unique position they occupied, nurses need to step up their service delivery to commensurate with the huge financial contributions from patients and their families to wound dressing. Specifically, from the study, the cost of providing wound dressing materials, consumables, product used, and hospitalization per week and per acute

care episode is enormous and beyond the family coping capacity, hence, nurses need to ensure that proper service delivery is upheld so that huge wound dressing finances commensurate with the quality of service rendered.

- Nurses are reputed to be patient teachers, counsellors, and advocates. Therefore, nurses need to scale up information dissemination to patients and families on the enrollment into Voluntary Contribution Social Health Insurance Programme (VCSHIP) which is believed to be low-income friendly social health insurance scheme.

- Furthermore, nurses should continue advocacy and campaign on safety and first aid with regards to roads, households, occupational safety from road traffic accidents, fire incidents, gas explosions and screening to rule out pathological and malignant conditions.

Nursing Education

- Wound dressing required high nursing intensity at all levels of care. However, it is critical that apart from burn and plastic nursing, there is no certification, licensure, and training programme for wound care nurses in Nigeria. Sadly, all nurses across different levels of care are involved in wound dressing (Ilesanmi and Ogundeji, 2020: 43.44).

- Also, nurses are the closest healthcare workers to patients and the expectation repose on nurses include patients' education, advocacy and dissemination of health promotion programmes including healthcare financing and polices to patients and families. Therefore, it has also been recommended that content on healthcare financing and health policy & management should be included into school of nursing curriculum.

Nursing & Midwifery Council of Nigeria (N&MCN)

- The N&MCN should organize educational preparation and licensure examination for wound care nurses in Nigeria. This will enhance expertise and professionalism within the domain of wound care to ensure efficiency and efficacy of wound care in Nigeria and west Africa sub-region.

Hospital Services and Policies

- The hospital services in the study sites should make use of available data to develop a workable patient friendly tariff for all categories of wounds to divorce the cost of wound dressing from the medical or surgical procedural cost. This will also prevent the cost of wound dressing being categorized as room and board rate without proper accounting system. If this is done, it will showcase nurses' contribution to patients care and place nurses on better pedestals within the healthcare ecosystem.

National Health Insurance Scheme (NHIS), Health Maintenance Organizations (HMOs) and the Federal Ministry of Health (FMOH)

- The study centered on modelling the cost of wound dressing and provide simple statistical and mathematical modelling to estimate and predict cost of wound dressing in southwest Nigeria. This was done to facilitate the design of professional service tariffs for wound dressing in the region. Therefore, the NHIS, HMOs, FMOH and other healthcare financing organizations should make use of this available data to formulate service tariffs on wound dressing among the hospitalized patients and for those on outpatients visit.

International Health Agencies and donors

- The study findings are a source of data that international funding agencies such as World Health Organization (WHO), International Monetary Fund (IMF), United State Agency for International Development (USAID) and others can assess to determine funding scale and gradient for wounds related to funding in Nigeria and beyond.

8.5. DISSEMINATION OF RESEARCH FINDINGS

The findings of this study will be presented in seminars, local and international conferences. Also, research article manuscripts will be developed and sent for approval and high impact peer review journals for publications so that the research findings can be universally accessible. Furthermore, the thesis will be available in University of South Africa (UNISA) library repository to add to the literature bank for research resources. Also, copies of the completed thesis will be made available to each of the health facilities where the study was conducted to improve their service delivery especially in tariffs for wound dressing and for their libraries for consultation and future research.

8.6. CONCLUDING REMARKS

Patients and families pay for wound dressing out of the limited scarce resources therefore, it is imperative that nurses should step up their service delivery on wound care to ensure wound care services commensurate with the patients' financial commitment. Based on this premise, it is worth noting that despite the enormous economic implication for wound dressing in Nigeria, sadly, there are no wound specialized professionals in Nigeria. Wound assessment, diagnosis and care is left in the jurisdiction of all categories of nurses, and this calls for review in Nigeria healthcare delivery system. Nurses need to demonstrate effectiveness, efficiency, and professionalism to show case strength and eligibility to provide needed wound care services to patients in their custody.

REFERENCES

Adamu U.H (2019). Evaluating Clients' Satisfaction with National Health Insurance Scheme in Jigawa State, Nigeria. *Texila International Journal of Public Health*; 7(3)

Akaa P.D, Ahachi N.C, Kortor N.J, Mue D.D, Elachi C.I, Ogiator M, et al. 2017. Diabetic Foot Ulcers: Epidemiology, Management Modalities and Outcome at Benue State University Teaching Hospital Makurdi. *Journal of Advances in Medicine and Medical Research*. 22(10): 1-12

Akinbile A.L.2016. Implementation and challenges of national health insurance scheme in Obafemi Awolowo University Health Centre. A dissertation submitted to faculty of social and administrative pharmacy. Obafemi Awolowo University, Ile-Ife, Osun State Nigeria

Anumah FO, Mshelia-Reng R, Abubakar R, Sough T, Asudo F, Jamda MA et al. 2017. Management outcome of diabetic foot ulcers in a teaching hospital in Abuja, Nigeria. *The Journal of Diabetic Foot Complications*. 2017; 9(1):3; 15 – 20

Anyebe E.E, Lawal H, Igbinlade S.A, Bolaji O.E. 2018. Perceived effectiveness of the National Health Insurance Scheme among health care professionals in Zaria, Northwest Nigeria. *Tropical Journal of Nursing*. 2(1): 11-20

Aregbesola B.S. 2017. Enhancing Political Will for Universal Health Coverage in Nigeria. *MEDICC Review*. 19(1): 42-46

Aregbesola B.S and Khan S.M. 2017. Determinants of catastrophic health expenditure in Nigeria. *European Journal of Economics*. DOI 10.1007/s10198-017-0899-1

Aregbesola B.S and Khan S.M. 2017. Determinants of impoverishment due to out-of-pocket payments in Nigeria. J Ayub Med Coll Abbottabad. 29(2):194–9

Aregbesola B.S and Khan S.M. 2018. Predictors of Enrolment in the National Health Insurance Scheme among Women of Reproductive Age in Nigeria. *International journal of health policy and management*. 7(11), 1015–1023. Doi 10.15171/ijhpm.2018.68

Aregbesola B.S and Khan S.M. 2018. Out-of-Pocket Payments, Catastrophic Health Expenditure and Poverty among Households in Nigeria. *International journal of health policy and management.* 7(9): 798–806. Doi 10.15171/ijhpm.2018.19

Azuogu B.N and Eze N.C. 2018. Awareness and Willingness to Participate in Community Based Health Insurance among Artisans in Abakaliki, Southeast Nigeria. *Asian Journal of Research in Medical and Pharmaceutical Sciences*. 4(3): 1-8. DOI: 10.9734/AJRIMPS/2018/42839

Bamgboye E.A. 2013. Lecture notes on research methodology in the health and medical sciences, 1st edition, *folbam publishers*, Samonda, Ibadan, Oyo State, Nigeria

Botman M, Beijneveld J.A, Negenborn V.L, Hendricks T.C.C, Schoonmade, Mackie D.P, van Zuijlen P.P.M. 2019. Surgical burn care in sub-Saharan Africa: A systematic review. *Burn Open*. 3: 129-134

Brain D, Tulleners R, Lee X, Cheng Q, Graves N, Pacella R.2019. Cost-effectiveness analysis of an innovative model of care for chronic wounds patients. PloS ONE. 14(3). https://doi.org/10.1371/journal.pone.0212366

Brewer B.B, Verran J.A, Stichler J.F 2008. The Systems Research Organizing Model: A Conceptual Perspective for Facilities Design. *Health Environments Research & Design Journal* 1(4): 7-19. DOI: 10.1177/193758670800100402

Brink, H, Van der Walt, C & Van Rensburg, G. 2012. Fundamentals of research methodology for health care professionals. 3rd edition. Lansdowne: Juta.

Builder M and Oseni-Momodu E. 2017. Pattern of wounds in Bingham University Teaching Hospital, Jos, Nigeria. *Journal of Medicine and Medical Sciences*.8 (5): 60-68.DOI: http:/dx.doi.org/10.14303/jmms.2017.0117

Builders MI and Oseni-Momodu E. 2018. A Survey of Wound Care in a Surgical Department in an Urban Clinical Setting in Northern Part of Nigeria. *International Journal of Clinical Oral and Maxillofacial Surgery*. 4(1):11-18. Doi: 10.11648/j.ijcoms.20180401.13

Burns, N. & Grove, SK. 2005. The practice of nursing research: Conduct, critique, and utilization. 5th edition. Philadelphia: Elsevier.

Burns, N & Grove, SK. 2013. The practice of nursing research. Conduct, critique, and utilization. 7th edition. Philadelphia: WB Saunders.

Cheng Q, Gibb M, Graves N, Finlayson K, Pacella RE. 2018. Cost-effectiveness analysis of guideline-based optimal care for venous leg ulcers in Australia. BMC Health Services Research 18:421. https://doi.org/10.1186/s12913-018-3234-3

Cho K, Mattke S, Gordon H, Sheridan M, Ennis W. 2020. Development of a Model to Predict Healing of Chronic Wounds within 12 Weeks. Advances in Wound Care. DOI: 10.1089/wound.2019.1091

Cleopatra I & Komolafe E (2018): Household Catastrophic Health Expenditure: Evidence from Nigeria. Microeconomics and Macroeconomics; 6(1):1-8. DOI: 10.5923/j.m2economics.20180601.0

Creswell J.W. 2014. Research Design: qualitative, quantitative, and mixed methods approach (4th Ed.). California: SAGE Publications

Danmusa UM. Terhile L. Nasir IA. Ahmed AA. Muhammed HY. 2016. Prevalence and healthcare costs associated with the management of diabetic foot ulcer in patients attending Ahmadu Bello University Teaching Hospital, Nigeria. *International Journal of Health Sciences*. 10(2): 219-228.

Delaplain P.T and Joe V, C. 2018. Problems and Costs That Could Be Addressed by Improved Burn and Wound Care Training in Health Professions Education. *AMA J Ethics.* 20(6):560-566. DOI 10.1001/journalofethics.2018.20.6.medu1-1806

Dincer M, Doger C, Tas S.S & Karakaya D. 2018. An analysis of patients in palliative care with pressure injuries. *Nigeria Journal of Clinical Practice*. 21(4): 484-491

Etafa, W, Argaw, Z, Gemechu, E, Melese B. 2018. Nurses' attitude and perceived barriers to pressure ulcer prevention.

BMC Nursing 17, 14. DOIhttps://doi.org/10.1186/s12912-018-0282-2. [Online]. Available at

https://doi.org/10.1186/s12912-018-0282-2 (accessed 14 March 2020)

Gilmartin H.M and Sousa K.H. 2016.Testing the Quality Health Outcomes Model Applied to Infection Prevention in Hospitals. Quality Management Health Care. 25(3): 149-161. Doi: 10.1097/QMH.0000000000000102

Grace N.E, Brian O.O, Uche M.O, Valentine U.O. 2017. Assessment of National Health Insurance Scheme's (NHIS) Effectiveness in a Tertiary Teaching Hospital in Southeast Nigeria. *Journal of Advances in Medical and Pharmaceutical Sciences*. 13(3): 1-9

Gray TA, Rhodes S, Atkinson RA, Rothwell K, Wilson P, Dumville JC, Cullum NA et al. 2018. Opportunities for better value wound care: A multiservice, cross-sectional survey of

complex wounds and their care in a UK community population. *BMJ Open*; 8: e019440. Doi: 10.1136/ bmjopen-2017-019440

Grove, SK, Burns, N & Gray, JR. 2013. The practice of nursing research appraisal, synthesis, and generation of evidence. 7th edition. Philadelphia: Elsevie

Grove, SK, Gray JR & Burns, N. 2015. Understanding nursing research, building evidence-based practice. 6th edition. Philadelphia: Elsevier.

Guest JF, Fuller GW, Vowden P. 2017. Clinical outcomes and cost-effectiveness of three different compression systems in newly diagnosed venous leg ulcers in the UK. *Journal of Wound Care*. 26 (5)

Guest JF, Fuller GW, Vowden P. 2018. Venous leg ulcer management in clinical practice in the UK: costs and outcomes. International Wound Journal. 15:29–37. Doi: 10.1111/iwj.12814

Guest JF, Vowden K. Vowden P. 2017. The health economic burden that acute and chronic wounds impose on an average clinical commissioning group/health board in the UK. 26(6). *Journal of wound care* [Online]. Available at https://doi.org/10.12968/jowc.2017.26.6.292. Accessed 14 March 2020

Guest JF, Fuller GW, Vowden P. 2020. Cohort study evaluating the burden of wounds to the UK's National Health Service in 2017/2018: update from 2012/2013. *BMJ Open*. Doi: 10.1136/ bmjopen-2020-045253

Ibeanusi S.E, Kejeh B. 2018. Burns care in Sub-Saharan Africa: Experience from a trauma registry in Nigeria – An observational study. *Nigeria Journal of Orthopedics and Trauma*. 17 (1):29-33)

Ilesanmi R.E and Ogundeji K.D. 2020: Nursing Intensity per Wound Care episode: A case of Poor Costing of Nursing Care in Nigeria. *West African Journal of Nursing*; 30(2):36-46

Jiang Q, Chen Z.H, Wang S.B, Chen X.D, (2017). Comparative effectiveness of different wound dressings for patients with partial-thickness burns: study protocol of a systematic review and a Bayesian framework network meta-analysis. *BMJ Open*, 7(3), Doi: 10.1136/bmjopen-2016-013289

Karimo, T. M., Krokeyi, W. S. and Ekainsai, S. Z. 2017. Financial Burden Associated with Ill-Health: Evidence from the Elderly Population in Nigeria. *Equatorial Journal of Social Sciences and Human Behaviour*. 2 (1): 25-43.

Lindholm C, Searle R.2016. Wound management for the 21st century: combining effectiveness and efficiency. International Wound Journal.13 (suppl. S2):5–15. Doi: 10.1111/iwj.12623

Lotz ME. 2019. The burden of wounds in a resource-constrained tertiary hospital: A cross-sectional study. *Wound Healing Southern Africa*. 12(1):29-33

Lowin J, Winfied T, Price P, Anderson P, Potokar T (2019). Estimating the cost impact of dressing choice in the context of a mass burns casualty event. *Annals of Burns and Fire Disasters*. 32(3):

Mertler, C.A., & Charles, C.M. 2008. Introduction to Educational Research (9th edition.). USA: Pearson

Mitchell P.M, Ferketich S, Jennings B.M. 2007. Quality Health Outcomes Model. *Journal of Nursing Scholarship*. https://doi.org/10.1111/j.1547-5069.1998.tb01234.x [Accessed 9th May 2020]

Moule, P & Goodman, M. 2014. Nursing research: An introduction. 2nd edition. London: Sage.

Munro G. 2017. Causes and consideration with chronic wounds: a narrative review of the evidence. *Wound practice and research*. 25(2)

Namomsa G. 2019. Assessing the practices and challenges of community-based health insurance in Ethiopia: The case of Oromia National Regional State District of Gimbich. *International Journal of Advanced Research*. 7(5): 734-75. DOI:10.21474/IJAR01/9095

Narwade P, Saxena D, Wasnik N, Akhta M. 2019. Nondiabetic chronic leg ulcers: aetiology and management. *International Surgery Journal*. 6(6):2070-2073

Nshakira-Rukundo E, Mussa EC, Nshakira N, Gerber N, von Braun J (2019). Determinants of enrolment and renewing of community-based health insurance in households with under-5 children in rural south-western Uganda. *International Journal of Health Policy and Management*; 8(10):593–606. Doi:10.15171/ijhpm.2019.49

Nussbaum SR, Carter MJ, Fife CE, DaVanzo J, Haught R, Nusgart et al. 2017. An economic evaluation of the impact, cost, and Medicare policy implications of chronic non healing wounds. Value in Health. (In press): 1-6

Odhiambo PA, Omondi K and Magak N. 2019. Wound Dressing Techniques and Costs at a County Hospital. *Annals of African Surgery*. 16(1):33–37. DOI: http://dx.doi.org/10.4314/aas.v16i1.8

Odusan O, Amoran OE, Salami O. 2017. Prevalence and pattern of Diabetic Foot Ulcers among adults with Diabetes mellitus in a secondary health care facility in Lagos, Nigeria. *Annals of Health Research*. 3(2): 98 – 104

Ogundeji K.D and Adeyemo A. 2020. Nurses' awareness of NHIS-VCSHIP as a tool for scaling up universal health coverage in Nigeria. *Nursing and Primary Care Journal*; 4(6): 1-7

Ogundeji K.D, Oluwaleke A.K, Akinyemi K.F. 2017. Costing Nursing Services in Health Care Delivery System: Nigerian Nurses at the Cross Road. *West African Journal of Nursing,* 28(2):41-47

Ogundeji K.D, Akinyemi K.F, Adeyemo A, Oluwaleke A.K, Ilesanmi R.E. 2018. Economic burden of wound care among patients in a Nigerian teaching hospital: Implications for Insurance Coverage in Nigeria; *African Journal of Nursing and Health Issues*; 9(2):139-154

Ogundeji KD. 2017. Achieving universal health coverage through NHIS Voluntary Contributors Social Health Insurance Programme (VCSHIP): Implication for nursing education and practice. *Galore International Journal of Health Sciences& Research*, 2(4): 14-18

Ogundeji K.D, Akinyemi K.F, Faremi F.A. (2020): *A Pilot Study on Nurses Awareness of NHIS-VCSHIP in Nigeria: Implication for out-of-Pocket Healthcare Expenditure. Annals of Nursing and Practice; 7(2): 1112.*

Ogundeji K.D. 2020. Evaluation of Nursing Care Value: Rhetoric of 21st Century Nursing Frontiers. *International Journal of Caring Sciences* 13(2): 1463-1466

Oreh A.C.2017. Universal Health Coverage – Is Leaving No One Behind in Nigeria a Pipe Dream? *American Journal of Public Health Research*. 5(5): 159-162. DOI: 10.12691/ajphr-5-5-4

Polit, DF & Beck, CT. 2012. Nursing research: Generating and assessing evidence for nursing practice. 9th edition. Philadelphia: Wolters Kluwer; Lippincott. Williams & Wilkin

Polit, DF & Beck, CT. 2008. Nursing research: Generating and assessing evidence for nursing practice. 8th edition. Philadelphia: Wolters Kluwer; Lippincott. Williams & Wilkins.

Polit, D. & Beck, C. (2014). Essentials of Nursing Research: Appraising Evidence for Nursing Practice (8th Ed.). Philadelphia: Wolters Kluwer Health: Lippincott Williams & Wilkins

Portney, LG & Watkins, MP. 2014. Pearson new international edition. Foundations of clinical research. Applications to practice. 3rd edition. London: Pearson.

Raheem TY, Adewale B, Adeneye AK, Musa AZ, Ezeugwu SMC, Yisau J. et al. 2019. State of health facilities in communities designated for community-based health insurance scheme in Nigeria: A case of Kwara and Ogun state. *International Journal of Tropical disease & Health*. 36(1): 1-10

Real K, Fay L, Isaas K, Carll-White A & Schadler A. 2018. Using Systems Theory to Examine Patient and Nurse Structures, Processes, and Outcomes in Centralized and Decentralized Units. *Health Environments Research & Design Journal*.11 (3):1-16. DOI: 10.1177/1937586718763794

Sen CK. 2019. Human Wounds and Its Burden: An Updated Compendium of Estimates. *Advances in Wound Care*.8 (2). DOI: 10.1089/wound.2019.0946

Tan B-K, Tan E WX, Chong S-J, Chang Y-Y, Song C & Lee VJ. 2016. An economic evaluation of chronic wound management in a tertiary hospital. *Journal of wound practice and research*. 24(3): 130-136

Ugwu E, Adeleye O, Gezawa I, Okpe I, Enamino M, Ezeani I. 2019. Burden of diabetic foot ulcer in Nigeria: Current evidence from the multicentre evaluation of diabetic foot ulcer in Nigeria. *World Journal of Diabetes*. 10(3): 200–211. Doi: 10.4239/wjd. V10.i3.200

ANNEXURES

ANNEXURE A: UNISA ETHICAL CLEARANCE

UNISA university of south africa

COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

01 December 2020

NHREC Registration # :
Rec-240816-052
CREC Reference # :
2020-CHS -69296707

Dear Kolawole Damilare Ogundeji

Decision:
Ethics Approval from 01 December 2020 to 31 November 2025

Researcher(s): Kolawole Damilare Ogundeji **69296707@mylife.unisa.ac.za**

Supervisors : Prof PR Risenga **risenpr@unisa.ac.za**

Co-supervisor : Prof G Tshweneagae **tshweg@unisa.ac.za**

Title: ***A nursing care costing model for wound dressing in Nigeria***

Degree Purpose: Doctoral degree

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval is granted for three years.

The ***Low risk application was reviewed*** by College of Human Sciences Research Ethics Committee, on **01 December 2020** in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date **(31 November 2025).** Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number ***2020*-CHS-90163346** *should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature :

Dr. K.J. Malesa
CHS Ethics Chairperson
Email: maleskj@unisa.ac.za
Tel: (012) 429 4780

Signature : PP

Prof K. Masemola
Executive Dean : CHS
E-mail: masemk@unisa.ac.za
Tel: (012) 429 2298

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

ANNEXURE B: UI/UCH ETHICAL CLEARANCE

INSTITUTE FOR ADVANCED MEDICAL RESEARCH AND TRAINING (IAMRAT)
College of Medicine, University of Ibadan, Ibadan, Nigeria.

Director: **Prof. Catherine O. Falade,** *MBBS (Ib), M.Sc., FMCP, FWACP*
Tel: 0803 326 4593, 0802 360 9151
e-mail: cfalade@comui.edu.ng lillyfunke@yahoo.com

UI/UCH EC Registration Number: **NHREC/05/01/2008a**

NOTICE OF FULL APPROVAL AFTER FULL COMMITTEE REVIEW

Re: A Nursing Care Costing Model for Wound Dressing in South West Nigeria

UI/UCH Ethics Committee assigned number: UI/EC/21/0047
Name of Principal Investigator: **Kolawole D. Ogundeji**
Address of Principal Investigator: Department of Health Studies
University of South Africa

Date of receipt of valid application: 15/02/2021

Date of meeting when final determination on ethical approval was made: **N /A**

This is to inform you that the research described in the submitted protocol, the consent forms, and other participant information materials have been reviewed and *given full approval by the UI/UCH Ethics Committee.*

This approval dates from **29/03/2021 to 28/03/2022.** If there is delay in starting the research, please inform the UI/UCH Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the* UI/UCH EC *assigned number and duration of* UI/UCH EC *approval of the study.* It is expected that you submit your annual report as well as an annual request for the project renewal to the UI/UCH EC at least four weeks before the expiration of this approval in order to avoid disruption of your research.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the UI/UCH EC. *No changes are permitted in the research without prior approval by the* UI/UCH EC *except in circumstances outlined in the Code. The* UI/UCH EC *reserves the right to conduct compliance visit to your research site without previous notification.*

UI/UCH EC
1 MAR 2021
APPROVED
COLLEGE OF MEDICINE, U.I.

Professor Catherine O. Falade
Director, IAMRAT
Chairperson, UI/UCH Research Ethics Committee
E-mail: uiuchec@gmail.com

ANNEXURE C: NATIONAL ORTHOPAEDIC HOSPITAL IGBOBI LAGOS ETHICAL CLEARANCE

NATIONAL ORTHOPAEDIC HOSPITAL,
IGBOBI, YABA, LAGOS.

Board Chairman
DR. TUNJI ALAUSA, M.D.

Medical Director
DR. M. F. ALIMI
MBBS, FMCS, FMC ORTHO

Head of Administration
E. I. OSAGIEDE (MRS.)
MPA, B.ED (G&C), HND, AHAN

FULL POSTAL ADDRESS
P. M. B. 2009,Yaba. 101212, Lagos.
120/124, Ikorodu Road, Igbobi,Lagos.
Website: www.nohlagos.gov.ng
E-mail: nohil@nohlagos.gov.ng
nohigbobi@yahoo.com
nohigbobi@gmail.com

Ref No:.....OH/90/C/IX.....
Date:.....18TH FEBRUARY,2021

OGUNDEJI KOLAWOLE DAMILARE
DEPARTMENT OF NURSING SCIENCE
LEAD CITY UNIVERSITY
IBADAN OYO,
NIGERIA.

ETHICAL CLEARANCE

The proposal of the study titled **"A NURSING CARE COSTING MODEL FOR WOUND DRESSING IN NIGERIA"** by **OGUNDEJI KOLAWOLE DAMILARE** has been reviewed by the Health, Research, and Ethics Committee of the Hospital.

Ethical Clearance is hereby given to proceed with the study and kindly submit a soft copy of your completed research work to the Hospital's library at the end of study.

DR. O.K. IDOWU
CHAIRMAN, HEALTH, RESEARCH, AND ETHICS COMMITTEE

Telephone Nos: 07059717777, 070597[illegible]059732222, 07059734444.

ANNEXURE D: OAUTHC ETHICAL CLEARANCE

ETHICS AND RESEARCH COMMITTEE (ERC)

OBAFEMI AWOLOWO UNIVERSITY TEACHING HOSPITALS COMPLEX
Tel: +2348152092751 +2348152092755 +2348152092999
E-mail: oauthc ethicalcommittee@yahoo.com

CHAIRMAN: Prof. D. A. Ndububa MB.BS, (UNN), FWACP, AGAF.

REGISTRATION NUMBERS:

INTERNATIONAL: IRB/IEC/**0004553** NATIONAL: **NHREC/27/02/2009a**

CLEARANCE CERTIFICATE

PROTOCOL NUMBER: ERC/2021/04/07

PROJECT TITLE: A NURSING CARE COSTING MODEL FOR WOUND DRESSING IN NIGERIA

INVESTIGATOR: MR. OGUNDEJI KOLAWOLE DAMILARE

DEPARTMENT/INSTITUTION: DEPARTMENT OF NURSING SCIENCE, LEAD CITY UNIVERSITY, IBADAN, OYO STATE.

DATE OF RECEIPT OF VALID APPLICATION: 11/03/2021

DATE WHEN FINAL DETERMINATION ON ETHICAL APPROVAL WAS MADE: 15/04/2021

DURATION OF APPROVAL: Three (03) Months

This is to inform you that the research described in the submitted protocol, the informed consent forms and other participant information materials have been reviewed and given full approval by the **OAUTHC Ethics and Research Committee.**

The approval is from **15/04/2021** to **14/07/2021**. You are to inform the Committee the commencement date of the research and if there is any delay in starting the research, please inform the Committee so that the date of approval can be adjusted accordingly. All informed consent forms used in the study must carry the **OAUTHC/ERC** protocol number and duration of approval of the study. In multi-year research you are to submit an annual report in order to obtain renewal of approval.

The National Code of Health Research Ethics required that you comply with all institutional guidelines, rules and regulations including ensuring that all adverse events are reported promptly to the **OAUTHC/ERC.** No changes are permitted in the research without prior approval by the **OAUTHC/ERC.** The **OAUTHC/ERC** reserves the right to conduct compliance visit to your research site without previous notification.

Prof. D. A. Ndububa,
Chairman, OAUTHC/ERC

ANNEXURE E: UCH APPROVAL LETTER TO CONDUCT RESEARCH

UNIVERSITY COLLEGE HOSPITAL, IBADAN

The pioneer Teaching Hospital in Nigeria.

P.M.B 5116, Ibadan **Tel:** +234 813 173 3447, +234 813 173 3398 **E-mail:** cmd@uch-ibadan.org.ng
Facebook: University College Hospital, Ibadan **Twitter:** @UchCmd **Website:** www.uch-ibadan.org.ng

Ref. No. HSD/54 9th April, 2021

Mr. K.D. Ogundeji
Department of Health Studies,
University of South Africa,
City of Tshwane,
South Africa.

Dear Mr. K.D. Ogundeji,

PERMISSION TO CONDUCT Ph.D. RESEARCH STUDY IN YOUR FACILITY

With reference to your letter dated 1st April 2021, I write to inform you that the Management of the University College Hospital, Ibadan has been notified by the University of Ibadan / University College Hospital Ethics Committee and has approved of your intention to carry out a research on 'A Nursing Care Costing Model for Wound Dressing in Nigeria'. Kindly note that:

1. The approval date is from 29th March 2021 to 28th March 2022.
2. No participant accrual or activity related to this research may be conducted outside of these dates.
3. That all informed consent forms used in this study must carry the UI/UCH EC assigned number and duration of UI/UCH EC approval of study.

I wish you success in your endeavours.

Yours sincerely,

O.O. Adeniyi (Mrs)
For: Chairman, Medical Advisory Committee
For: Chief Medical Director

ANNEXURE F: INTRODUCTION TO RESEARCH ETHICS

TRREE

Zertifikat

Certificat

Certificado

Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Clinical Trials Centre
The University of Hong Kong

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Kolawole Ogundeji

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2020/10/08

CID : rZEOCpUjal

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

FMH Continuing Education Program (5 Credits)
Programme de Formation continue (5 Crédits)

FPH Continuing Education Programms
Programmes de formation continue

Ce programme est soutenu par - This program is supported by :

European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/289.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20170310]

ANNEXURE G: RESEARCH ETHICS EVALUATION

TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Clinical Trials Centre
The University of Hong Kong

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Kolawole Ogundeji

a complété avec succès - has successfully completed

Research Ethics Evaluation

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2020/10/10
CID : hFujvWQc0B

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

FMH Continuing Education Program (5 Credits)
Programme de Formation continue (5 Crédits)

FPH Continuing Education Programms
Programmes de formation continue

Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2891.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20170310]

ANNEXURE H: INFORMED CONSENT TRAINING

TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Clinical Trials Centre
The University of Hong Kong

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Kolawole Ogundeji

a complété avec succès - has successfully completed

Informed Consent

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2020/10/10
CID : 71WKGUgMZW

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

FMH Continuing Education Program (5 Credits)
Programme de Formation continue (5 Crédits)

FPH Continuing Education Programs
Programmes de formation continue

Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/e/2891.html) - Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.samw.ch) - Commission for Research Partnerships with Developing Countries (www.kfpe.ch)

[REV : 20170310]

ANNEXURE I: PARTICIPANT INFORMATION SHEET

Ethics clearance reference number: 2020-CHS-90163346

Research permission reference numbers: NHREC/05/01/2008a (21/0047), OH/90/C/IX, ERC/2021/04/07.

Title: **A nursing care costing model for wound dressing in Nigeria**

Dear Prospective Participant

My name is Ogundeji Kolawole Damilare and I am conducting research with professor PR Risenga and Professor GB Tshweneagae in the department of health studies towards a PhD at the University of South Africa. We have funding from self-sponsored sources to conduct this study. We are inviting you to participate in a study entitled a nursing care costing model for wound dressing in Nigeria.

WHAT IS THE PURPOSE OF THE STUDY?

I am conducting this research to examine the financial burden of wound dressing imposed on inpatients and outpatients in teaching hospitals in southwest Nigeria and to develop a nursing care costing model for wound dressing in Nigeria.

WHY AM I BEING INVITED TO PARTICIPATE?

You have been invited to participate in the study because you are admitted in this hospital ward (for wound dressing) which has been purposively selected for a research study. You also meet the eligibility criteria to be recruited into the study. You have also spent some monies on wound dressing since admission/regular clinic visit and we are interested in taking inventory of your expenses so far to help develop a nursing care costing model for wound dressing in Nigeria.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

Your participation mainly involves responding to the questionnaire through interviews on cost implications of wound dressing since you have been hospitalized or since your clinic visit for wound dressing. The questionnaire is structured to address the respondents' socio-demographic characteristics, wound dressing characteristics, direct cost of wound dressing and healthcare insurance coverage. Responding and answering the questionnaire requires around 25-35 minutes.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participating in this study is voluntary and you are under no obligation or influence to consent to participation. If you decide to participate in the study, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time from the study without any repercussion or asked to give reason. The information you provided will be kept confidential. Your name, hospital number and any other identifying information will not be attached to the information you gave. Your name will never be used in any presentation or publication of the study results. Once you have agreed and signed to participate in this study and respond to the questionnaire via interview, the information will be used for PhD research thesis work or published in a scientific journal.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

If you take part in this study, there may be no immediate direct benefit for you. You will not receive any payment for taking part in this study. However, from this study, a costing model will be developed that will assist in designing the cost implications of providing wound dressing in Nigeria. Therefore, it will help the hospitals and health insurance organizations in planning and budgetary allocation for wound dressing.

ARE THEIR ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

There are no negative consequences if you participate in this study. However, there may be minor discomfort or inconvenience due to taking your time in responding to the questionnaire. The interview will not be conducted during or immediately after wound dressing procedure. You will be interviewed at your convenient time.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

The information you provided will be kept confidential. No one apart from the researcher or the research assistants will know about your involvement in this research. Any information given will be treated with high level of confidentiality and will never be linked to your name, hospital number or any other form of identification. Also, your name, address, hospital number will never be used in any presentation or publication of the study results. The

information without your identity will only be used for Ph. Research thesis or published in a scientific journal.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

The hard copy of the interview administered questionnaire will be kept for a period of five years in a locked cupboard/filing cabinet in the researcher' office. Any electronic information will also be stored on a password protected computer for the same period of years. Future use of the kept data will be subjected to further Research Ethics Review and approval if applicable. After the period of five years, the hard copy will be shredded while any electronic information be deleted accordingly.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

The participants will not incur any financial costs or receive any incentives by participating in this study.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the Research Ethics Review Committee of the College of Human Sciences, UNISA. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Mr. Ogundeji Kolawole Damilare on his mobile number: +2347032273361 or email address: 69296707@mylife.unisa.ac.za or kolawole.ogundeji@gmail.com. Should you require any further information or want to contact the researcher about any aspect of this study, please contact Ogundeji Kolawole Damilare through his mobile: +2347032273361 or email: 69296707@mylife.unisa.ac.za or kolawole.ogundeji@gmail.com. Should you have concerns about the way in which the research has been conducted, you may contact Prof PR Risenga at: risenpr@unisa.ac.za or Prof. GB Thupayagale-Tshweneagae at: tshweg@unisa.ac.za.

Contact the UNISA Health Studies Research Ethics Committee at: HSREC@unisa.ac.za if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits, and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason.

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings and my participation will be kept confidential unless otherwise specified.

I agree to the responding and answering of the questionnaire.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname……

Participant Signature……Date……

Researcher's Name & Surname……

Researcher's signature…… Date……

ANNEXURE J

QUESTIONNAIRE FOR NURSING CARE COST OF IN-PATIENTS WOUND DRESSING

A NURSING CARE COSTING MODEL FOR WOUND DRESSING IN NIGERIA

Dear respondent

I am a PhD student interested in information to assess cost of hospitalized patients wound dressing. This study will help to examine the financial burden imposed on patients admitted for various types of wounds. It will also help to develop a nursing care costing model that will facilitate the design of healthcare financing to assist individuals with wounds. As such, your honest response to the following questions will be highly appreciated. All information given will be treated as private. Your participation is voluntary, and you do not have to answer questions you do not want to answer. Please sign below if you wish to respond. Thank you.

Signature/ Date

SECTION A: RESPONDENTS' SOCIO- DEMOGRAPHIC CHARACTERISTICS

1. Gender: a) Male b) Female
2. Age …….
3. Highest education level……
4. Occupation……..
5. Family Size……..
6. Monthly Income…….

SECTION B: WOUND AND DRESSING CHARACTERISTICS

7. Aetiology …….
8. Diagnosis…….
9. Type of wound ……..
10. Comorbidities……
11. Frequency of wound dressing per week …….

12. Type of dressing pack used (a) minor (b) moderate (c) Major
13. Number and type of dressing packs used per week……
14. Quantity of other dressing consumables used per week (e.g., bandage, plaster etc.). Specify …….
15. Type of dressing lotion used …….
16. Number of bottles of the dressing lotion used per week…….
17. Length of hospital stay…….

SECTION C: DIRECT COST OF WOUND DRESSING

18. Cost of dressing materials per week # …….
19. Cost of other dressing consumables per week (specify) # …….
20. Cost of lotion used per week (specify)…….
21. Total cost of dressing per week #…….
22. Total cost of dressing per acute care episode #…….
23. Total cost of other expenses during acute wound care episode (if any) …….
24. Cost of hospitalization per week #……
25. Total Cost of hospitalization per acute care episode #…….

SECTION D: HEALTHCARE INSURANCE COVERAGE

26. Do you personally pay for your wound care? If not, who pays? ……
27. Are you on any healthcare insurance coverage? a) Yes…… b) No……
28. If yes, Public Health Insurance (NHIS)……. or Private……. Specify……
29. Duration of insurance coverage a) Annually b) till my parent retirement c) till my retirement d) others Specify…….

THANK YOU

ANNEXURE K

QUESTIONNAIRE FOR NURSING CARE COST OF OUT-PATIENTS WOUND DRESSING

A NURSING CARE COSTING MODEL FOR WOUND DRESSING IN NIGERIA

Dear Sir/Madam

I am a PhD student interested in information to assess cost of out-patients' wounds care. This study will help to examine the financial burden imposed on patients with various types of wounds in outpatients' clinics. It will also serve as a guide to ascertain costs that will facilitate the design of healthcare financing to assist individual with wounds. As such, your honest response to the following questions will be highly appreciated. All information given will be treated as private. Your participation is voluntary, and you do not have to answer questions you do not want to answer. Please sign below if you wish to respond. Thank you.

_____

Signature/ Date

SECTION A: RESPONDENTS' SOCIO- DEMOGRAPHIC CHARACTERISTICS

1. Gender: a) Male b) Female
2. Age …….
3. Highest Educational level …….
4. Occupation ……
5. Family Size ……
6. Monthly income

SECTION B: WOUND CARE CHARACTERISTICS

7. Aetiology …….
8. Diagnosis…….
9. Type of wound …….
10. How long have you been coming for wound dressing in the clinic? ……
11. Frequency of wound dressing per week …….
12. Type of dressing pack used (a) minor (b) moderate (c) Major
13. Number and type of dressing packs used per week……

14. Quantity of other dressing consumables used per week (e.g., bandage, plaster etc.). Specify …….
15. Type of dressing lotion used …….
16. Number of bottles of the dressing lotion used per week…….

SECTION C: DIRECT COST OF WOUND DRESSING

17. Cost of dressing materials per week # …….
18. Cost of other dressing consumables per week (specify) # …….
19. Cost of lotion used per week (specify)……. #
20. Total cost of dressing per week……. #
21. Total cost of dressing per care episode……. #
22. Total cost of other expenses during wound care episode (if any) …….

SECTION D: HEALTHCARE INSURANCE COVERAGE

23. Do you personally pay for your wound care? If not, who pays? ……
24. Are you on any healthcare insurance coverage? a) Yes…… b) No……
25. If yes, Public Health Insurance (NHIS)……. or Private……. Specify……
26. Duration of insurance coverage a) Annually b) till my parent retirement c) till my retirement d) others Specify…….

THANK YOU

ANNEXURE L: RESEARCHER ACKNOWLEDGEMENT

Hereby, I Ogundeji Kolawole Damilare, student number 69296707, in my personal capacity as a researcher, acknowledge that I am aware of and familiar with stipulations and contents of the

- Unisa Research Policy
- Unisa Ethics Policy
- Unisa IP Policy

and that I shall conform to and abide by these policy requirements.

Signature: 

Date: 29th November, 2020

ANNEXURE M: PERMISSION LETTER REQUEST 1

OGUNDEJI KOLAWOLE DAMILARE
Department of Nursing Science
Lead City University
Ibadan, Oyo State
Nigeria
21st January 2021

The Chief Medical Director
University College Hospital
Ibadan, Oyo State
Nigeria

Dear Sir,

PERMISSION TO CONDUCT Ph.D. RESEARCH STUDY IN YOUR FACILITY

I am Ogundeji Kolawole Damilare, a Registered Nurse with Bachelor of Nursing Science (BNSc) degree and Master's in Medical Surgical Nursing (MSc. Nursing) degree background. I am currently a doctoral student (PhD in Nursing) at the department of Health Studies, University of South Africa. As part of the requirement for the degree, I am conducting a research study entitled '**A nursing care costing model for wound dressing in Nigeria'.**

The data will be collected among inpatients and outpatients with wounds in selected wards/clinics of the hospital where wound dressing is performed. The method of data collection will be interviewer-administered questionnaire. The data will be collected after the routine ward round, wound dressing and other morning procedures are completed.

The participation in the study will be voluntary. The information provided will be kept confidential. The findings of the study will be used for the research thesis work and for publication in scientific journals.

You can contact me at the following contact addresses: Mobile Number: +2347032273361 and email- 69296707@mylife.unisa.ac.za or kolawole.ogundeji@gmail.com. If you need any further explanation you may contact my supervisor, Prof PR Risenga at risenpr@unisa.ac.za or my co-supervisor, Prof Gloria Tshweneagae at tshweg@unisa.ac.za/+274292195 or the ethics chairperson, Prof Mathibe-Neke at mathijm@unisa.ac.za

I will be grateful if my request is favorably considered. Thank you

Yours faithfully

Ogundeji Kolawole

S.N: 69296707

ANNEXURE N: PERMISSION LETTER REQUEST 2

OGUNDEJI KOLAWOLE DAMILARE
Department of Nursing Science
Lead City University
Ibadan, Oyo State
Nigeria
21st January 2021

The Chief Medical Director
Obafemi Awolowo University Teaching Hospital Complex
Ile-Ife, Osun State
Nigeria

Dear Sir,

PERMISSION TO CONDUCT Ph.D. RESEARCH STUDY IN YOUR FACILITY

I am Ogundeji Kolawole Damilare, a Registered Nurse with Bachelor of Nursing Science (BNSc) degree and Master's in Medical Surgical Nursing (MSc. Nursing) degree background. I am currently a doctoral student (PhD in Nursing) at the department of Health Studies, University of South Africa. As part of the requirement for the degree, I am conducting a research study entitled '**A nursing care costing model for wound dressing in Nigeria'.**

The data will be collected among inpatients and outpatients with wounds in selected wards/clinics of the hospital where wound dressing is performed. The method of data collection will be interviewer-administered questionnaire. The data will be collected after the routine ward round, wound dressing and other morning procedures are completed.

The participation in the study will be voluntary. The information provided will be kept confidential. The findings of the study will be used for the research thesis work and for publication in scientific journals.

You can contact me at the following contact addresses: Mobile Number: +2347032273361 and email- 69296707@mylife.unisa.ac.za or kolawole.ogundeji@gmail.com . If you need any further explanation you may contact my supervisor, Prof PR Risenga at risenpr@unisa.ac.za or my co-supervisor, Prof Gloria Tshweneagae at tshweg@unisa.ac.za/+274292195 or the ethics chairperson, Prof Mathibe-Neke at mathijm@unisa.ac.za

I will be grateful if my request is favorably considered. Thank you

Yours faithfully

Ogundeji Kolawole

S.N: 69296707

ANNEXURE O: PERMISSION LETTER REQUEST 3

OGUNDEJI KOLAWOLE DAMILARE
Department of Nursing Science
Lead City University
Ibadan, Oyo State
Nigeria
21st January 2021

The Chief Medical Director
National Orthopedic Hospital
Igbobi, Lagos State
Nigeria

Dear Sir,

PERMISSION TO CONDUCT Ph.D. RESEARCH STUDY IN YOUR FACILITY

I am Ogundeji Kolawole Damilare, a Registered Nurse with Bachelor of Nursing Science (BNSc) degree and Master's in Medical Surgical Nursing (MSc. Nursing) degree background. I am currently a doctoral student (PhD in Nursing) at the department of Health Studies, University of South Africa. As part of the requirement for the degree, I am conducting a research study entitled '**A nursing care costing model for wound dressing in Nigeria'.**

The data will be collected among inpatients and outpatients with wounds in selected wards/clinics of the hospital where wound dressing is performed. The method of data collection will be interviewer-administered questionnaire. The data will be collected after the routine ward round, wound dressing and other morning procedures are completed.

The participation in the study will be voluntary. The information provided will be kept confidential. The findings of the study will be used for the research thesis work and for publication in scientific journals.

You can contact me at the following contact addresses: Mobile Number: +2347032273361 and email- 69296707@mylife.unisa.ac.za or kolawole.ogundeji@gmail.com . If you need any further explanation you may contact my supervisor, Prof PR Risenga at risenpr@unisa.ac.za or my co-supervisor, Prof Gloria Tshweneagae at tshweg@unisa.ac.za/+274292195 or the ethics chairperson, Prof Mathibe-Neke at mathijm@unisa.ac.za.

I will be grateful if my request is favorably considered. Thank you

Yours faithfully

Ogundeji Kolawole

S.N: 69296707

ANNEXURE P: TURNITIN REPORT

THESIS_for_turnitin.docx

ORIGINALITY REPORT

7%	6%	3%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	uir.unisa.ac.za Internet Source	1%
2	hdl.handle.net Internet Source	<1%
3	edepot.wur.nl Internet Source	<1%
4	mountainscholar.org Internet Source	<1%
5	www.tandfonline.com Internet Source	<1%
6	www.unn.edu.ng Internet Source	<1%
7	www.bibalex.org Internet Source	<1%
8	repository-tnmgrmu.ac.in Internet Source	<1%
9	www.pertanika.upm.edu.my Internet Source	<1%

ANNEXURE Q: LETTER FROM LANGUAGE EDITOR

ROSEMARY'S PROOFREADING
& EDITING SERVICES

+27 83 215 6445
Rosemarys.pes@gmail.com
1 Richards drive
Midrand, 1684

09 NOVEMBER 2021

To Whom It May Concern:

RE: LANGUAGE EDITING

This letter serves as confirmation that language and technical editing was conducted by Rosemary's Proofreading and Editing Services. Further details of the study and the researcher have been provided below.

TITLE OF THE STUDY: "A NURSING CARE COSTING MODEL FOR WOUND DRESSING IN NIGERIA".

Researcher: OGUNDEJI KOLAWOLE DAMILARE

Student number: 69296707

Kind Regards

R MALULEKE (CODER & LANGUAGE EDITOR)

ANNEXURE R: TURNITIN RECEIPT

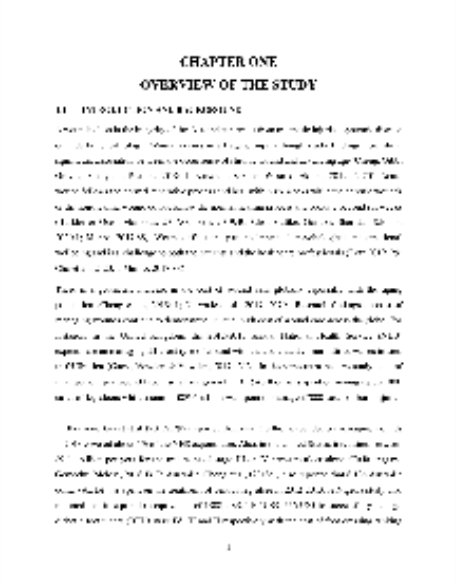
turnitin

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	Assignment title:Research
Submission title:	THESIS_for_turnitin.docx
File name:	THESIS_for_turnitin.docx
File size:	570.88K
Page count:	182
Word count:	51,989
Character count:	292,571
Submission date:	11-Sep-2021 07:40AM (UTC+0100)
Submission ID:	1645853742



CHAPTER ONE

OVERVIEW OF THE STUDY