CAREGIVERS' UTILISATION OF LONG-LASTING INSECTICIDE-TREATED NETS FOR UNDER-FIVE CHILDREN AT TWO SELECTED CLINICS IN PETAUKE DISTRICT, EASTERN PROVINCE, ZAMBIA

BY

BESNART J. BANDA (BScN, RN)

A Dissertation submitted to the University of Zambia in partial fulfilment of the requirement towards the awarding of the Master of Science Degree in Public health Nursing

THE UNIVERSITY OF ZAMBIA

LUSAKA

2022

NOTICE OF COPYRIGHT

No part of this Dissertation may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage and retrieval system without prior written permission from the author.

©2022 Besnart J. Banda

DECLARATION

I Besnart J. Banda declare that this dissertation herein presented for the Degree of Masters in Public Health Nursing has not been previously submitted either wholly or in part for other Degree at this or any other University nor is it being currently submitted for any other Degree. I also declare that this dissertation is my own work and that all the sources that have been used have been acknowledged using complete references. It has been written according to the guidelines for Masters of Science in Public Health Nursing degree at the University of Zambia.

Candidate's Name: **Besnart J. Banda**

Signature: …………………………..

Date: ………………………………..

APPROVED

Supervisors:

Dr Dorothy Chanda (Supervisor)

Signed: ______________________________ Date: __________________________

Department of Public Health Nursing, School of Nursing Sciences, University of Zambia

Mrs Natalia Shitima (Co-supervisor)

Signed: __________________________ Date: ______________________________

School of Nursing Sciences, UNZA, P.O. Box 50110, Lusaka, Zambia

STATEMENT

I, Besnart J. Banda, certify that this study is entirely the outcome of own independent investigations. The various sources of information to which I am indebted are clearly acknowledged under the references. The views contained in this report represent the opinions and findings by the author and not of the University of Zambia. This study was purely for academic purposes.

Signed: ___________________________ Date: _______________________________

CERTIFICATE OF COMPLETION OF DISSERTATION

I, Dr Dorothy Chanda having supervised and read this Dissertation, is satisfied that this is the original work of the author under whose name it is being presented.

I, further, confirm that the work has been completed satisfactorily and approve this Dissertation for final submission.

Supervisor's Name: ____

Signature: _____________________ Date: _________________________

Head of Department

Department of Public Health Nursing, School of Nursing Sciences, University of Zambia.

Name: ____

Signature: _____________________ Date: _________________________

CERTIFICATE OF APPROVAL

The University of Zambia approves this Dissertation of Besnart J. Banda on Caregivers' utilisation of long-lasting insecticide treated nets for under - five children at two selected clinics in Petauke District, Eastern Province, Zambia in partial fulfilment of the requirements for the award of the degree of Master of Science in Public Health Nursing.

Name of Examiner I …………………………………………………………………….

Signature………………………………………………… Date………………………….

Name of Examiner II ……………………………………………………………………

Signature………………………………………………… Date………………………….

Name of Examiner III …………………………………………………………………..

Signature………………………………………………… Date………………………….

ABSTRACT

Background: Malaria can be prevented if LLITNs are used appropriately for under-five children. Unfortunately, studies show that there is an increased prevalence of malaria in under-five children despite the free mass distribution of LLITNs to their caregivers. Malaria if left untreated leads to increased morbidity and mortality rate among under-five children. There has been mass distribution of LLITNs in Zambia so that every under-five child should be sleeping under an LLITN. About 228,725 LLITNs were distributed throughout Petauke district in 2014. However, the magnitude of malaria cases among under-five children at the study sites continued to increase by 17.7% between 2016 and 2019 (PDMHIS, 2019).

The study aimed at investigating factors that influence utilisation of LLITNs among caregivers of under-five children at two selected clinics.

Methods and Materials: An analytical cross-sectional study design was used and 328 study respondents from two clinics were sampled. Systematic random sampling was used to select the study respondents. Data collection was done using a semi-structured questionnaire. Statistical Package for Social Sciences (SPSS) version 23was used to process and analyse data. Chi-square test and multivariable logistic regression were used to determine the relationship among variables.

Results: The study results showed that more than three quarters (75.9% $n = 249$) of the respondents used LLITNs for their under-five children while less than a quarter (24.1% $n = 79$) did not. The study also revealed that knowledge on LLITN, attitude towards LLITN use and marital status were significantly (P<0.001) associated with LLITNs use. Probable interventions included increasing health education messages as an important activity, which should be rendered to all caregivers of under-five children.

Conclusion and recommendation: The study results revealed that there is a significant association between knowledge, attitude towards LLITNs, and utilisation of LLITNs among caregivers of under-five children. In addition, marital status was also significantly associated with utilisation of LLITNs. The use of LLITN is not the only strategy of eliminating malaria according to the goal of MoH but must be used in combination with other strategies such as IEC.

Keywords: Utilisation, Knowledge, Attitude, Long Lasting Insecticide Treated Net, Caregivers.

DEDICATION

I would like to dedicate this dissertation to my (mother, brothers, sisters, other family members and friends) for their encouragement, support and sacrifices they made during the course of my study at the University of Zambia.

ACKNOWLEDGEMENT

I would like to acknowledge my supervisors' Dr. Dorothy Chanda and Mrs Natalia Shitima without whose guidance this study would not have been possible to achieve.

I wish to thank all the Lectures at UNZA School of Nursing Sciences for the advice, knowledge, and counsel.

I would also like to acknowledge the Petauke District Health Office for allowing me to conduct this study in Petauke District.

My sincere gratitude goes to the managers of Kakwiya Rural Clinic and Petauke Urban Clinic for allowing me to conduct my research at their institutions.

Lastly, my heartfelt appreciation to all the study participants who accepted to participate in the study.

I pray that God richly blesses you all.

TABLE OF CONTENTS

NOTICE OF COPYRIGHT....ii

DECLARATION.... iii

STATEMENT....iv

CERTIFICATE OF COMPLETION OF DISSERTATION....v

CERTIFICATE OF APPROVAL....vi

ABSTRACT....vii

DEDICATION.... viii

ACKNOWLEDGEMENT....ix

TABLE OF CONTENTS....x

LIST OF TABLES....xiv

LIST OF FIGURES....xiv

LIST OF ABBREVIATIONS/ACRONYMS....xv

CHAPTER ONE INTRODUCTION....1

1.1 Introduction....1

1.2 Background information....1

1.3 Statement of the problem....3

1.4 Study justification....4

1.5 Research question....5

1.6 Research objectives....5

1.6.1 General objective....5

1.6.2 Specific objectives....5

1.7 Research hypothesis....5

1.8 Theoretical Model....6

1.8.1 Application of the PRECEDE/PROCEED Model....7

1.9 Variables....10

1.9.1 Dependent variable 10
1.9.2 Independent variables 10
1.9.3 Variables, Indicators and Cut-off Points 10
1.10 Conceptual definition of terms 10
1.11 Operational definition of terms 11
CHAPTER TWO LITERATURE REVIEW 12
2.1 Introduction 12
2.2 Overview of Utilisation of LLITNs 12
2.3 Socio – demographic Factors 13
2.3.1 Education Level 13
2.3.2 Marital Status 14
2.4 Knowledge on LLITNs 14
2.5 Attitude Towards Utilisation of LLITNs 15
2.6 Distance to the nearest health facility 16
2.7 Summary 16
CHAPTER THREE METHODOLOGY 18
3.1 Introduction 18
3.2 Study design 18
3.3 Study setting 18
3.4 Study population 19
3.5 Sample Selection 19
3.5.1 Inclusion criteria 20
3.5.2 Exclusion criteria 20
3.6 Sample size Calculation 21
3.7 Data collection tools 22
3.8 Validity of the data collection tool 22
3.9 Reliability of the data collection tool. 23

3.10 Data collection techniques 23
3.11 Data management and storage..24
3.12 Pilot study..24
3.13 Ethical and cultural considerations 24
CHAPTER FOUR DATA ANALYSIS AND PRESENTATION OF FINDINGS 25
4.1 Introduction 25
4.2 Data Analysis 25
4.3 Presentation of Findings...25
4.3.1 Social Demographic characteristics of the respondents 26
4.3.1 Utilisation of LLITNs 27
4.3.2 Knowledge on LLITNs..28
4.3.3 Attitude towards utilisation of LLITNs 30
4.3.4 Associations between variables 32
CHAPTER FIVE DISCUSSION OF FINDINGS 36
5.1 Introduction 36
5.2 Socio-Demographic Characteristics of the Sample...36
5.3 Utilisation of LLITNs..37
5.4 Knowledge on LLITNs 39
5.5 Attitude towards LLITN use 39
5.6 New finding from this Study 40
5.7 Implications to the Health Care System 40
5.7.1 Nursing practice...40
5.7.2 Nursing administration 41
5.7.3 Nursing education...41
5.7.4 Nursing research 41
5.8 Recommendations 41
5.9 Dissemination of findings 42

5.10 Utilisation of study findings.....42
5.11 Study limitations.....42
5.12 Conclusion.....42
REFERENCES.....43
APPENDIX I: PARTICIPANT INFORMATION SHEET (ENGLISH).....51
APPENDIX II: ZOWONJEZERA - PEPALA WACHIWIRI (CHEWA).....53
APPENDIX III: VOLUNTARY CONSENT FORMDECLARATION (ENGLISH).....55
APPENDIX IV: ZOWONJEZERA WACHINAI (CHEWA).....57
APPENDIX V: DATA COLLECTION TOOL.....59
APPENDIX VI: ZOWONJEZERA WACHISANU NDI IMODZI (CHEWA).....64
APPENDIX VII: MARKING KEY FOR THE VARIABLES KNOWLEDGE AND ATTITUDE TOWARDS LLITNS.....69

LIST OF TABLES

Table 1.1: Magnitude of confirmed malaria cases among under - five children from 2016 – 2019 at Kakwiya Rural and Petauke Urban Clinics...3
Table 1.2: Variables, Indicators and Cut–Off Points...10
Table 4.1: Social Demographic Characteristics of the respondents (n = 328).........................26
Table 4.2: Utilisation of LLITNs among respondents (n = 328)..27
Table 4.3: Knowledge of respondents on LLITNs (n=328) 29
Table 4.4: Attitude of respondents towards utilisation of LLITNs (n=328)............................31
Table 4.5: Association between utilisation of LLITNs and marital status, education level, knowledge and attitude using the chi square/Fishers exact test...33
Table 4.6: Univariate logistic regression analysis of the effect of knowledge, attitude, marital status and education on LLITNs utilisation...34
Table 4.7: Multivariable logistic regression analysis of the effect of knowledge, attitude, education and marital status on LLITNs utilisation...35

LIST OF FIGURES

Figure 1.1: Conceptual Framework adapted from PRECEDE/PROCEED MODEL for clarity. Source: Gautam and Adhikari, (2018)...7
Figure 1.2: Conceptual Framework adapted from the modified PRECEDE/PROCEED model 9
Figure 4.1: Overall knowledge of respondents on LLITNs (n = 328)....................................30
Figure 4.2: Overall attitude of respondents towards utilisation of LLITNs (n = 328).............32

LIST OF ABBREVIATIONS/ACRONYMS

CDC	Centers for Disease Control and Prevention
IEC	Information Education and Communication
IRS	Indoor Residual Spraying
ITNs	Insecticide Treated Nets
LLITNs	Long Lasting Insecticidal Nets
MIS	Malaria Indicator Survey
MoH	Ministry of Health
NMCC	National Malaria Control Centre
NMSP	National Malaria Strategic Plan
ORS	Oral Rehydration Solution
PDMHIS	Petauke District Medical Health Information System
RBM	Roll Back Malaria
SPSS	Statistical Package for Social Sciences
U-5	Under five
UNZABREC	University of Zambia Biomedical Research Ethics Committee
USAID	United States Agency for International Development
WHO	World Health Organisation
WHOPES	World Health Organisation Pesticide Evaluation Scheme
ZSA	Zambia Statistical Agency

CHAPTER ONE
INTRODUCTION

1.1 Introduction

Malaria can be prevented if caregivers use LLITNs appropriately with under-five children. Unfortunately, studies show that there is an increased prevalence of malaria in under-five children despite the free mass distribution of LLITNs to their caregivers (MoH, 2018). Malaria if left untreated leads to increased morbidity and mortality rate among under-five children. Hence, this study focused on caregivers' utilisation of LLITNs for under-five children at two selected clinics in Petauke District, Eastern Province, Zambia. This report is divided into five chapters. Chapter 1 looked at the introduction, background information, statement of the problem, study justification and conceptual framework, research objectives, research question, study hypothesis, conceptual definition of terms, and operational definition of terms. Chapter 2 and 3 looked at literature review and research methodology respectively. Chapter 4 focused on data analysis and interpretation of findings while Chapter 5 discussed the findings of the study.

1.2 Background information

Malaria is an infectious parasitic disease, which is transmitted to humans by the bite of an infected female Anopheles mosquito (WHO, 2018). The Roll Back Malaria Partnership to End Malaria identified under - five children and pregnant women as the highest risk groups for malaria. One of the strategies set to fight malaria among these groups was increasing the utilisation of mosquito nets (Odoko, Nwose and Igumbor, 2017).

According to CDC (2019), an insecticide-treated net (ITN) is a bed net that has been treated with safe, residual insecticide in order to kill and repel mosquitoes. ITNs were retreated every 6 to 12 months or even more frequently especially if they were washed and this resulted in very low retreatment rates in most African countries. This retreatment exercise proved to be cumbersome hence the introduction of the Long-Lasting Insecticide-Treated Net (LLITN) which is intended to remain effective for three to five years without retreatment (GiveWell, 2018). LLITNs are a powerful malaria prevention tool that is recommended by the World Health Organization (WHO) for use by people who are at risk of contracting malaria particularly in malaria endemic countries such as Zambia (WHO, 2019). It has been observed that LLITNs decrease malaria incidence among under - five children (Wanzira *et al.*, 2017).

LLITNs form a protective barrier around people who sleep under them. LLITNs that are treated with an insecticide are much more protective as they not only provide a barrier but also kill mosquitoes and other insects that alight on them. In addition, they repel mosquitoes, thereby reducing the number that enter the house and attempt to feed on people inside (CDC, 2019).

The WHO has put in a lot of effort and recommendations through WHO Pesticide Evaluation Scheme mechanism to evaluate and promote the distribution of LLITNs so that everyone can have ownership of nets (Krezanoski, 2016). WHO recommends that LLITNs should be distributed for free so that universal coverage can be reached especially to those people who are at risk of malaria; for example, under - five children.

A study revealed that from 2008 to 2010, 294 million LLITNs were distributed in sub-Saharan Africa (Finlay *et al.*, 2017). Despite several high impact interventions such as free mass distribution of LLITNs to mostly disadvantaged populations having been put in place for the prevention and control of malaria, malaria burden and deaths have been escalating (Kanmiki *et al.*, 2019). For instance, the WHO in 2015 stated that approximately 212 million cases of malaria occurred worldwide and 627,000 died; 90% of this occurred in Africa resulting in 92% deaths and more than 75% of the deaths being among under –five children (Nuwamanya *et al.*, 2018). To the contrary, India reported 3 million fewer cases in 2017, which was a 24% decrease compared to the previous year, 2016 (Finlay *et al.*, 2017). The World Malaria Report (WHO, 2019), estimated that there were 228 million cases of malaria globally in 2018.
A study, which was conducted in Myanmar, highlighted that there was poor utilisation of LLITNs among under five children. It was noted that some caregivers of under-five children did not use LLITNs which had implications on childhood morbidity and mortality due to malaria (Min et al, 2020). Further, a study which was conducted in Malawi revealed that LLITNs were a key vector control intervention in malaria prevention. It was concluded that continued efforts to increase awareness of the importance of using LLITNs in malaria prevention in Malawi were necessary to reduce malaria cases (Nkoka *et al, 2019).*
In 2013, the annual LLITN distribution in Zambia was about 1.5 million per year while LLITN ownership of at least one LLITN per household was 72% with utilisation among all household members being reported at 49%. This was below target for universal 100% coverage and 80% utilisation and this led to a comprehensive mass distribution of LLITNs in 2014 (Masaninga *et al.*, 2018). The Ministry of Health and the districts took the control of malaria very seriously by distributing several LLITNs through free mass distribution to prevent malaria. About 228,725 LLITNs were distributed throughout Petauke district in 2014 (Masaninga *et al.*, 2018).

In addition, in 2017 and 2018, the National Malaria Elimination Programme organized LLITN distribution campaigns. About 10,060,000 LLITNs were distributed covering all 10 provinces. This resulted in 79% of households having reported owning at least one LLITN. Eastern Province recorded having the highest LLITN ownership rates, in which 92.4% of households reported at least having one LLITN (MoH, 2018). The national malaria incidence for Zambia was 386/1000 persons in 2013, 409/1000 in 2014, and 335/1000 in 2015 (Inambao *et al.*, 2017).

However, there is inadequate information on how people are utilising the LLITNs at Kakwiya Rural and Petauke Urban Clinics.

1.3 Statement of the problem

Despite mass distribution of LLITNs in 2014 by MoH, in Petauke district in which 228,725 LLITNs were distributed (Masaninga et al, 2018), malaria cases continued to increase by 17.7% between 2016 and 2019 at Kakwiya Rural and Petauke Urban Clinics as shown in table 1.1.

Table 1.1: Magnitude of confirmed malaria cases among under - five children from 2016 – 2019 at Kakwiya Rural and Petauke Urban Clinics.

Year	Under 5 sick children seen	Under 5 children with confirmed malaria cases	Percentage
2016	8969	1740	19.4%
2017	11402	3122	27.4%
2018	10964	2866	26.1%
2019	10214	3789	37.1%

Source: Petauke District Medical Health Information System (PDMHIS), (2019).

Table 1.1 shows a 17.7% increase in magnitude of confirmed malaria cases among under - five children between 2016 and 2019 at Kakwiya Rural and Petauke Urban Clinics. There is inadequate information on how people are utilising LLITNs in Petauke district. However, the number of cases of malaria are increasing and inadequate or non-use of LLITNs is one of the predisposing factors to malaria. The probable causes of these increases could be due to poor attitude towards LLITN use, perhaps lack of knowledge on the importance of utilisation of LLITNs.

The prevalence of malaria has many effects on under - five children, the family and the community (MOH, 2018). Under - five children who are suffering from malaria may die more because their immune system is compromised. Families also spend considerable amounts of

money and time at health facilities taking care of children who are sick resulting in absence from work leading to low productivity in the country. Furthermore, family members are psychologically traumatized and there is population decrease due to mortality. Members of the community live in poverty due to being unproductive since they are psychologically traumatised, and so unable to conduct their income generating businesses.

Added to absence from work and low productivity due to malaria are the huge sums of money, which the government spends to procure anti-malarial drugs as well as medical supplies such as Rapid Diagnostic Test kits.

It has been noted that before mass distribution of LLITNs, the incidence of malaria cases was over 150 per 1000 population in Petauke district (USAID, 2019). Despite all these efforts, the utilisation of LLITNs has not shown any improvement in the incidence and prevalence of malaria among the vulnerable groups. This is because the incidence of malaria cases after mass distribution of LLITNs shows an increase in malaria cases by 17.7% instead of reducing as indicated in Table 1.1. Therefore, malaria continues to be high in Petauke district among the under - five children.

The community has LLITNs but it is unknown whether the LLITNs are being utilised or not. There was the need, therefore, to establish utilisation levels of LLITNs that may be contributing to persistently high cases of malaria.

1.4 Study justification

A study that focused on emulating commercial, private-sector value-chains to improve access to Oral Rehydration Solution (ORS) and zinc in Petauke, Katete, Kalomo and Monze concluded that even if diarrhoea was the third leading cause of death among the under - five children, malaria was the first leading cause of death in under - five children in Petauke district (Ramchandani, 2016). The results of another study that was conducted by Tan *et al.*, (2016) also noted that malaria in under - five children was high in Petauke district. These studies however did not focus on how LLITNs were being used in under - five children.

From 2013 to 2014 and 2017 to 2018, there was mass distribution of LLITNs (MoH, 2018). However, the utilisation of these nets remained unknown. Therefore, this study came in to ascertain levels of utilisation of these nets. Furthermore, studies done previously did not interrogate level of utilisation of LLITNs at Kakwiya Rural and Petauke Urban Clinics. This study bridged the gap in research knowledge concerning utilisation of LLITNs at Kakwiya

Therefore, this study investigated LLITN utilisation among caregivers of under - five children so that recommendations based on research results could be implemented and possibly help to control malaria in Zambia.

1.5 Research question

What are the factors that influence utilisation of Long-Lasting Insecticide Treated Nets among caregivers of under-five children at selected clinics in Petauke district?

1.6 Research objectives

The following are the research objectives:

1.6.1 General objective

To investigate factors that influence utilisation of long-lasting insecticide treated nets among caregivers of under - five children at two selected clinics in Petauke district.

1.6.2 Specific objectives

- To ascertain the proportion of caregivers of under-five children who utilise Long Lasting Insecticide Treated Nets at selected clinics in Petauke district.
- To assess knowledge levels of the caregivers of under-five children on the utilisation of the LLITNs.
- To determine the attitudes of caregivers of under-five children towards the use of LLITNs.

1.7 Research hypothesis

Null hypothesis

There is no association between utilisation of LLITNs among caregivers of under-five old children and these identified variables stated below:

- Knowledge on LLITNs
- Attitude towards utilisation of LLITNs

1.8 Theoretical Model

In this study, the researcher used the PRECEDE/PROCEED model to guide the study. Green developed the MODEL in 1974. In 1991, Krueter added the PROCEED component. The new version was published in 2005 (Porter, 2016). It works backwards from the outcome to construct an intervention that will bring favourable outcomes. This model is used for comprehensive planning in both health promotion and health education for individuals, families and communities. It enhances the quality of life and health status by doing what is necessary to prevent illness (Mohamed and Khaton, 2017). The reason for using this model is because of its easy applicability in planning, implementing, monitoring and evaluating a community intervention. In addition, it is a participatory model where the community is involved in controlling and improving their own health, resolving the problems that affect them, hence creating community ownership of the intervention. PRECEDE-PROCEED model has got nine phases of which PRECEDE includes Phases 1 and 2 that identify the goals of the intervention while Phases 3 and 4 establishes the structure and targets for the planning and designing of the intervention. Phase 5 is the administrative and policy assessment where the investigator determines the state and local programmes, which may already be in place that influence what can be implemented (Hlaing, Sullivan and Chaiyawat, 2019).

PROCEED is the treatment portion of the model. It consists of Phase 6, which is the implementation of the intervention (Porter, 2016). Phases 7, 8 and 9 are monitoring and evaluation phases of the intervention, which work backwards evaluating the success of the interventions. The process evaluation in Phase 7 looks at whether the intervention addressed the concerns that were identified in Phase 3 as planned. The impact evaluation of Phase 8 determines whether the intervention implemented is having the intended effects on the behaviours or environmental factors, which were identified in Phase 2 (Banerjee *et al.*, 2015; Bazpour *et al.*, 2019). The outcome evaluation of Phase 9 looks at whether the intervention eventually resulted in improved people's quality of life. Lastly, this process goes back to where it started from, either the desired quality of life outcome being achieved, or to start over again through managing what was learnt (Center for Community Health and Development, 2020).

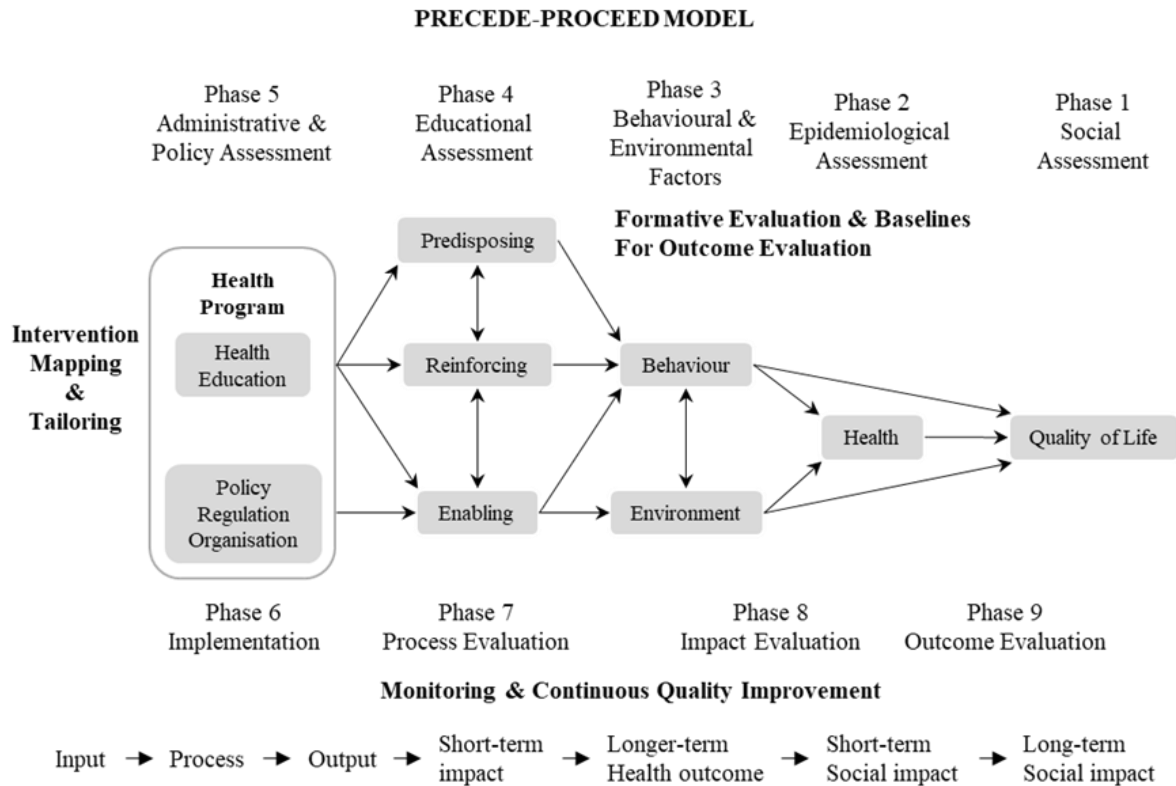


Figure 1.1: Conceptual Framework adapted from PRECEDE/PROCEED MODEL for clarity. Source: Gautam and Adhikari, (2018)

1.8.1 Application of the PRECEDE/PROCEED Model

PRECEDE/PROCEED model was applied to this study because it focused on the variables of this model. However, only the PRECEDE portion has been applied to this study because no intervention took place in this study.

Figure 1.2 shows details of a modified version of the PRECEDE-PROCEED model, which has been adopted for easy application in this study. It can be noted that as this is a non – interventional study which will only recommend implementation to relevant bodies, it was thus necessary and appropriate that only the PRECEDE aspect of the model be maintained. The PROCEED component that deals with implementation, monitoring and evaluation is thus eliminated. Therefore, in this study, the PROCEED portion of the model is not used.

Under the modified version of the PRECEDE-PROCEED model in Figure 1.2, it can be noted that the socio, epidemiological, environmental, behavioural, educational, administrative and policy assessments are the five main concepts that are most relevant to this study.

Using the model, the social assessment component focuses on the number of under-five children at the household level. For example, if the under - five children outnumber the LLITNs available, this may mean that some children will not sleep under LLITNs. Hence, they are likely to suffer from malaria.

The epidemiological assessment component focused on the actual disease that is malaria in this study. There is high prevalence of malaria among under - five children at Kakwiya Rural and Petauke Urban Clinics. This could be due to low utilisation of LLITNs or maybe the caregivers of the under - five children lack knowledge on the importance of using LLITNs.

Behavioural factors focused on poor attitude of caregivers of under five children towards use of LLITNs for their children. As these children have a low immune system, the risk of suffering the adverse effects of malaria such as high mortality rates are always predominant (Hill and Kuile, 2018).

Educational assessment focuses on some reinforcing and predisposing factors towards utilisation of LLITNs. Predisposing factors to low utilisation of LLITNs may include lack of access to LLITNs because, if few people own LLITNs, this will mean that few people will use them. Lack of knowledge on the importance of using LLITNs could also be a predisposing factor to low LLITN use. The result is that if caregivers of under - five children do not know that using LLITNs protect their children from malaria; they will not see the importance of using the LLITNs. Therefore, it is important that healthcare providers give adequate health education to the caregivers of under - five children on the importance of using LLITNs. Long distance to the nearest health facility could be another contributing factor to low LLITN use because it might be difficult for the caregivers to access the facility and collect LLITNs. These are usually distributed for free to the under - five children. Healthcare providers might also not be able to conduct frequent outreach healthcare services to these far places. Reinforcing factors focused on the Information, Education and Communication, which healthcare providers give to caregivers of under - five children during under-five clinics and through mass media such as television and radio.

Administrative and Policy assessment looked at how the Ministry of Health has put up some strategies of free distribution of LLITNs especially to caregivers of under - five children and giving health education on correct and consistent use of LLITNs to the caregivers. It is also encouraging Indoor Residual Spraying (IRS) to help in reducing malaria. In addition, the government is also training Community Health Assistants who also help in distribution of

LLITNs. It is expected that malaria cases should be reducing every year. Despite this being the target, it was observed that there was an increase in the magnitude of malaria cases being recorded (Johnson *et al.*, 2018).

The results of this study helped to make recommendations to the Ministry of Health, which they can possibly implement to aid the current strategies in place.

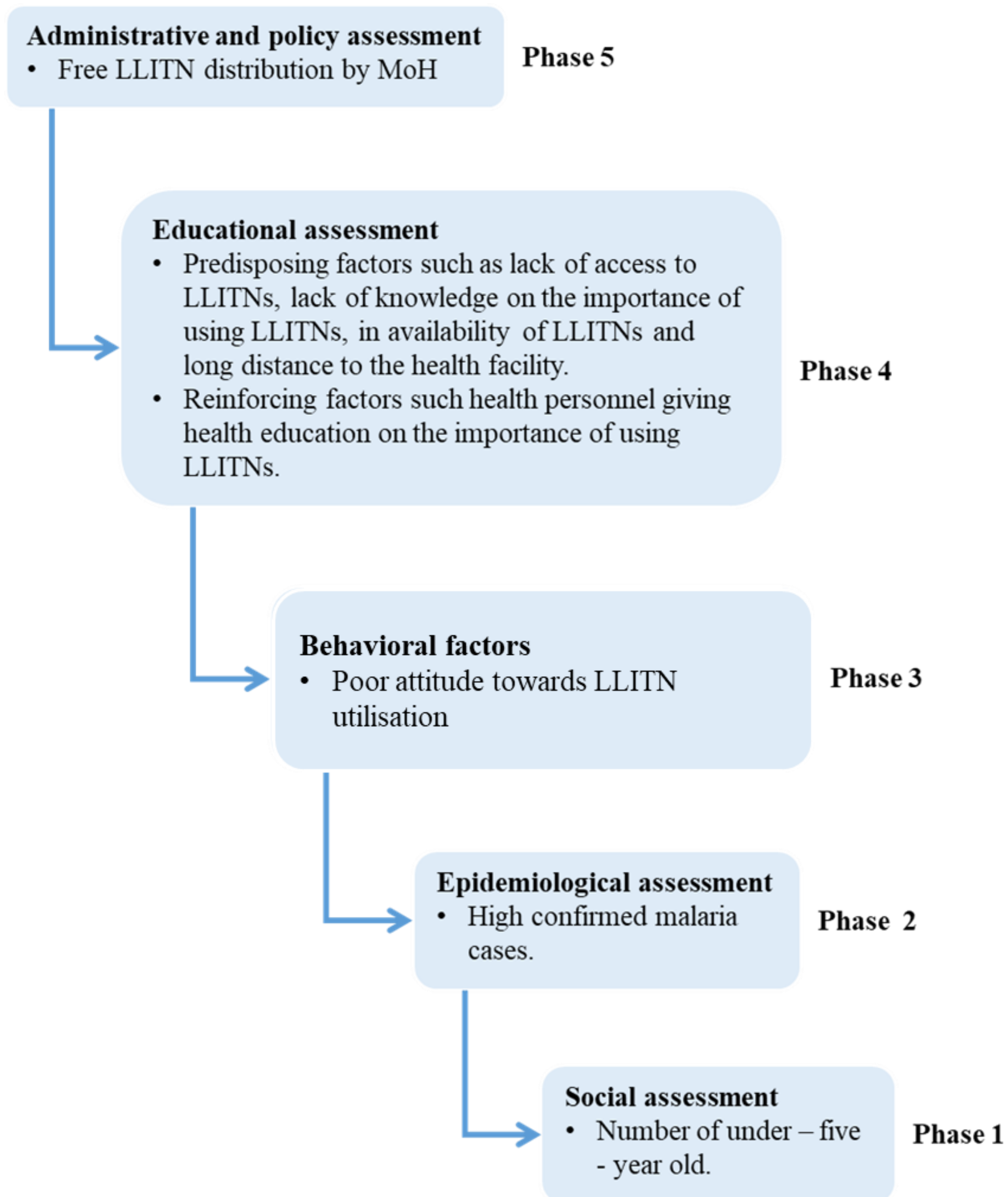


Figure 1.2: Conceptual Framework adapted from the modified PRECEDE/PROCEED model

1.9 Variables

1.9.1 Dependent variable

- Caregivers utilisation of LLITNs

1.9.2 Independent variables

- Knowledge on LLITN use
- Attitude towards LLITN use

1.9.3 Variables, Indicators and Cut-off Points

Table 1.2: Variables, Indicators and Cut–Off Points

Type of variables	Indicators	Cut off points	Question Number
DEPENDENT VARIABLE			
Utilisation	No	Never slept under an LLITN	9 - 16
	Yes	Slept under an LLITN	9 - 16
INDEPENDENT VARIABLES			
Knowledge on LLITNs	Low	Respondents who scored 0 to 4 correct responses to knowledge questions.	17 - 23
	High	Respondents who scored above 4 correct responses to knowledge questions.	17 - 23
Attitude towards LLITN use	Poor	They had no interest, and they did not feel like sleeping under LLITN every night of the year and scored 0-2 correct responses to attitude questions.	24-27
	Good	They had interest and they felt that they should sleep under LLITN every night of the year and scored 3– 4 correct responses to attitude.	24-27

1.10 Conceptual definition of terms

Knowledge: State of having information (Merriam-Webster, 2020).

Utilisation: Making use or participating in an existing service (GiveWell, 2018).

Attitude: A feeling about something (Merriam-Webster, 2020).

1.11 Operational definition of terms

Utilisation: Sleeping under LLITN. It was categorised as yes and no. Yes meant that under-five children slept under LLITN while no meant that they never sleep under LLITN.

Knowledge: General awareness or possession of information on LLITN or what one knew and understood about it. It was categorised as a low and high levels of knowledge. A participant had a high knowledge level if scored 5-7 correct responses to knowledge questions while a score of 0 to 4 correct responses to knowledge questions was categorised as low knowledge level.

Attitude: Having interest in utilisation of LLITNs and felt that their under five children should sleep under LLITN. The variable attitude was categorised as poor and good. Participants had a good attitude towards LLITN utilisation if they had interest and felt that their under- five children should sleep under LLITN every night of the year and scored 3– 4 correct responses to attitude questions. If they had no interest, did not feel like having their under - five children sleep under LLITN every night of the year, and scored 0-2 correct responses to attitude questions were categorised as having poor attitude.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews several literature and citations on utilisation of LLITNs among caregivers of under - five children. The purpose of conducting literature review in this study is to provide orientation to what is already known, become familiar with practical issues relating to utilisation of LLITNs among caregivers of under - five children, refine certain parts of the study and provide information on approaches, methods, instruments that exist, tried or not.

Published studies have been used in this literature review and the process of reviewing the literature has been followed in order to have scientific, evidence-based literature that adds value to the study. Studies were searched electronically by using Google Scholar, PubMed and HINARI. Only literature, which was published five years or less, was searched, so that current information could be used. The selected literature in this chapter was discussed under the following headings: Overview of LLITN utilisation, socio demographic factors (marital status and education level), knowledge on LLITNs, attitude towards utilisation of LLITNs and finally a conclusion was drawn.

2.2 Overview of Utilisation of LLITNs

It is very important for under five children to sleep under an LLITN every night so that they are protected from mosquito bites. A study conducted in Brazil by Sousa et al., (2019) revealed that the proportion of individuals who used mosquito nets the previous night increased 1 year after the distribution of the LLITNs in the area where the intervention was done but decreased after 5 years. It was found that the use of the LLITNs in urban areas was, at least, four times greater than that in the rural areas. One of the reasons stated was that in rural areas, some individuals tend to use mosquito nets only when there were a lot of mosquitoes and malaria cases (Sousa et al., 2019). On the other hand, Min et al., (2020) revealed that in Myanmar, there was higher utilisation rates for LLITN among children in rural areas as compared to those in urban areas. A possible reason stated was low incidence of malaria in urban areas. However, in African countries, it was noted that even if LLITNs are very effective in the prevention of malaria, utilisation remains very low despite caregivers of under - five children having been given LLITNs for free (Chinwe et al., 2017).

A study conducted by Iwuafor et al., (2016) in Nigeria showed that about 71.5 % of caregivers with under - five children owned at least one LLITN but only 25.4 % of the children used the

LLITN a night before the survey was conducted. There were a lot of reasons which were given for not using the LLITNs and some of them included that they were too hot (77.2 %), about 7.3% said that it was difficult to hang the nets while another 7.3% said that there were no mosquitoes.

In the same year, LLITN use among under-five children was 69% instead of the targeted 80% (MoH, 2018).

According to the study conducted by Min *et al.*, (2020), malaria was one of the top-five contributors to deaths of the under-five children in Myanmar. It revealed that ownership and utilization of LLITNs was very poor among under-five children. The findings showed that less than one out of five under-five children slept under an LLITN the night prior to the survey. Reason to this finding was probably due to poor ownership of LLITNs. They emphasised on mass distribution of LLITNs especially to households with under-five children to improve ownership of ITNs. This was by conducting a head count in households with under five children.

Another study conducted in Ethiopia by Tassew, Hopkins and Deressa, (2017) showed that availability of LLITNs could be associated with the age. Those aged between 26 and 60 years were more likely to possess LLITNs compared to those who were younger than 26 or older than 60 years. The level of education was positively associated with ownership of LLITNs. In addition, caregivers of under-five children who had knowledge on LLITN as one of the preventive measures of malaria were more likely to own LLITNs.

According to the Zambia Malaria Indicator Survey (MoH, 2018) conducted during the national mass LLITN distribution campaign, it was concluded that despite the progress in the LLITN distribution, gaps in LLITN coverage exist and there was need to look at reasons why caregivers of under - five children do not use LLITNs. Further, a survey conducted in Zambia found that about 80.4% of households had a mosquito net while 80.1% of households owned at least one LLITN. About 54.4% had more than one LLITN. Eastern Province had the highest LLITN ownership rates, with 92.4% of households reporting of having at least one LLITN (MoH, 2018).

2.3 Socio – demographic Factors

2.3.1 Education Level

The results of the study conducted by Khanam *et al.*, (2018), in Bangladesh revealed that LLITN access increased with an increase in household head’s level of education. In another

study conducted in Nigeria by Bisi-Onyemaechi *et al.*, (2017), about 2.4% of the respondents who used LLITN did not have formal education and 25% of these respondents used LLITNs. Of those respondents, six had primary education and 27.3% of these respondents used LLITNs. Bisi-Onyemaechi *et al.*, (2017) noted that there was a strong association between utilisation of LLITNs and education. Therefore, it was established that education has a significant impact on the level of awareness as there was a consistent increase in awareness as educational status increased. These findings were inconsistent with the findings of a study conducted by Diema-Konlan *et al.*, (2019) which showed that there was no association between caregivers with tertiary level of education and the utilisation of LLITNs. It was discovered that caregivers who had tertiary education level were 53% times less likely to use LLITNs as compared to those who did not have any educational background. The reason cited was that with increasing education, most women are likely to engage in activities that decrease their risk of contracting infections including malaria.

In Zambia, women with more education were more likely to report hearing a malaria message than less educated women (MoH, 2018). Therefore, caregivers of under-five children are more likely to use LLITNs if they have knowledge about malaria transmission and the importance of utilisation of LLITNs in the prevention of malaria (Israel *et al.*, 2018).

2.3.2 Marital Status

A study conducted in Thailand on LLITN use revealed that single women who were less than 19 years old were the least likely to use an LLITN (Hill and Kuile, 2018). In addition, it was noted that children who were born to a married mother or a mother who lived with a partner, were more likely to sleep under an LLITN compared to children born to a mother who was widowed or divorced. They stated that the partner helped to remind the caregiver of under – five child to have their child sleep under an LLITN (Ruyange *et al.*, 2016).

Similarly, in some African countries, ownership of LLITNs was associated with marital status of the household head. It was observed that households headed by married persons were more likely to own LLITNs than those headed by single persons. They stated that there could be much better decision-making power in married household heads than their counterparts who were single (Fokam *et al.*, 2017).

2.4 Knowledge on LLITNs

A study conducted by Iyer *et al.*, (2019) in the Peruvian Amazon, revealed that all participants knew that malaria was an illness which was transmitted by mosquitoes and that malaria is a

serious illness. Some participants said that traditional herbal treatments were effective for preventing and treating malaria while others stated that drinking the juice of a fruit called ‘toronja’ was effective in the prevention and treatment of malaria. Also discovered was that some participants learnt about malaria from nurses who taught them in their communities while others learnt through school teaching programmes and radio.

Diema-Konlan *et al.*, (2019) observed that caregivers of under-five children were 59% times less likely to use LLITN with increased knowledge on malaria and the use of the LLITN. They stated that there was increasing likelihood that caregivers would use alternative means of preventing malaria than using LLITNs only. However, the respondents who had less knowledge on LLITN and malaria used LLITNs more frequently. Some people do not use LLITNs because they think that the chemicals used on the nets can cause cancer. Still, others think that the nets can bruise the baby’s skin when they touch their skin (Taremwa *et al.*, 2017).

On the other hand, Nyavor *et al.*, (2017) through their study conducted in Ghana proved that knowledge on the importance of using LLITNs motivates caregivers of under-five children to use LLITNs correctly and consistently. Caregivers will always use LLITNs when they understand that these children have low immune system, and therefore are at risk of acquiring infections easily including malaria, which results in high mortality rates.

Similarly, in Zambia, caregivers of under-five children are more likely to use LLITNs if they have knowledge about malaria transmission and the importance of utilisation of LLITNs in the prevention of malaria. This information is learnt during under-five clinics through health education which is given by the health workers while other sources of information are through radio and television (Israel *et al.*, 2018).

2.5 Attitude Towards Utilisation of LLITNs

The attitude towards utilisation of LLITNs can be affected by the culture of people. For instance, a study conducted in the Peruvian Amazon showed that all the participants slept under either traditional or LLITNs every night because it was their culture to sleep under the nets (Iyer et al., 2019). Attitude plays a key role in the utilisation of LLITNs because healthcare providers can disseminate information, and emphasis placed on the importance of using LLITNs. However, it is the responsibility of the caregivers of under-five children to take this information seriously so that they can make use of LLITNs.

The attitude of caregivers of under – five children towards utilisation of LLITNs contributed to low utilisation of LLITNs. Some stated that LLITNs were too rough; others noted that

LLITNs had irritating smell (Taremwa et al., 2017). Other caregivers of under-five children did not use LLITNs consistently because they felt that they caused heat, and others felt that LLITNs caused them rash (Orji et al., 2018).

According to a study conducted in Zambia by Shimaponda-Mataa et al., (2016) revealed that a number of participants owned an LLITN because they were given for free and never considered purchasing one as an option. This attitude showed that once an LLITN has been damaged, they cannot purchase another. Another study reported that some people did not use LLITNs because they were too expensive while others claimed that it was too hot or there were few mosquitoes during the dry season (Pinchoff et al., 2016).

2.6 Distance to the nearest health facility

In a study conducted by Iyer *et al.*, (2019) in the Peruvian Amazon, findings revealed that the distance from health facilities increased the risk of mortality among under-five children, because the location of the community affected LLITN distribution. It was discovered that community members in remote areas had to travel long distances to a nearby village to receive LLITNs as a result some people did not get LLITNs. In addition, it was difficult for people to purchase LLITNs due to long distance.

To the contrary, a study conducted in Gambia by Jallow, Bah and Bajinka, (2019) showed that distance from health centre was not found to be statistically significant with the utilization of ITNs. This was because most respondents travelled up to 2 Kilometres for them to acquire LLITNs. Results of the study conducted by Immurana and Urmi, (2018) in Ghana, showed that mothers of under-five children who lived far from a health facility were 3% more likely to use LLITNs for their children as compared to those who lived near. It was stated that it could be because mothers knew how challenging distance was in seeking medical care, as a result, they ended up adopting preventive care measures such as using LLITNs so that they prevent malaria.

In Zambia, a study conducted by Wang *et al.*, (2016) noted that point distribution attendance suffered when Rural Health Centres were used as distribution points of LLITNs due to the long travel distance.

2.7 Summary

It has been observed that socio demographic factors, attitude towards LLITN use, knowledge on LLITNs have an impact on the utilisation of LLITNs. This is because inadequate knowledge on the importance of sleeping under LLITNs can lead to low utilisation levels since people will not value the importance of using the LLITNs. In addition, socio demographic factors such as

marital status can affect the utilisation level of LLITNs as caregivers of under - five children may be reminded by the spouse to use LLITNs for their under-five children. Lastly, poor attitude towards utilisation of LLITNs can negatively affect use of LLITNs while having good attitude towards LLITN utilisation can make people use them correctly and consistently.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This chapter focused on the research design, research setting, study population, sample selection, sample size, data collection tools, validity, reliability, data collection technique, pilot study and data analysis.

3.2 Study design

The study involved collection of information on the factors that influenced utilisation of LLITNs among caregivers of under - five children. This study was a quantitative study and an analytical cross-sectional design because cross- tabulations using Chi-square/Fisher's exact test and logistic regression were employed to explain the association between dependent and independent variables. It is called a quantitative cross-sectional study because the study focused on gathering numerical data to explain the association between dependent and independent variables. The numerical data was collected only on one occasion with the same respondents meaning that the investigator interviewed each respondent once. In addition, data was collected over a short and fixed period, and it involved describing and analysing the prevailing situation without taking any interventions. Advantages of using a cross-sectional design include the following: data collection was completed in a short time, it allowed the researcher to collect large amounts of data from a large number of people on a variety of subjects and it was relatively inexpensive. The disadvantage of using a cross – sectional study design was that the researcher could not make conclusions about causal effect. However, a recommendation was made to relevant authorities to conduct an interventional study.

3.3 Study setting

This study was conducted at Kakwiya Rural and Petauke urban Clinics in Petauke district. Petauke is among the nine districts in Eastern Province of Zambia and situated along the Great East Road. The district is about 400 Kilometres east of Lusaka; the Capital City of Zambia and 170 Kilometres from Chipata City; the provincial headquarters of Eastern Province. It borders Serenje to the North, Sinda district and Mozambique to the South, Katete district to the East, Nyimba district to the West and Mambwe district to the North West. Petauke district was purposively selected because it is one of the districts where both free mass and routine distribution of LLITNs to under-five children was conducted but still had high incidence of malaria in under-five children. In addition, Petauke district was proved cost effective in terms

of distance to the researcher compared to other districts that might have a similar situation but were far from Lusaka.

The research was conducted at Kakwiya Rural and Petauke Urban Clinics. The two sites were selected purposively because they had highest cases (a 17.7% increase in magnitude of malaria cases between 2016 and 2019) of malaria in under-five children compared to the rest of the health facilities in Petauke district. However, the study participants were selected using systematic random sampling. The results are not the representative of the entire Petauke district but only to the two study sites. The use of systematic random sampling ensured that the population was evenly sampled.

3.4 Study population

Petauke district had a population of approximately 297, 612 as for the year 2018 of which 32% (96, 015) were under-five children (Petauke district health statistics, 2018). The study population was all caregivers of under-five children aged 18 years and above from Kakwiya Rural Clinic and Petauke Urban Clinic. Study population under Kakwiya was 2, 208 while Petauke Urban Clinic was 8, 006; the total being 10, 214.

The target population for the study was all caregivers of under-five children who are residents of Petauke district.

3.5 Sample Selection

In this study, a sample size of 328 study participants was selected using systematic random sampling. The systematic random selection was done a day before the interview. This was done by obtaining the lists of under-five children from the under-five children clinic register at two clinics and counting all the children in the register. The total study population (N) was 10214 at both Petauke Urban and Kakwiya Rural Clinics. Then, the sample size (n) was selected which was 328. Thereafter, the sampling interval (k) = N/n was calculated which was 10214/328=31 or (8006/257=31 for Petauke Urban Clinic) and (2208/71=31 for Kakwiya Rural clinics). Then randomly any number between 1 to 31 was selected. This was considered to be the first participant to be included in the study and this was done at each clinic. Thereafter, every 31st child was selected until 257 participants for Petauke Urban and 71 participants for Kakwiya Rural clinics were selected. Then the researchers kept their names confidential. The caregivers' of the selected under-five children were asked to sign the consent forms on the day of the interview. Only those who agreed to participate were recruited.

In the registers the names that appear are names of the under-five children because it is an under-five children clinic. In addition, the addresses where the under five children live are also indicated in the register. The researchers accessed the caregivers in the community. The systematic random sampling method allowed for better representation, objectivity and left very little room for bias (Chanda, 1998; Etikan and Babatope, 2019). Therefore, this gave every caregiver an equal chance of being selected to participate in the research.

The formula below was used:

$$\boldsymbol{k = \frac{N}{n}}$$

Where k = sampling interval, N = population size, n = sample size

Thus,

$$k = \frac{10214}{328}$$

$$k = 31$$

In the event that the respondent declined to be part of the study, the next caregiver was picked In the case where the caregiver was absent at the time of the study, the caregiver was revisited. Similarly, if on the second visit the caregiver was absent, the respondent was replaced with the next one. This study was a community-based inquiry.

3.5.1 Inclusion criteria

This study included caregivers of under-five children aged 18 years and above whose children were documented in the under-five children register. The inclusion criteria also included caregivers of under-five children who were residents of Petauke urban and rural district, and those who consented to participate in the study. In addition, those who had been a caregiver for at least six months.

3.5.2 Exclusion criteria

Caregivers of under-five children whose children had missing information in the register. In addition, caregivers of under – five children who were not residents in the study catchment area and those who did not give consent to participate in the study were excluded.

3.6 Sample size Calculation

The formula by Etikan and Babatope, (2019), was used for sample size estimation. The purpose of sample size calculation therefore was to show that the number of caregivers of under five children that were considered in this study was big enough to do this study. Since the number of under five children for Petauke Urban Clinic (8, 006) is much greater than that for Kakwiya Rural Clinic (2, 208) of which their caregivers were selected, the proportion to size was employed when drawing the sample to ensure that a representative sample was obtained for both clinics. Therefore, the formula was as follows:

$$\boldsymbol{N = \frac{Z^2 P(1 - P)}{d^2}}$$

Where:

P= Prevalence/Proportion of LLITN use among caregivers of under five - year - old children which was 69.1% (Zambia Statistics Agency - ZSA et al., 2020).

Z= standard normal variant at 95% confidence level = (1.96)

d= precision ±5%

Therefore:

$$N = \frac{1.96^2 \times 0.691(1 - 0.691)}{0.05^2}$$

$$N = \frac{3.8416 \times 0.691 \times 0.309}{0.0025}$$

$$N = \frac{0.8203}{0.0025}$$

$$N = 328.1018$$

$$\underline{\underline{N = 328}}$$

Since the study was conducted at two sites; Petauke Urban Clinic and Kakwiya Rural Clinic, the sample size from each facility was calculated using the formulae below:

$$\text{No. of participants per facility} = \frac{Caregiver\ of\ u - 5\ children \times Total\ Sample}{Total\ Caregivers\ of u - 5\ children\ in\ 2\ sites}$$

Petauke Urban Clinic

$$\text{No. of participants per facility} = \frac{8006 \times 328}{10214} = 257$$

No. of participants from Petauke Urban Clinic = 257 Participants

Kakwiya Rural Clinic

$$\text{No. of participants per facility} = \frac{2208 \times 328}{10214} = 71$$

No. of participants from Kakwiya Rural Health Clinic = 71 Participants

Therefore, total number of samples was $257 + 71 = 328$ Participants.

3.7 Data collection tools

The tool that was used in this study for data collection was a semi- structured questionnaire. It had both closed and open-ended questions. Open ended questions allowed participants to provide their opinions. The questionnaire was written in simple language for easy understanding. Semi-structured questionnaire was chosen because questions could be clarified if they were misunderstood, and the participants were required to give responses to the questions which they were asked by the interviewer.

3.8 Validity of the data collection tool

External validity can help to generalise the findings to the general population from which the research respondents were selected. External validity was of prime importance to this study because it was a non-interventional. In addition, to ensure validity, extensive literature review was conducted on recent literature on utilisation of LLITNs. An extensive literature review was also conducted before designing the tools.

Experts in public health and research supervisors examined the questions to determine whether they stimulated desired responses on the variables measured. In addition, the questions were constructed in a simple, clear and precise way in order to give respondents chance to give clear and precise answers. The validity of the instrument used in this study was maintained by ensuring that all aspects of variables regarding under-five children were included in the questionnaire for the respondents.

On the other hand, internal validity deals with extent to which a researcher is confident that a cause-and-effect relationship established in a study cannot be explained by other factors. In

this study, internal validity was not applied because this was a non-interventional study. Therefore, if there will be some further studies related to this study, then internal validity can be applied.

3.9 Reliability of the data collection tool.

To ensure reliability, a pilot study was conducted at Petauke Urban Medical and Nyamphande Rural Health Centers. The questionnaire was administered from the community. Reliability was ensured by training the research assistants in use of the instrument. The questions in this study were simple, concise and brief. During the pre-test, respondents were asked if there were any questions, which they did not understand. This allowed for alteration of questions.

3.10 Data collection techniques

Semi – structured questionnaire was used in the data collection. The Principal investigator and Research assistants collected data by administering questionnaires to the respondents and were asked to respond to the same questions in the same order. The questionnaire was designed to collect some basic information on caregivers and their children's demographic characteristics and also attitude and knowledge. The questionnaire provided a lot of options of responses from which respondents could select.

The measurement of utilisation was dependent on the respondents' self-report and not on physical observation of utilisation. All research assistants who participated in the study were trained on how to objectively administer the questionnaire.

The interviewers wrote down the responses by using verbatim technique. Therefore, the questionnaire was translated into Chichewa, a language which is commonly spoken in Petauke. The research assistants were selected based on how well they knew the language, critical thinking and knowledge of subject matter. The questionnaire was administered to mothers/caregivers of the under-five children through face-to-face interviews.

The process of data collection from the community was carried out in the following manner:

The researchers selected caregivers using systematic random sampling and those who were present at the household during data collection and met the inclusion criteria were approached. The researchers introduced themselves to the caregivers who agreed to participate. Therefore, the researchers explained the purpose of the study in simple terms to enable the respondents to take part in the research fully informed. Respondents were informed that participation was voluntary, and they were free to withdraw from the study if they wished to do so and that it

would not affect their obtaining health care in any way. The researchers got the consent signed by each respondent after they explained everything. Each respondent was interviewed privately in order to maintain confidentiality for 30 minutes. In addition, respondents were assured that the information that was collected was for research purposes only and no names were entered on the questionnaires. The information was kept confidential to prevent it from being exposed to other people. The researcher proceeded to ask the respondents questions using the semi-structured questionnaire. At the end of the interview, the researcher thanked the respondents.

3.11 Data management and storage

To ensure privacy and safety, collected data was kept confidential. Only the researcher had access to the information after it had been collected.

3.12 Pilot study

Pre-testing the data collection tools and techniques before the study, was conducted at Petauke Urban Medical Centre and Nyamphande Rural Health Centre. The centres have almost the same settings in terms of geo location, population, social, physical, which was used in the study. This was done on small scale in order to test the effectiveness of the tools and techniques. Pre-testing was done outside the study area but with similar characteristics to that of the study area to avoid contamination of data. The pilot study helped to make changes to the tools by adding some questions on knowledge on LLITNs section and removed some questions, which focused on malaria instead of LLITNs.

3.13 Ethical and cultural considerations

The protocol and the informed consent document were reviewed and approved by the University of Zambia Biomedical Research and Ethics Committee (UNZABREC) and the reference number is and the National Health Research Authority. The privacy and confidentiality of the participants in the study were maintained. This was done by ensuring that all participants taking part in the study were de-identified by not using their names but codes. Risks and benefits of participating in the research were clearly explained to the participants. Therefore, only those respondents who volunteered to participate in the study were recruited and signed consent forms.

CHAPTER FOUR
DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 Introduction

This chapter shows how data and the findings were analysed and presented using bar charts, pie charts and tables. The data analysis and presentation of findings chapter focused on the data processing and analysis, demographic characteristics of the participants, knowledge on LLITNs, utilisation of LLITNs, attitude towards utilisation of LLITNs and the association between the independent and dependent variables.

4.2 Data Analysis

After data collection, categorisation was done, in which the semi-structured questionnaire were sorted out and edited for internal consistence, completeness and accuracy. The closed ended questions were assigned numerical codes to ensure easy entry and analysis using the computer while open ended questions were analysed by reading the entire data in order to identify and group answers that belonged together. Following data categorisation, the researcher assigned numerical codes such as (1, 2, 3, 4 and others). Data was checked for completeness and consistency. Data was analysed using Statistical Software Package (SPSS) version 23. Some findings have been presented in forms that comprise frequency tables, pie charts, bar charts, cross tabulations and logistic regression model. Independent variables were analysed against the dependent variable using Chi-Square test to test for an association. Then a multiple logistic regressions analysis was done to show the various associations among independent variables. These were presented in a multiple logistic regression model.

In this study, the variables were Knowledge on LLITNs, Attitude towards utilisation of LLITNs. The cut off point for statistical significance was set at 5%, P-values of 0.05 or less were considered statistically significant thereby rejecting the null hypothesis.

4.3 Presentation of Findings

The results have been presented in tables and figures. Some figures that were used included; pie chart to present the overall knowledge on LLITN utilisation and a bar chart was used to present the overall attitude towards utilisation of LLITNs among caregivers of under – five children.

4.3.1 Social Demographic characteristics of the respondents

This section consists of socio-demographic data of the respondents. The socio demographic data comprised the respondent's age, religion, educational level, marital status, occupation and monthly income as indicated in table 4.1.

Table 4.1: Social Demographic Characteristics of the respondents (*n* = 328)

Variable	Frequency	Percentage (%)
Age		
18 – 28 years	148	45.1
29 – 39 years	135	41.2
40 – 50 years	31	9.5
Over 50 years	14	4.2
Marital status		
Single	42	12.8
Married	226	68.9
Widowed	27	8.2
Dicorced	29	8.8
Cohabiting	4	1.2
Level of Education		
No formal education	27	8.2
Primary	133	40.5
Secondary	143	43.6
Tertiary	25	7.6
Number of under-five children		
One	215	65.5
Two	102	31.1
Three	11	3.4
Religious affiliation		
Muslim	5	1.5
Christian	323	98.5
Employement status		
Unemployed	235	71.6
Formal	84	25.6
Informal	9	2.7
Monthly income		
Below K1000	279	85.1
K1000 – K2,999	38	11.6
K3000-K5000	8	2.4
Over K5000	3	0.9
Area of residence		
Low density	43	13.1
Medium density	162	49.4
High density	123	37.5

Table 4.1 indicates that almost half of the study respondents (45.1% *n* = 148), were in the age group of 18-28 years old and 68.9% (*n* = 226) were married. More than half of the respondents

(65.5% n=215) had one under-five child in their household and most of them (98.5% *n* = 323) were Christians with 1.5% (*n* = 5) being Muslims. Slightly below half (43.6% *n* = 143) of the respondents reached secondary school level. Almost three quarters (71.6% *n* = 235) of the respondents were not in any form of employment while more than three quarters (85.1% *n* = 279) had a living income of less than 1,000 Zambian Kwacha (US$ 56) per month. Less than half (49.4% *n* = 162) of the respondents resided in medium density areas.

4.3.2 Utilisation of LLITNs

This section presents findings on utilisation of LLITNs among respondents

Table 4.2: Utilisation of LLITNs among respondents (*n* = 328)

Characteristic	Frequency	Percentage (%)
Utilisation of LLITNs for under five-year-old children		
Yes	249	75.9
No	79	24.1
Frequency of children sleeping under LLLITNs		
Every night throught out the year	194	77.9
Sleep under LLITNs but not consistently	55	22.1
Reason children do not sleep under LLITNs		
Not been given LLITNs from the health facility	9	11.4
LLITNs got damaged	61	77.2
Lack of finances to purchase one	7	8.9
One LLITN available which is being used by the caregiver but not the under five child.	2	2.5
Owning of LLITNs		
Owned	289	88.1
Not owned	39	11.9
Number of LLITNs owned		
One	243	74.1%
Two	50	15.2%
Three	8	2.4%
More than three	1	0.3%
Source of LLITNs		
Health facility/Outreach health services	295	97.7
Other sources	7	2.3
Distance to the nearest health facility		
Near	321	97.9
Far	7	2.1

Table 4.2 shows that about 75.9% (*n* = 249) respondents used LLITNs for their under-five children while 24.1% (*n* = 79) did not. In addition, out of the respondents who had under-five children slept under LLITNs, over three quarters, (77.9% *n* = 194) reported having their under five children slept under LLITN the night before the interview and consistently throughout the

year while 22.1% (*n* = 55) used LLITNs before but not consistently. More than three quarters (77.2% *n* = 61) of the respondents whose under-five children did not sleep under LLITNs indicated that it was because their LLITNs were damaged, not given LLITNs (11.4% *n* = 9), one LLITN was given which is being used by the caregiver and not the under-five child (2.5% *n* = 2) and lack of money to buy LLITNs (8.9% *n* = 7). About 88.1% (*n* = 289) of the respondents owned at least one LLITN while 11.9% (*n* = 39) had no LLITNs. Out of the respondents who stated that they had LLITNs, more than three quarters (84.1% *n* = 243) of the respondents had only one LLITN in their household while only 14.2% (*n* = 41) had two LLITNs. Above three quarters (97.9% *n* = 283) obtained LLITNs from a government health facility. Majority (97.1% *n* = 321) of the respondents lived near (up to 5km) to the health facility while, 2.1% (*n* = 7) lived far (over 5km) from the health facility.

4.3.3 Knowledge on LLITNs

This section consists of findings on knowledge of respondents on LLITNs. Knowlegde was measured by use of indicators and indicators were based on a series of questions. In this section, there were seven knowledge questions and each time a respondent gave an answer that indicated knowledge on LLITN use, the researcher recorded a score of one. The researcher recorded a score of zero if an answer given did not indicate knowledge on LLITN use. The researcher then added the total number of correct answers to the seven questions and created a knowledge score. For each respondent the scores ranged from 0 - 7. Respondents with a score of 4 to 7 were considered as having high level of knowledge while those who scored below 4 were considered as having low knowledge level.

Table 4.3: Knowledge of respondents on LLITNs (n=328)

Characteristic	Frequency	Percentage (%)
Ever heard of of Long Lasting Insecticide Treated Nets		
Yes	320	97.6
No	8	2.4
Primary source of information about LLITNs		
Media	78	24.4
Peers	5	1.55
Health facility	217	67.8
Multiple sources	15	4.70
Relatives	5	1.55
How often should under – five children sleep under an LLITN		
Every night	305	95.3
Not every night	15	4.70
Definition of LLITNs		
An LLITN is an ITN that forms a protective barrier around people who sleep under them and remains effective for at least three years or 20 washes.	298	95.2
It is not used for prevention of mosquitoes	15	4.80
Importance of using LLITNs		
Barrier against mosquitoe bites	301	94.0
Quick healing from malaria	14	4.4
No idea	5	1.6
Aware of government's preventive measures against mosquitoes		
Yes	311	94.8
No	17	5.2
Known preventive measures against malaria		
IRS only	31	9.50
LLITNs only	86	26.2
Anti malarial drugs only	44	13.4
Multiple responses	150	45.7

Table 4.3 shows that the majority, 97.6% (n= 320) reported having heard of LLITNs before the interview. Two thirds of the respondents 67.8% (n= 217), heard about the LLITNs at the health facility, the majority of the respondents 95.3% (n= 305) knew that under five children should sleep under an LLITN every night while 4.7% (n= 15) did not know. Out of the respondents

who knew what an LLITN was, the majority 95.2% (n= 298) said that an LLITN forms a protective barrier around people who sleep under them and remains effective for at least three years or 20 washes. The majority of the respondents 94 % (n= 301) indicated that LITNs were an important barrier against mosquitoe bites. A large proportion of the respondents 94.8% (n= 311) were aware of the government's preventive measures to reduce malaria, and less than half 45.7% (n= 150) mentioned more than one preventive measure the government has implemented to reduce malaria. About a quarter 26.2% (n= 86) mentioned that LLITNs as kown measure against malaria, while 13.4% (n= 44) mentioned drugs.

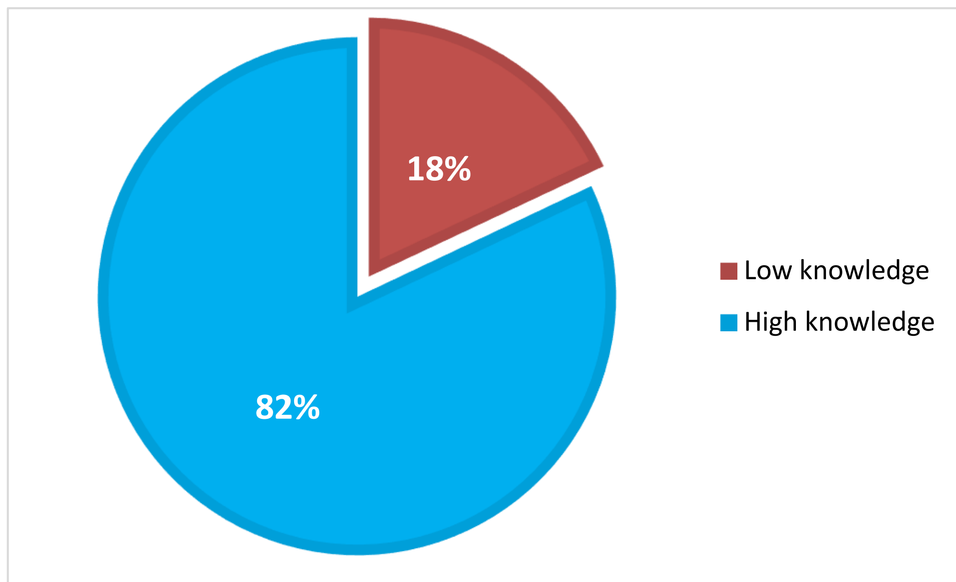


Figure 4.1: Overall knowledge of respondents on LLITNs (n = 328)

Figure 4.1 shows that more than three quarters (82% n = 269) of study respondents had high level knowledge on LLITNs while 18% (n = 59) expressed low knowledge levels on LLITNs.

4.3.4 Attitude towards utilisation of LLITNs

This section consists of findings on attitude of respondents towards utilisation of LLITNs. Attitude was measured using a likert scale. The interviewer ticked only one response to each question provided by the respondent. In this section, there were four attitude questions and each time a respondent gave a correct answer to attitude question, the researcher recorded a score of one. The researcher recorded a score of zero if a wrong answer was given. The researcher then added the total number of correct answers to the four questions and created an attitude score. For each respondent the scores ranged from 0 - 4. Respondents with a score of 3 to 4 were considered as having good attitude while those who scored between 0 to 2 were considered as having poor attitude.

Table 4.4: Attitude of respondents towards utilisation of LLITNs (n=328)

Characteristic	Frequency	Percentage (%)
Whether it is important for under-5 children to sleep under LLITNs even if mosquitoes are not visible in the house		
Strongly agree	71	21.6
Agree	192	58.5
Not sure	50	15.2
Disagree	9	2.7
Strongly disagree	6	1.8
Whether cultural beliefs could influence the use of LLITNs		
Strongly agree	22	6.7
Agree	96	29.3
Not sure	51	15.5
Disagree	143	43.6
Strongly disagree	16	4.9
Importance of spouse support in ensuring under five children sleep under LLITN every night		
Strongly agree	66	20.1
Agree	210	64.0
Not sure	7	2.1
Disagree	34	10.4
Strongly	11	3.4
Whether under five children should use LLITNs only when they have malaria		
Strongly agree	15	4.6
Agree	30	9.1
Not sure	26	7.9
Disagree	90	27.4
Strongly disagree	167	50.9

From table 4.4, the majority of the respondents 192 (58.5%) agreed that it was important for under-five children to sleep under LLITNs even if they had not seen mosquitoes in the house, while 50 (15.2%) were not sure whether it was important for under-five children to sleep under LLITNs even if they had not seen mosquitoes in the house. Almost half of the respondents 143 (43.6%) disagreed that cultural beliefs can affect caregivers of under - five children to either use or not use LLITNs for their children, while 96 (29.3%) agreed. Most of the respondents 210 (64.0%) agreed that the spouses support was important in ensuring that the under-five children sleep under LLITN every night. Slightly above above half of the respondents 167 (50.9%) strongly disagreed that under-five children should only sleep under

LLITNs when they have malaria. About 30 (9.1%) agreed while 26 (7.9%) were not sure if under-five children should only sleep under LLITNs when they have malaria.

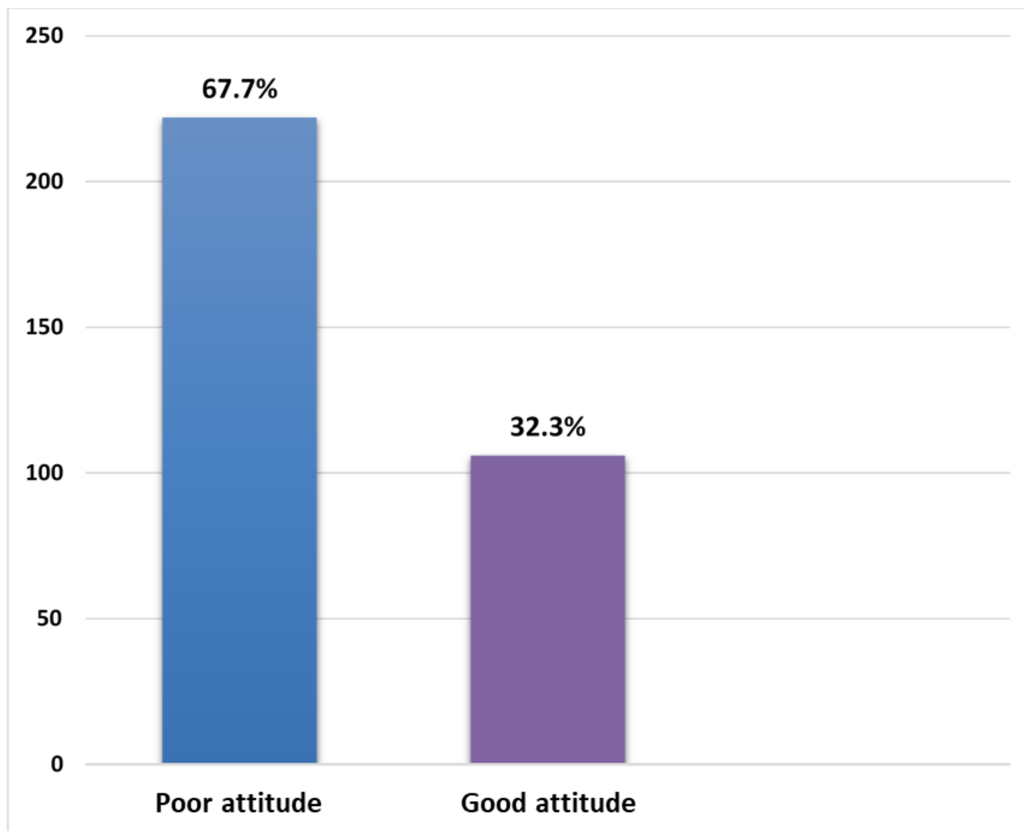


Figure 4.2: Overall attitude of respondents towards utilisation of LLITNs (*n* = 328)

Over two thirds of the respondents (67.7% *n* = 222) expressed poor attitudes towards use of LLITNs while over a quarter (32.3% *n* = 106) had a good attitude (Figure 4.2).

4.3.5 Associations between variables

This section presents the univariate associations using the chi square/Fishers exact test. In addition, it also presents univariate and multivariable logistic analysis estimates of associations between the dependent variable and potential predictors. The Chi square/Fisher's exact test were employed to test the association between dependent and independent variables. However, these tests could not show the strength of the association between dependent and independent variables. That is why binary logistic regression was further used so that the strength of the association can be explained. This was done by firstly conducting a univariate logistic regression analysis of the effect of knowledge, attitude, marital status and education on LLITNs utilisation. Thereafter, all the independent variables were adopted into the multivariate logistic regression model. Literature review was used to decide which independent variables should be

included in the multivariate logistic regression. Literature showed that all the predictor variables that were analysed in the univariate logistic regression, should be adopted into the multivariable logistic regression because they could explain the utilisation of LLITNs. That is why all the independent variables were adopted into the multivariate logistic regression model.

Table 4.5: Association between utilisation of LLITNs and marital status, education level, knowledge and attitude using the chi square/Fishers exact test.

Variable	Utilisation of LLITNs		p-value
	No n (%)	**Yes n (%)**	
Marital status			
- Single	16 (38.1)	26 (61.9)	
- Married	41 (18.1)	185 (81.9)	<0.001^{F}
- Widowed	12 (44.4)	15 (55.6)	
- Divorced	6 (20.7)	23 (79.3)	
- Cohabiting	4 (100)	0 (0)	
Education level			
- None	10 (37)	17 (63)	
- Primary	33 (24.8)	100 (75.2)	0.277^{C}
- Secondary	29 (20.3)	114 (79.7)	
- Tertiary	7 (28)	18 (72)	
Attitude towards LLITN use			
- Bad	65 (29.3)	157 (70.7)	<0.001^{C}
- Good	14 (13.2)	92 (86.8)	
Knowledge on LLITNs			
- Low	30 (50.8)	29 (49.2)	<0.001^{C}
- High	49 (18.2)	220 (81.8)	

C= chi-square test; F = Fisher's exact test, LLITNs = Long lasting insecticide treated nets

Table 4.5 indicates that more than three quarters (81.9% n = 185) of married respondents utilised LLITNs compared to those who were single (61.9% n = 26), divorced (79.3% n = 23), widowed (55.6% n = 15) or cohabiting (0% n = 0). The difference was significant (P<0.001). Good attitude towards utilisation of LLITNs was significantly (p<0.001) associated with LLITN use; more than three quarters (86.8% n = 92) of respondents with good attitude utilised the LLITNs compared to 70.7% (n = 157) who expressed a poor attitude. Knowledge on LLITNs was significantly (P<0.001) associated with LLITNs use. More than three quarters (81.8% n = 220) of the respondents with high knowledge levels reported use of LLITNs compared to less than half (49.2% n = 29) with low-level knowledge. Level of education showed no significant association with LLITN use (P=0.277), as there were minimal differences in use of LLITNs between categories of education attainment.

Table 4.6: Univariate logistic regression analysis of the effect of knowledge, attitude, marital status and education on LLITNs utilisation.

Variables	Indicators	unadjusted estimates			
		Odds Ratio	95% CI		p-value
			Lower	Upper	
Marital status	**Single**	**Ref**			
	Married	2.78	1.37	5.64	**0.005**
	Widowed	0.77	0.29	2.05	**0.600**
	Divorced	2.36	0.79	7.04	**0.124**
Education level	**None**	**Ref**			
	Primary	1.78	0.74	4.27	**0.195**
	Secondary	2.31	0.96	5.58	**0.062**
	Tertiary	1.51	0.47	4.88	**0.489**
Knowledge	**Low**	**Ref**			
	High	4.64	2.56	8.44	**<0.001**
Attitude	**Poor**	**Ref**			
	Good	2.72	1.45	5.12	**0.002**

LLITN= long lasting insecticide treated nets, CI= Confidence Interval

Table 4.6 shows univariate logistic analysis of selected independent variables and utilisation of LLITNs. The analysis showed that, married carers compared to single ones had 2.78 times greater odds of utilising LLITNs, and this effect was significant (OR=2.78, CI, 1.37–5.64, p=0.005). Similarly, carers with high knowledge on LLITNs showed 4.64 times higher odds of utilising LLITNs than carers with low knowledge (OR=4.64, CI, 2.56–8.44, P<0.001), and those with good attitude had 2.72 times more odds of using the LLITNs than those with poor attitude (OR=2.72, CI, 1.45–5.12, P=0.002). Therefore, the effect of knowledge and attitude on utilisation of LLITNs was significant. However, the effect of education level did not show statistically significant predictive effect on LLITNs use (p-value >0.05).

Table 4.7: Multivariable logistic regression analysis of the effect of knowledge, attitude, education and marital status on LLITNs utilisation.

Variables	Indicators	Adjusted estimates			
		Odds Ratio	95% CI		p-value
			Lower	Upper	
Marital status	**Single**	**Ref**			
	Married	2.675	1.170	6.118	**0.020**
	Widowed	0.574	0.185	1.774	**0.335**
	Divorced	1.793	0.520	6.181	**0.355**
Education level	**None**	**Ref**			
	Primary	1.278	0.456	3.580	**0.641**
	Secondary	1.343	0.475	3.793	**0.578**
	Tertiary	1.172	0.298	4.604	**0.821**
Knowledge	**Low**	**Ref**			
	High	5.714	2.896	11.275	**<0.001**
Attitude	**Bad**	**Ref**			
	Good	2.374	1.156	4.876	**0.019**

All the predictor variables (knowledge, attitude, education level and marital status) that were prior thought to explain the utilisation of LLITNs among carers of under-five children were adopted in the regression model. Table 4.7 shows that controlling for other variables, married carers compared to single ones had 2.68 times greater odds of utilising LLITNs, and this effect was significant (OR=2.675, p=0.02). Carers with high knowledge on LLITNs showed 5.71 times higher odds of utilising LLITNs than carers with low knowledge (OR=5.714, P<0.001), and those with good attitude had 2.4 times more odds of using the LLITNs than those with poor attitude (OR=2.374, P=0.019). The effect of knowledge and attitude on utilisation of LLITNs was significant. The effects of primary, secondary or tertiary education and being a widow or divorced were however, not statistically significant (p-values >0.05).

CHAPTER FIVE
DISCUSSION OF FINDINGS

5.1 Introduction

The study purpose was to investigate factors influencing utilisation of LLITNs among caregivers of under – five children at two selected clinics in Petauke district. The outline of the discussion consists of the characteristics of the sample, discussion of each objective used in the study, the implications of the findings to the nursing care system, dissemination of findings, limitation of the findings, recommendations and the conclusion. This chapter discusses the findings of the study in relation to other findings from other studies conducted elsewhere. To get the insight of utilisation of LLITNs at Kakwiya Rural and Petauke Urban Clinics, relationships between utilisation and socio demographic factors, knowledge on LLITN use and attitude towards use of LLITNs were investigated. This was done using Pearson chi-square test (cross tabulations) and logistic regression model; results of the analysis were presented in tables 4.5, 4.6 and 4.7. The findings of this study revealed that there was a significant relationship between knowledge on LLITNs, attitude towards LLITNs, marital status and utilisation of LLITNs.

5.2 Socio-Demographic Characteristics of the Sample

The results of this study showed that the majority of married respondents utilised LLITNs. This could be due to the presence of the spouse who was available to remind the caregiver to have their child sleep under an LLITN. The results of this study were similar to the study which was conducted in Cameroon by Fokam *et al.*, (2017) which revealed that caregivers who were married were more likely to use LLITNs as compared to their counterparts who were not married. This was because there was much better decision-making power in married household heads. Similar, results were obtained by Nkoka *et al.*, (2019) in Malawi who noted that children whose mothers were married were more likely to sleep under an LLITN than unmarried women who might lack support from their spouses.

The findings of this study revealed that education level had no significant association with LLITN use as there were minimal differences in use of LLITNs between categories of education attainment. This could be because all caregivers of under - five children are given health education on the importance of having their children sleep under LLITNs regardless of the education level. This is done during under-five children's clinic and they use simple language so that every caregiver understands. This means that everyone will have the same

knowledge on the importance of using LLITNs for under-five children. These results were similar with the results of Admasie, Zemba and Paulos, (2018) who found that educational status was not significantly associated with LLITN use among caregivers of under - five children in Ethiopia.

The results did not show any significance in terms of age, the number of under-five children in their household, residence, employment status and religion with the use of LLITNs among caregivers of under-five children. This could be because most of the LLITNs are provided to the caregivers freely and LLITNs are also distributed to the caregivers from the nearest health facilities.

5.3 Utilisation of LLITNs

Despite this high Percentage of LLITN use, the levels of malaria are still going up. So maybe further research should show how they use the LLITNs, which will show the technique of using them. The results may show whether they are using LLITNs correctly or not. The findings of this study show that about 75.9% of respondents used LLITNs maybe because of the good mass distribution of LLITNs by MoH that happened in Eastern Province in which LLITN ownership rates was 92.4% (MOH, 2018). This was higher than LLITNs use among under - five in Zambia in 2017, which was 69.1% (Zambia Statistics Agency - ZSA *et al.*, 2020). These LLITNs are usually being distributed during antenatal and under - five children clinics However, the malaria trend has continued to increase showing that maybe these nets were not properly used. In fact it is not only this strategy that could reduce malaria this is just one of the strategies used in combination with other strategies such as IRS.

The results of this study were consistent with the results, which were obtained from the study on whether increasing LLITN distribution increased children's LLITN use. It was concluded that LLITN distribution via Ante Natal Care and Expanded Programme on Immunisation services in sub-Saharan Africa could not only assist countries in maintaining LLITN ownership and use, but might be extremely effective at increasing LLITN ownership and use (Theiss-Nyland, Lines and Fine, 2019).

In addition, Nawa *et al.*, (2019) in their study on 'Investigating the upsurge of malaria prevalence in Zambia' stated that increasing interventions such as LLITNs distribution was shown to have contributed to malaria reduction in 2015 because of high utilisation of LLITNs.

The findings of this study showed that about 24.1% of the respondents did not use LLITNs. The respondents indicated that it was because their LLITNs were either damaged, were not

given LLITNs and lacked finances to purchase LLITNs. This showed that once LLITNs are damaged, caregivers did not buy LLITNs for their under – five children but expected the government to provide for them again. The implications of such findings indicate that if the government does not ensure free and frequent mass distribution of LLITNs to the caregivers of under - five children, there may be very low utilisation levels of LLITNs. Similar results were reported in Myanmar, which also showed that lack of finances, damaged LLITNs and caregivers not being given LLITNs were the major constraints to LLITN use (Linn *et al.*, 2019).

The results of this study showed that majority of the respondents owned at least one LLITN. The high numbers of respondents owning LLITN could be due to free mass distribution of LLITNs to under - five children through under five children's clinic. This ownership frequency is higher than the 78.8%, obtained by Teh *et al.*, (2021) in Cameroon.

The results of this study on ownership of LLITNs relates with those from a study done by Nyamai *et al.*, (2018) in Kenya which revealed high possession of LLITNs due to mass distribution of LLITNs. The high prevalence of ownership of LLITNs in this study could be due to efforts of Malaria Control Program in distributing free LLITNs rolled out in Zambia in the past years. Ownership should go together with effective utilisation to achieve its protection against malaria.

In this study, the effective use of LLITN was slightly lower than ownership of LLITNs. Similarly, the study findings in Nigeria by Anikwe *et al.*, (2020) revealed that that owning LLITN might not always mean that they will use LLITNs because some respondents owned LLITNs but did not use them because of the discomfort in sleeping under the LLITNs due to elevated room temperature caused by the LLITN. A study conducted in Malawi by Florey *et al.*, (2017), reported that LLITN ownership was found to be significantly associated with utilisation and led to decreased mortality in under five children because LLITNs offered protection from mosquito bites that cause malaria.

It was noted in this study that most of the respondents lived near (up to 5km) to the health facility where they collect LLITNs from for use in their under - five children while only few lived far (over 5km) from the health facility. This could be due to the strategy, which the Ministry of Health is doing in bringing health care services as close to the people as possible, resulting in construction of many health facilities throughout Zambia including Petauke district. Similar results were obtained in Gambia, which showed that most respondents travelled between 0 to 2km in order to acquire LLITNs for use (Jallow, Bah and Bajinka, 2019).

5.4 Knowledge on LLITNs

Knowlegde was measured by use of indicators which were based on a series of questions. Respondents who scored between 4 and 7 correct responses were considered as having high level of knowledge while those who scored below 4 were considered as having low knowledge level. The results showed that majority (82%) of the respondents had high knowledge on LLITNs while few (18%) expressed low knowledge on LLITNs. This could be attributed to health education on LLITNs, which health care personnel provide to the caregivers of under - five children. They provide this information through television, radios, under - five children's clinic and antenatal care services.

Knowledge on LLITNs was significantly associated with LLITNs use. It was noted that caregivers who had high level knowledge were more than five times more likely to use LLITNs for their under five children compared to those who had low knowledge level. This could be because those with high-level knowledge on LLITNs understand that when under - five children sleep under LLITNs, they will be protected from mosquito bite, thereby preventing them from malaria. The findings of this study were consistent with the results found in Nigeria by Anikwe *et al.*, (2020). It was reported that improving knowledge on LLITN use among pregnant women and caregivers of under - five children reduced malaria rate in both pregnant women and under- five children.

Similar results were obtained in the study conducted in Cameroon by Teh *et al.*, (2021) where it was observed that high knowledge on malaria and LLITNs led to high utilisation of LLITN. Further, research conducted by Alemu *et al.*, (2018) in Ethiopia stated that knowledge about malaria transmission was found to be associated with utilisation of LLITNs. They noted that caregivers who had knowledge on malaria and how it is transmitted were more likely to use LLITNs because they understand that sleeping under LLITNs would protect under-five children from mosquito bites thereby preventing malaria. In addition, Ahorlu *et al.*, (2019) conducted a study in Ghana noted that lack of knowledge on malaria was among the barriers to consistent use of LLITNs.

5.5 Attitude towards LLITN use

Attitude was measured using a likert scale. Respondents with a score of 3 to 4 were considered as having good attitude while those who scored between 0 to 2 were considered as having poor attitude towards utilisation of LLITNs. The results of this study indicated that more than two thirds of the respondents (67.7%) expressed poor attitude towards use of LLITNs while over a

quarter (32.3%) had good attitude. This could be because of cultural beliefs, which make them fail to change their behaviours towards the importance of using LLITNs. According to the study conducted by Nkoka *et al.*, (2019), in Malawi, it was noted that mass campaigns should emphasize on both LLITN distribution and strengthen behavioural change communication messages related to LLITN usage in order to increase utilisation of LLITNs. The findings of this study were similar to the findings in Sudan conducted by Masaad *et al.*, (2017) which showed that in spite of caregivers of under- five children having good knowledge about LLITNs, most of them still had negative attitude and only few reported their children always sleep under LLITN.

In this study, good attitude was significantly associated with utilisation of LLITNs. The results of this study revealed that caregivers who had good attitude towards LLITNs were more than two times more likely to use LLITNs for their under-five children compared to those who had poor attitude. This could be because those who had good attitude understood that if their under-five children sleep under an LLITN, they would be protected from mosquito bites. As a result, they would not suffer from malaria. Hence, they resorted in adopting good behaviour towards utilisation of LLITNs.

5.6 New finding from this Study

The study found out that some households with LLITNs had different sleeping arrangements as the caregivers and the under-five children sleep in different rooms. That means that the caregivers sleep under LLITNs instead of under-five children. The reasons stated were that the caregivers were used to sleeping under the LLITNs, therefore, it could not be given to the under-five children. In addition, it was also stated that it was better for the caregivers not to be bitten by the mosquitoes because they are the ones who take care of the under-five children as indicated in Table 4.2 above.

5.7 Implications to the Health Care System

5.7.1 Nursing practice

Nurses in clinical areas can use the results of this study so that they focus more on IEC as one of strategies of reducing malaria. This can help caregivers of under – five children to develop good attitude towards prevention of malaria. For example, use of IRS in combination with LLITNs.

5.7.2 Nursing administration

The findings of this study can help nurse managers as they supervise staff nurses to provide adequate IEC to the caregivers of under – five children on the importance of LLITN utilisation. In addition, this information can help nurse managers in planning for combined strategies of reducing malaria.

5.7.3 Nursing education

The results of this study can assist nurse educators to teach student nurses various strategies of eliminating malaria such as use of IRS and providing comprehensive IEC to caregivers of under – five children.

5.7.4 Nursing research

Nurses may use the findings of this study by conducting a study which should show how LLITNs are being utilised. The results can reveal whether caregivers of under – five children correctly use the LLITNs and determine the cause of increase in malaria cases among under – five despite high utilisation of LLITNs.

5.8 Recommendations

- MoH and Petauke District Health Management Team to conduct a further research on this topic, which should be an interventional study in the catchment areas of Kakwiya Rural and Petauke Urban Clinics help to establish the cause of increase in magnitude of malaria cases. The study should show whether they use LLITNs and how they use them. It should be done through physical inspection because the results of this study were based on respondents' self-report.
- Petauke District Health Management Team should strengthen awareness sessions on the use of LLITNs among under-five children during under-five children clinics and immunisation.
- Members of staff at the two study sites need to organise people to perform demonstrations in form of role plays on how LLITN is used and its importance in preventing malaria especially in under-five children. The role play should portray correct message on correct use of LLITNs.
- Community members especially caregivers of under-five children should ensure that their children always sleep under an LLITN even if there is only one at the household.

5.9 Dissemination of findings

The principal investigator also plans to conduct a meeting with Kakwiya Rural and Petauke Urban Clinics' members of staff to inform them of the findings of this study and recommendations. Bound copies of the research will be distributed to the University of Zambia, School of Nursing Sciences library special collection section and Medical Library.

5.10 Utilisation of study findings

The study findings will inform policy makers such as Ministry of Health and Petauke District Health Management Team to ensure that there is frequent mass distribution of LLITNs to the under-five children in these study sites. This will help caregivers of under-five children to have their children sleep under LLITNs. The results of the study findings will also aid members of staff at the two study sites to be more focused on delivering Information Education and Communication to caregivers. In so doing, this will emphasise the importance of under-five children sleeping under LLITNs in order to reduce malaria.

5.11 Study limitations

- The study was conducted only in two sites of Petauke making it difficult to generalize results to the rest of Petauke District.
- During data collection, some households were difficult to access since there was need to seek permission from owners using cell phone because they went out for work. As a result, the research team spent more time at one household in some cases thereby increasing the cost of the study because more time was required to collect data.

5.12 Conclusion

The study results has revealed that there is a significant association between knowledge, attitude towards LLITNs and utilisation of LLITNs among caregivers of under - five children at Kakwiya Rural and Petauke Urban Clinics in Petauke district. In addition, the study has further revealed that marital status was significantly associated with utilisation of LLITNs. The implication of these findings is that LLITN use is not the only strategy that can reduce malaria in under-five children but should be used in combination with other strategies such as IRS and IEC. In addition, few caregivers will have LLITNs if there is no mass distribution of LLITNs and this may result in low utilisation.

REFERENCES

Admasie, A., Zemba, A. and Paulos, W. (2018) 'Insecticide-Treated Nets Utilization and Associated Factors among under-5 Years Old Children in Mirab-Abaya District, Gamo-Gofa Zone, Ethiopia', Front Public Health, 6, p. 7. doi: 10.3389/fpubh.2018.00007.

Ahorlu, C. S., Adongo, P., Koenker, H., Zigirumugabe, S., Sika-Bright, S., Koka, E., . . . Monroe, A. (2019) 'Understanding the gap between access and use: a qualitative study on barriers and facilitators to insecticide-treated net use in Ghana', Malar J, 18(1), p. 417. doi: 10.1186/s12936-019-3051-0.

Alemu, M. B., Asnake, M. A., Lemma, M. Y., Melak, M. F. and Yenit, M. K. (2018) 'Utilization of insecticide treated bed net and associated factors among households of Kola Diba town, North Gondar, Amhara region, Ethiopia', BMC Res Notes, 11(1), p. 575. doi: 10.1186/s13104-018-3697-7.

Anikwe, C. C., Irechukwu, J. C., Okorochukwu, B. C., Ikeoha, C. C., Obuna, J. A., Ejikeme, B. N. and Anikwe, I. H. (2020) 'Long-Lasting Insecticide-Treated Nets: Assessment of the Awareness and Utilization of Them among Antenatal Clinic Attendees in Abakaliki, Southeast Nigeria', J Trop Med, 2020, p. 2984867. doi: 10.1155/2020/2984867.

Banerjee, A. T., Kin, R., Strachan, P. H., Boyle, M. H., Anand, S. S. and Oremus, M. (2015) 'Factors Facilitating the Implementation of Church-Based Heart Health Promotion Programs for Older Adults: A Qualitative Study Guided by the Precede-Proceed Model', Am J Health Promot, 29(6), pp. 365-373. doi: 10.4278/ajhp.130820-QUAL-438.

Bazpour, M., Gheibizadeh, M., Malehi, A. S. and Keikhaei, B. (2019) 'The Effect of a Training Program Based on the PRECEDE-PROCEED Model on Lifestyle of Adolescents with Beta-Thalassemia: A Randomized Controlled Clinical Trial', International journal of hematology-oncology and stem cell research, 13(1), pp. 12-19.

Bisi-Onyemaechi, A., Obionu, C., Chikani, U., Ogbonna, I. and Ayuk, A. (2017) 'Determinants of use of insecticide-treated nets among caregivers of under-five children in Enugu, South East Nigeria', Annals of Tropical Medicine and Public Health, 10(4), pp. 1037-1042. doi: 10.4103/atmph.Atmph_758_16.

CDC (2019) 'Insecticide-Treated Bed Nets'. Available at: https://www.cdc.gov/malaria/malaria_worldwide/reduction/itn.html (Accessed: 22/07/2020).

Center for Community Health and Development (2020) 'Precede/Proceed: What Is Precede-Proceed? Why Use Precede-Proceed? How Do You Use Precede-Proceed?'. Available at: https://ctb.ku.edu/en/table-contents/overview/other-models-promoting-community-health-and-development/preceder-proceder/main (Accessed: 22/07/2020).

Chanda, D. O. C. (1998) A study to determine the knowledge, attitude, and practice of nurses towards their own health promotion. Research Project. University of Zambia.

Chinwe, N. J., Ocheyana, G. I., Ibo, O. P. and Eberechukwu, Y.-I. L. (2017) 'The Use of Insecticide Treated Bed Net in Children Under Five Years of Age in Alakahia Community, Rivers State', Asian Journal of Psychiatry, 3, p. 32.

Cote, C. M., Goel, V., Muhindo, R., Baguma, E., Ntaro, M., Shook-Sa, B. E., . . . Boyce, R. M. (2021) 'Ongoing long-lasting insecticide-treated net distribution efforts are insufficient to maintain high rates of use among children in rural Uganda', doi: 10.1101/2021.02.26.21252527.

Diema-Konlan, K., Amu, H., Konlan, K. D. and Japiong, M. (2019) 'Awareness and Malaria Prevention Practices in a Rural Community in the Ho Municipality, Ghana', Interdiscip Perspect Infect Dis, 2019, p. 9365823. doi: 10.1155/2019/9365823.

Etikan, I. and Babatope, O. (2019) 'A Basic Approach in Sampling Methodology and Sample Size Calculation', Med Life Clin, 1(2).

Finlay, A. M., Butts, J., Ranaivoharimina, H., Cotte, A. H., Ramarosandratana, B., Rabarijaona, H., . . . Vanden Eng, J. (2017) 'Free mass distribution of long lasting insecticidal nets lead to high levels of LLIN access and use in Madagascar, 2010: A cross-sectional observational study', PLoS One, 12(8), p. e0183936. doi: 10.1371/journal.pone.0183936.

Florey, L. S., Bennett, A., Hershey, C. L., Bhattarai, A., Nielsen, C. F., Ali, D., . . . Ye, Y. (2017) 'Impact of Insecticide-Treated Net Ownership on All-Cause Child Mortality in Malawi, 2006-2010', Am J Trop Med Hyg, 97(3_Suppl), pp. 65-75. doi: 10.4269/ajtmh.15-0929.

Fokam, E. B., Kindzeka, G. F., Ngimuh, L., Dzi, K. T. and Wanji, S. (2017) 'Determination of the predictive factors of long-lasting insecticide-treated net ownership and utilisation in the Bamenda Health District of Cameroon', BMC Public Health, 17(1), p. 263. doi: 10.1186/s12889-017-4155-5.

GiveWell (2018) 'Mass Distribution of Long-Lasting Insecticide-Treated Nets (LLINs)'. Available at: https://www.givewell.org/international/technical/programs/insecticide-treated-nets (Accessed: 22/072020).

Hill, J. and Kuile, F.-t. (2018) 'Insecticide-treated nets to reduce the risk of malaria in pregnant women.' 2020(22/07/2020), https://www.who.int/elena/titles/commentary/bednets_malaria_pregnancy/en/.

Hlaing, P. H., Sullivan, P. E. and Chaiyawat, P. (2019) 'Application of PRECEDE-PROCEED Planning Model in Transforming the Clinical Decision Making Behavior of Physical Therapists in Myanmar', Front Public Health, 7(114), p. 114. doi: 10.3389/fpubh.2019.00114.

Immurana, M. and Urmi, A. (2018) 'Determinants of Insecticide Treated Net Utilisation for Under-Five Children in Ghana', American Journal of Preventive Medicine and Public Health, p. 1. doi: 10.5455/ajpmph.20180308023922.

Inambao, A., Kumar, R., Hamainza, B., Makasa, M. and Nielsen, C. F. (Year) 'Malaria incidence in Zambia, 2013 to 2015: Observations from the health management information system'.

Israel, O. K., Fawole, O. I., Adebowale, A. S., Ajayi, I. O., Yusuf, O. B., Oladimeji, A. and Ajumobi, O. (2018) 'Caregivers' knowledge and utilization of long-lasting insecticidal nets among under-five children in Osun State, Southwest, Nigeria', Malar J, 17(1), p. 231. doi: 10.1186/s12936-018-2383-5.

Iwuafor, A. A., Egwuatu, C. C., Nnachi, A. U., Ita, I. O., Ogban, G. I., Akujobi, C. N. and Egwuatu, T. O. (2016) 'Malaria Parasitaemia and the use of insecticide-treated nets (INTs) for malaria control amongst under-5 year old children in Calabar, Nigeria', BMC Infect Dis, 16(1), p. 151. doi: 10.1186/s12879-016-1459-5.

Iyer, M., Skelton, J., de Wildt, G. and Meza, G. (2019) 'A qualitative study on the use of long-lasting insecticidal nets (LLINs) for the prevention of malaria in the Peruvian Amazon', Malar J, 18(1), p. 301. doi: 10.1186/s12936-019-2937-1.

Jallow, A., Bah, O. and Bajinka, O. (2019) 'Determinants of Ownership and Utilization of Insecticide-Treated Bed Nets for Malaria Control in the Kanifing Municipality, the Gambia', Acta Scientific Microbiology, 2(8), pp. 123-134. doi: 10.31080/asmi.2019.02.0312.

Johnson, O., Pintauro, S., Brock, D. and Bertmann, F. (2018) 'Application of the PRECEDE-PROCEED Model for Community Program Evaluation', Journal of the Academy of Nutrition and Dietetics, 118(9), p. A66. doi: 10.1016/j.jand.2018.06.028.

Kanmiki, E. W., Awoonor-Williams, J. K., Phillips, J. F., Kachur, S. P., Achana, S. F., Akazili, J. and Bawah, A. A. (2019) 'Socio-economic and demographic disparities in ownership and use of insecticide-treated bed nets for preventing malaria among rural reproductive-aged women in northern Ghana', PLoS One, 14(1), p. e0211365. doi: 10.1371/journal.pone.0211365.

Khanam, F., Hossain, M. B., Chowdhury, T. R., Rahman, M. S., Kabir, M., Naher, S., . . . Rahman, M. (2018) 'Exploring the gap between coverage, access, and utilization of long-lasting insecticide-treated nets (LLINs) among the households of malaria endemic districts in Bangladesh', Malar J, 17(1), p. 455. doi: 10.1186/s12936-018-2610-0.

Krezanoski, P. J. (2016) 'Delivering insecticide-treated nets for malaria prevention: innovative strategies', Res Rep Trop Med, 7, pp. 39-47. doi: 10.2147/RRTM.S83173.

Kyalo, G. M. and Kioko, U. M. (2018) 'Factors Affecting Use of Insecticide Treated Nets by Children Under Five Years of Age in Kenya', American Journal of Health Research, 6(4), doi: 10.11648/j.ajhr.20180604.15.

Linn, S. Y., Maung, T. M., Tripathy, J. P., Shewade, H. D., Oo, S. M., Linn, Z. and Thi, A. (2019) 'Barriers in distribution, ownership and utilization of insecticide-treated mosquito nets among migrant population in Myanmar, 2016: a mixed methods study', Malar J, 18(1), p. 172. doi: 10.1186/s12936-019-2800-4.

Malaria Consortium (2016) 'Malaria prevention through insecticide treated nets'.[in https://www.malariaconsortium.org/: Malaria Consortium. Available at: https://www.malariaconsortium.org/media-downloads/802/Malaria%20prevention%20through%20insecticide%20treated%20nets.

Masaad, T. T. M., Elmosaad, Y. M., Mohammed, A. E. E., Elmanssury, A. E., Jaber, M., Mustafa, M. M. and Edrees, H. (2017) 'Knowledge, Attitude and Practices Among Mothers Towards Insecticide-Treated Nets in Abuharira Village -Um Remta Locality- The White Nile State -2015', Science Journal of Clinical Medicine, 6(2), doi: 10.11648/j.sjcm.20170602.11.

Masaninga, F., Mukumbuta, N., Ndhlovu, K., Hamainza, B., Wamulume, P., Chanda, E., . . . Kawesha-Chizema, E. (2018) 'Insecticide-treated nets mass distribution campaign: benefits and lessons in Zambia', Malar J, 17(1), p. 173. doi: 10.1186/s12936-018-2314-5.

Merriam-Webster (2020) 'Knowledge'. Available at: https://www.merriam-webster.com/dictionary/knowledge (Accessed: 24/07/2020).

Middleton, F. (2019) 'Reliability vs validity: what's the difference?'. Available at: https://www.scribbr.com/methodology/reliability-vs-validity/ (Accessed: 22/07/2020).

Min, K. T., Maung, T. M., Oo, M. M., Oo, T., Lin, Z., Thi, A. and Tripathy, J. P. (2020) 'Utilization of insecticide-treated bed nets and care-seeking for fever and its associated socio-demographic and geographical factors among under-five children in different regions: evidence from the Myanmar Demographic and Health Survey, 2015-2016', Malar J, 19(1), p. 7. doi: 10.1186/s12936-019-3088-0.

MoH (2018) Zambia National Malaria Indicator Survey 2018 https://www.moh.gov.zm/: Ministry of Health.

Mohamed, R. A. R. and Khaton, S. E. (2017) 'The Effect of an Educational Intervention Based on the PRECEDE-PROCEED Model on Knowledge , Behaviors and Attitudes of Adolescent Students Regarding Drug Abuse and Addiction'.

Nawa, M., Hangoma, P., Morse, A. P. and Michelo, C. (2019) 'Investigating the upsurge of malaria prevalence in Zambia between 2010 and 2015: a decomposition of determinants', Malaria Journal, 18(1), p. 61. doi: 10.1186/s12936-019-2698-x.

NHS (2018) 'Malaria'. Available at: https://www.nhs.uk/conditions/malaria/ (Accessed: 24/07/2020).

Nkoka, O., Chipeta, M. S., Chuang, Y. C., Fergus, D. and Chuang, K. Y. (2019) 'A comparative study of the prevalence of and factors associated with insecticide-treated nets usage among children under 5 years of age in households that already own nets in Malawi', Malar J, 18(1), p. 43. doi: 10.1186/s12936-019-2667-4.

Nuwamanya, S., Kansiime, N., Aheebwe, E., Akatukwasa, C., Nabulo, H., Turyakira, E. and Bajunirwe, F. (2018) 'Utilization of Long-Lasting Insecticide Treated Nets and Parasitaemia at 6 Months after a Mass Distribution Exercise among Households in Mbarara Municipality,

Uganda: A Cross-Sectional Community Based Study', Malar Res Treat, 2018, p. 4387506. doi: 10.1155/2018/4387506.

Nyamai, R., Knight, V., Ochanda, D., Amimo, F. and Ayodo, G. (2018) 'Effective Utilization of Insecticide Treated Nets and Hospitalization of Children Under Five Years at Matete Health Centre in Western Kenya', International Journal of Development Research, 8(3).

Nyavor, K. D., Kweku, M., Agbemafle, I., Takramah, W., Norman, I., Tarkang, E. and Binka, F. (2017) 'Assessing the ownership, usage and knowledge of Insecticide Treated Nets (ITNs) in Malaria Prevention in the Hohoe Municipality, Ghana', The Pan African medical journal, 28, p. 67. doi: 10.11604/pamj.2017.28.67.9934.

Odoko, J. O., Nwose, E. U. and Igumbor, E. O. (2017) 'Utilization of insecticide treated nets against malaria among pregnant women in Southern Nigeria', International Journal of Research in Medical Sciences, 5(11), p. 6. doi: 10.18203/2320-6012.ijrms20174913.

Orji, M. L., Onyire, N. B., Chapp-Jumbo, A., Anyanwu, O. U. and Eke, C. B. (2018) 'Perception and utilization of insecticide-treated mosquito net among caregivers of children in Abakaliki, Nigeria', Annals of African medicine, 17(4), pp. 172-177. doi: 10.4103/aam.aam_64_16.

Pinchoff, J., Chaponda, M., Shields, T. M., Sichivula, J., Muleba, M., Mulenga, M., . . . Southern Africa International Centers of Excellence for Malaria, R. (2016) 'Individual and Household Level Risk Factors Associated with Malaria in Nchelenge District, a Region with Perennial Transmission: A Serial Cross-Sectional Study from 2012 to 2015', PLoS One, 11(6), p. e0156717. doi: 10.1371/journal.pone.0156717.

Porter, C. M. (2016) 'Revisiting Precede–Proceed: A leading model for ecological and ethical health promotion', Health Education Journal, 75(6), pp. 753-764. doi: 10.1177/0017896915619645.

Ramchandani, R. (2016) Emulating commercial, private-sector value-chains to improve access to ORS and Zinc in rural Zambia: evaluation of the Colalife trial. Johns Hopkins.

Ruyange, M. M., Condo, J., Karema, C., Binagwaho, A., Rukundo, A. and Muyirukazi, Y. (2016) 'Factors associated with the non-use of insecticide-treated nets in Rwandan children', Malar J, 15(1), p. 355. doi: 10.1186/s12936-016-1403-6.

Shimaponda-Mataa, N. M., Tembo-Mwase, E., Gebreslasie, M. and Mukaratirwa, S. (2016) 'Knowledge, attitudes and practices in the control and prevention of malaria in four endemic provinces of Zambia', Southern African Journal of Infectious Diseases, 32(1), pp. 29-39. doi: 10.1080/23120053.2016.1205330.

Shin, L. (2018) 'Care Partner’s Guide: Care Partner versus Caregiver'. Available at: https://hopes.stanford.edu/care-partners-guide-care-partner-versus-caregiver/ (Accessed: 26/07/2020).

Sousa, J. O., de Albuquerque, B. C., Coura, J. R. and Suarez-Mutis, M. C. (2019) 'Use and retention of long-lasting insecticidal nets (LLINs) in a malaria risk area in the Brazilian Amazon: a 5-year follow-up intervention', Malar J, 18(1), p. 100. doi: 10.1186/s12936-019-2735-9.

Taherdoost, H. (2016) 'Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research', SSRN Electronic Journal, 5, pp. 28-36. doi: 10.2139/ssrn.3205040.

Tan, K. R., Coleman, J., Smith, B., Hamainza, B., Katebe-Sakala, C., Kean, C., . . . Craig, A. S. (2016) 'A longitudinal study of the durability of long-lasting insecticidal nets in Zambia', Malar J, 15(1), p. 106. doi: 10.1186/s12936-016-1154-4.

Taremwa, I. M., Ashaba, S., Adrama, H. O., Ayebazibwe, C., Omoding, D., Kemeza, I., . . . Hilliard, R. (2017) 'Knowledge, attitude and behaviour towards the use of insecticide treated mosquito nets among pregnant women and children in rural Southwestern Uganda', BMC Public Health, 17(1), p. 794. doi: 10.1186/s12889-017-4824-4.

Tassew, A., Hopkins, R. and Deressa, W. (2017) 'Factors influencing the ownership and utilization of long-lasting insecticidal nets for malaria prevention in Ethiopia', Malar J, 16(1), p. 262. doi: 10.1186/s12936-017-1907-8.

Teh, R. N., Sumbele, I. U. N., Meduke, D. N., Nkeudem, G. A., Ojong, S. T., Teh, E. A. and Kimbi, H. K. (2021) 'Insecticide-treated net ownership, utilization and knowledge of malaria in children residing in Batoke-Limbe, Mount Cameroon area: effect on malariometric and haematological indices', Malar J, 20(1), p. 333. doi: 10.1186/s12936-021-03860-6.

Theiss-Nyland, K., Lines, J. and Fine, P. (2019) 'Can ITN distribution policies increase children's ITN use? A DHS analysis', Malar J, 18(1), p. 191. doi: 10.1186/s12936-019-2824-9.

USAID (2019) Malaria Operational Plan FY 2019. https://www.pmi.gov/where-we-work/zambia/. Available at: https://d1u4sg1s9ptc4z.cloudfront.net/uploads/2021/03/fy-2019-zambia-malaria-operational-plan.pdf.

Wang, P., Connor, A. L., Joudeh, A. S., Steinberg, J., Ndhlovu, K., Siyolwe, M., . . . Hamainza, B. (2016) 'Community point distribution of insecticide-treated bed nets and community health worker hang-up visits in rural Zambia: a decision-focused evaluation', Malar J, 15(1), p. 140. doi: 10.1186/s12936-016-1165-1.

Wanzira, H., Katamba, H., Okullo, A. E., Agaba, B., Kasule, M. and Rubahika, D. (2017) 'Factors associated with malaria parasitaemia among children under 5 years in Uganda: a secondary data analysis of the 2014 Malaria Indicator Survey dataset', Malar J, 16(1), p. 191. doi: 10.1186/s12936-017-1847-3.

WHO (2019a) 'Malaria'. Available at: https://www.who.int/news-room/facts-in-pictures/detail/malaria (Accessed: 24/07/2020).

WHO (2019b) World malaria report 2019. https://www.who.int. 232 pp. Available at: https://www.who.int/publications/i/item/world-malaria-report-2019.

Zambia Statistics Agency - ZSA, Ministry of Health - MOH, University Teaching Hospital Virology Laboratory - UTH-VL and ICF (2020) Zambia Demographic and Health Survey 2018. Lusaka, Zambia: ZSA, MOH, UTH-VL and ICF. Available at: https://www.dhsprogram.com/pubs/pdf/FR361/FR361.pdf.

APPENDIX I: PARTICIPANT INFORMATION SHEET (ENGLISH)

STUDY TITLE: CAREGIVERS' UTILISATION OF LONG-LASTING INSECTICIDE TREATED NETS FOR UNDER FIVE-YEAR-OLD CHILDREN AT SELECTED CLINICS IN PETAUKE DISTRICT

I am Besnart J. Banda, a student pursuing a Master of Science in Nursing Degree, at the School of Nursing at the University of Zambia.

In partial fulfilment for my training, I am expected to undertake a research project of which my topic is stated above. The main objective of this study is to determine the caregiver's utilisation of Long-Lasting Insecticide Treated Nets for under five-year-old children at selected clinics in Petauke District. This study seeks to find out how caregivers of under five -year old children use Long Lasting Insecticides Treated Nets. The researcher will only ask you questions which pertains to the subject matter. Therefore, the researcher is kindly requesting you to participate in this study. Before you make a choice to either or not to participate in this study, I wish to explain the purpose, some risks or benefits of the study to you, as well as what is expected of you. I would like to inform you that participation in this study is voluntary and hence; you are allowed to withdraw at any stage of the study if you wish to do so, without explaining any reasons why you wish to withdraw. For you to participate in the study, you were selected randomly. The questions you will answer in this study will be on knowledge levels, distance, utilisation, attitude and ownership. It is also expected that you give information regarding your demographic data, in case you think you may leave any question for personal reasons unanswered, or you are not sure you may feel free to do so. Strict confidentiality will be maintained over any information that you will give during the interview as no names will be written on the interview schedule guide. This study has got no risks though some questions may be sensitive and personal but do get assured that confidentiality will be maintained throughout the interview. There are no risks involved in this study. However, some questions maybe personal and sensitive but care will be taken so that you do not feel uncomfortable. The interview may take a bit time approximately 30 minutes if you feel stressed kindly let me know and I will attend to your needs appropriately. You are free to withdraw from the study any time you wish to do so.

Benefits

No monetary benefits are involved in this study but you will gain other benefits from this study since the knowledge and advice on importance of using LLITNs will be given. In addition, the study results from this study will also assist in educating caregivers of under five-year-old children to use insecticide treated nets correctly and consistently. Further, the results will contribute to reducing the incidence and prevalence of malaria among the under five-year-old children in the district.

The information which you will provide will help the researcher to know the utilisation levels of LLITNs and the findings will be used by policy makers and other organizations to find ways to improve utilisation of LLITNs among caregivers of under - five children.

You will be asked to sign consent form or provide a thumb print for agreement in case you are interested to participate in this study. Feel free to ask any questions where you are not clear for clarification.

Procedure

There will be a face-to-face interview with all the study respondents in this study. The Researcher will ask you a set of questions using a semi - structured questionnaire. When you sign the consent form, the researcher will then ask you some important questions and your responses will be written down. The interview will take about 30 minutes. At the end of the interview each day, the researcher will secure all the questionnaire under lock and key. No one except the researcher and the research assistants will have access to the questionnaires.

APPENDIX II: ZOWONJEZERA - PEPALA WACHIWIRI (CHEWA)

MUTU WA PHUNZIRO: KUGWIRITSA NTCHITO UKONDE WAUDZUZDU PAKATI PA ANTHU AMENE ASUNGA ANA OCEPA PA ZAKA ZISANU KU MZINDA WA PETAUKE - ZAMBIA.

Dzina langa ndine Besnart J. Banda wophunzira zakufufuza monga za sayansi yaukale, ku Yunivesiti ya Zambia, imene ndi sukulu ya unamwino. Mwakukwanitsa maphunziro anga a pulogolamu ya sayansi ya digiri ya unamwino, ndikufunika kuti ndichite kafukukufuku komwe ndatchula pamwambapa. Cholinga chachikulu cha phunziro lino ndi chofuna kudziwa zimene zimakhudza kugwiritsa ntchito ukonde waudzudzu pa anthu omwe asunga ana ocepa pa zaka zisanu ku mzinda wa petauke.

Phunziro ili likufuna kudziwa momwe anthu osunga ana ocepa pa zaka zisanu akutsewenzetsera ukonde waudzudzu ku mzinda wa Petauke. Mafunso okha omwe akhudzana ndi nkhaniyi adzafunsidwa kutenga nawo mbali mu phunziroli. Chonde musanapange chisankho kapena musanalowe nawo mu phunziro ili, ndikufuna kukufotokozerani cholinga cha phunziroli, zoopsa kapena zopindulitsa zililzonse ndi zomwe mukuyembekezera. Ndikufunanso kuti ndikudziwitseni kuti kutenga nawo mbali mu phunziroli ndi mwaufulu, choncho, muli omasuka kuchoka pa gawo lililonse la phunziro ngati mukufuna, ngakhale mutavomereza ndipo muli omasuka kukana kutenga nawo mbali pa phunziroli. Mudzayankha mafunso okhudza chidziwitso, kusewenzetsa, msikhu wa maphunziro, chikhalidwe ndi mtunda wa mayendedwe kupita ku chipatala.

Ndipo mudza yembekezeranso kuti mudziwe zambiri monga zokhudza deta yanu, ngati mukuona kuti simungayankhe funso lina lirilonse limene simunayankhidwe pazifukwa zanu zomwe mumakhala omasuka kuchita kapena simudziwa muli ndi ufulu kuisiya kuyankha funso limenelo. Chidziwitso chilichonse chomwe chidzaperekedwa chidzasungidwa ndi chidaliro ndipo palibe dzina lomwe lidzalembedwa potsatira ndondomeko ya zokambirana zimene zidza khalapo. Ili phunziro ilibe zoopsa monga momwe mutu wa nkhani ukunenera koma, mafunso ena angawoneke osasamala, kasamalidwa kazakhalapo kuti musamve manyadzi. Kuyankhulana kungatenge pang'ono nthawi pafupifupi mphindi makhumi atatu. Ngati mukumva kuti muli opanizika, chonde, ndidziwtseni mwamsngamsanga kuti ndipite ku zosowa zanu molingana.

Ubwino

Sikudzakhala zopindulitsa zapadera kuchokera mu phunziro lino koma zina zophindulitsa ndizakuti chakuti chidziwitso ndi malangizo pa kutsewenzetsa ukonde waudzudzu, kudzaperekedwa. Zimene mungapereke zidzathandiza mfufuziyu kuziwa momwe mosikito neti ikusewenzetsedwa. Ndipo zomwe adzapeza zizagwiritsidwa nchito ndi omwe amapanga ndondomeko ndi mabungwe ena kuti apeze njira zowonjezera nchito zowunikira kusewenzetsa mosikito neti.

Mudzafunsidwa kuti mulembe chilolezo kapena zolemba zanu kuti muvomereze ngati mukufuna kutenga nawo mbali mu phunziro ili. Ndiponso chonde, funsani zomwe simukudziwa bwino.

Ndondomeko

Mu phunziro ili muzakha kuyankhulana maso ndi maso ndi wofunsayo amene angakufunseni mafunso osiyanasiyana pogwiritsa nchito mafunso olembedwa. Ndipo pambuyo posayina fomu yoyenera, ndikupitiriza kukufunsani mafunso oyenera ndipo mayankho anu adzalembedwa pafupi mpindi makumi atatu.

APPENDIX III: VOLUNTARY CONSENT FORMDECLARATION (ENGLISH)

TITLE OF STUDY: CAREGIVERS UTILISATION OF LONG-LASTING INSECTICIDE TREATED NETS FOR UNDER FIVE - YEAR - OLD CHILDREN AT SELECTED CLINICS IN PETAUKE DISTRICT

I have been explained to and I understand the nature, the purpose, confidentiality, risks, benefits and discomforts of the research in which I have been asked to participate. In addition, I understand that participating in this study is purely voluntary. I also understand that even after having agreed to take part in this study, I am free to withdraw at any time without giving an explanation. The chance of asking questions about the research was given and I have been answered to my satisfaction.

I therefore agree to participate.

I …………………………………...here by called the respondent fully understand the

guidelines of this study and I am therefore willing to participate in the study.

Dated this ……….... day of …………...2020.

Signature/thumb print of respondent:

Witness:…………………………………………..

Persons to contact in case of problems or questions:

1. Besnart J. Banda,
University of Zambia.
School of Nursing Sciences.
P.O. Box 50110, Lusaka.
Mobile: 096 641 8200
E-mail: besnartbanda@yahoo.com

2. Dr. Dorothy Chanda and Mrs. Natalia Shitima.
School of Nursing Sciences.
University of Zambia,
P.O. Box 50110, Lusaka.
Mobile: 097 784 7323 and 097 967 0098 respectively

3. The Chairman,

Research Ethics Committee,

University of Zambia.

P.O. Box 50110, Lusaka.

Phone No.: +260-211-256067

E-mail: unzarec@unza.zm

APPENDIX IV: ZOWONJEZERA WACHINAI (CHEWA)

MAWONEKEDWE OLOLERA OVOMEREZEKA CHIWONETSERO

(CHIDZIWITSO CHOBVOMEREZEKA)

MUTU WA PHUNZIRO: KUGWIRITSA NTCHITO UKONDE WAUDZUDZU PAKATI PA ANTHU AMENE ASUNGA ANA OCEPA PA ZAKA ZISANU KU MZINDA WA PETAUKE - ZAMBIA.

Ndakhala ndikufotokozeredwa ndikukumvetsetsa chikhalidwe, cholinga, chisinsi, zoopsa, phindu ndi zosokoneza zafukufuku zomwe ndafunsidwa kutenga nawo mbali. Ndiponso ndikumvetsetsanso kuti kutenga nawo gawo mu phunziroli ndikudzipereka. Ndili okumvetsetsa kuti ngakhale titagwirizana kuti ndichite nawo phunziroli, ndili ndi ufulu kusiya nthawi iliyonse popanda kufotokoza.

Ndapatsidwa mwai wakufunsa mafunso okhudza kafukufuku ndipo ndayankhidwa kuti ndikhale wokhutira.

Choncho ndikuvomereza kutenga mbali.

Ine …………………………………………….……. ndiri wovomerayo ndi wo mvetsetsa Zimene malangizo a phunziroli ndiyenso ndikufuna kwambiri kutenga nawo mbali pa phunziro ili.

………………………………………………………………………………......

Siginito/zolemba za womvera ……………………………………………………

Mboni ………………………………………………………………………………

ANTHU OYENERA KULANKHULANA NAWO NGATI PALI MABVUTO

KAPENA MAFUNSO

1. Besnart J. Banda

Yunivesite ya Zambia.

Sukulu ya sayansi ya unamwino.

P.O Box 50110, Lusaka.

Nambala ya lamya: 0966418200,

E-mail: besnartbanda@yahoo.com

2. Dr. Dorothy Osigwe Chinuedo Chanda ndi amai Natalia Shitima.

Yunivesite ya Zambia,

Sukulu ya unamwino.

P.O Box 50110, Lusaka.

Nambala ya lamya: 0977847323 ndi 0979670098 mwandondomeko.

3. Tcheyamani, komiti yamalamulo ochita kafukufuku,

Yunivesite ya Zambia.

P.O Box 50110, Lusaka.

Nambala ya lamya: 260-1-256067,

E-mail: unzarec@unza.zm

APPENDIX V: DATA COLLECTION TOOL

THE UNIVERSITY OF ZAMBIA

SCHOOL OF NURSING SCIENCES

TOPIC: Caregivers' utilisation of Long-Lasting Insecticide Treated Nets for under five children at two selected clinics in Petauke district.

Date of Interview:………………………………………………………….…………………

Place of Interview:……………………………………………………………………....

Name of Interviewer:…………………………………………………………………………

Serial Number:……………………………………………………………………………….

INSTRUCTIONS FOR THE INTERVIEWER

1. Introduce yourself to the respondent.
2. Explain the reason for the interview.
3. No name of the respondent should be written on the interview schedule
4. Tick the most suitable response to the question or fill in the answer in the space provided.
5. Reassure the respondent of confidentiality and anonymity.
6. Give the respondent time to ask questions at the end of the interview.
7. At the end of each interview thank the respondent.

SECTION A: SOCIO-DEMOGRAPHIC DATA

1. The age in years at last birthday
   - ☐ 18 – 28 years.
   - ☐ 29 – 39 years.
   - ☐ 40 – 50 years.
   - ☐ 51 – 61 years.
   - ☐ 62 and above.
2. Religion
   - ☐ Muslim.
   - ☐ Buddhist.
   - ☐ Hindu.
   - ☐ Christian.
   - ☐ Others (specify) ………………………………….
3. Marital Status
   - ☐ Married
   - ☐ Widowed
   - ☐ Divorced
   - ☐ Single
   - ☐ Cohabiting
4. How many under five- year - old children do you have at this household?
   - ☐ 1
   - ☐ 2
   - ☐ 3
   - ☐ 4 and above
5. Level of Education
   - ☐ None
   - ☐ Primary
   - ☐ Secondary
   - ☐ Tertiary
6. Employment Status
   - ☐ Unemployed
   - ☐ Self employed
   - ☐ Employed
7. Personal Income per month

- ☐ Below K1000
- ☐ K1000 – K2, 999
- ☐ K3000 – K5000
- ☐ K5000

8. Area of Residence
   - ☐ Low density
   - ☐ Medium density
   - ☐ High density
   - ☐ Others Specify………………………..

SECTION B: UTILISATION

9. Do you have LLITNs in your household?
   - ☐ Yes
   - ☐ No
10. If you answered YES in question 16, how many LLITNs do you have?
    - ☐ 1
    - ☐ 2
    - ☐ 3
    - ☐ More than 3
11. If you answered YES in question 10, where did you get your LLITN/LLITNs?
    - ☐ Health facility/Outreach health services
    - ☐ Other sources
12. If you answered NO in question 10, what are the reasons?
    Specify……………………………………………………………………………
13. What is the distance between your home and the nearest health facility where you access the LLITNs?
    - ☐ Less than 1 km
    - ☐ Between 1 km to 5km
    - ☐ More than 5km
14. Has/have your under five – year – old child /children ever slept under LLITN?
    - ☐ Yes
    - ☐ No
15. If you answered YES in question 14, when was the last time they slept under the LLITN?
    - ☐ Every night throughout the year

☐ Slept under LLITNs but not consistently

16. If you answered NO to question 14, what has made your under-five-year old child /children not to sleep under the LLITN?...

SECTION C: KNOWLEDGE ON LLITNs

17. Have you heard of or do you know a Long Lasting Insecticide Treated Net?

☐ Yes

☐ No

18. If your answer is YES to Question 9, where did you hear it from?

☐ Radio

☐ Television

☐ Hospital

☐ Relative.

☐ A friend

19. Do you know an LLITN?

☐ Yes

☐ No

20. What is an LLITN?…..………………………………………

21. What is the importance of using an LLITN?

☐ Barrier against mosquito bites

☐ Quick healing from malaria

☐ No idea

22. Do you know any/other measures which the government is implementing to prevent mosquitoes?

☐ Yes

☐ No

23. If your answer is YES to question 22, mention some of the preventive measures against mosquitoes………………………………………………………………………………

SECTION D: ATTITUDE

Tick the correct responses below

24. It is important for under-five children to sleep under LLITNs even if you have not seen mosquitoes in the house.					
25. Cultural beliefs can make caregivers either use or not use LLITNs.					
26. The partner/spouse is important in supporting your under - five child/children to sleep under LLITN every night.					
27. Under-five children should only sleep under LLITNs when they have malaria.					

The End.

APPENDIX VI: ZOWONJEZERA WACHISANU NDI IMODZI (CHEWA)

SUKULU LALIKULU LA YUNIVESITI YA ZAMBIA
SUKULU YA SAYANSI YA UNAMWINO
MDANDANDA WA KUYANKHULANA

MUTU: KUGWIRITSA NTCHITO UKONDE WAUDZUDZU PAKATI PA ANTHU AMENE ASUNGA ANA OCEPA PA ZAKA ZISANU KU MZINDA WA PETAUKE - ZAMBIA.

TSIKU LA KULANKHULANA: …………………..……………….……………………….

MALO OLANKHULILANA: …………………….…………………………….………..

DZINA LA OLANKHULANA NAYE: …………………….…………………….………..

NAMBALA YA CHIZINDIKIRO: ……………………….…………………….……..

MALANGIZO KWA OFUNSA

1. Zidziwitseni kwa olankhulana nawo.
2. Fotokozani mwatsatanetsatane chifukwa cha kulankhulilana nawo.
3. Musalembe dzina la ofunsidwawo pa pepala ili lakulankhulanali.
4. Chongani yankho imene ndiyo yendelana ndi funso kapena lembani yankho mumalo opatsidwa.
5. Onesesani kuti mwawa tsimikizira oyankha kuti ndi za chisinsi ndi zobisa.
6. Patsani mpata kwa woyankhawo kufunsa mafunso mukatsiridza kuwafunsa.
7. Wongani dzikomo oyankhawo pambuyo pa mafunso ya ndondomeko mwina cigawo chiriconse.

NDIME A: DETA YA UMOYO PA ZAZIWERENGERO

1. Zaka zomwe anakwanitsa patsiku la kubadwa linapitayo m'cakako.
   - ☐ 18 – 28 years.
   - ☐ 29 – 39 years.
   - ☐ 40 – 50 years.
   - ☐ 51 – 61 years.
   - ☐ 62 kapena kupotsa.
2. Chipembezo
   - ☐ Isilamu
   - ☐ Abuda.
   - ☐ Ahindu.
   - ☐ Akhristu.
   - ☐ Ngati pali zina (lembani) …………………………………………………………
3. Za banja
   - ☐ Wokwatiwa/wokwatira
   - ☐ Wofeledwa
   - ☐ Wozuzulidwa
   - ☐ Wosakwatiwa /wosakwatira
   - ☐ Wokhala ndi bambo/mai popanda chilolezo
4. Kodi muli ndi ana ochepa zaka zisanu angati pa nyumba panu?
   - ☐ 1
   - ☐ 2
   - ☐ 3
   - ☐ 4 and above
5. Mlingo wa maphunziro
   - ☐ Maphunziro aku kolegi kapena yunivesiti
   - ☐ Maphuziro a secondale
   - ☐ Maphunziro a pulayimali.
   - ☐ Sana mphunzirepo
6. Nchito imene ali kusewenza.
   - ☐ Sasewenza
   - ☐ Azisewenzera
   - ☐ Asewenza

7. Zimene apeza pa mwezi
   - ☐ Yocepekera pa K1000
   - ☐ Pakati pa K1000 ndi K2, 999
   - ☐ Pakati pa K3000 ndi K5000
   - ☐ Kupitilira pa K5000
8. Kumene akhala
   - ☐ Komwe kumakhala anthu ochepa
   - ☐ Kumene kumakhala anthu ambiri koma kulibe chipwirikiti
   - ☐ Kemene kumakhala anthu ambiri ndiponso kuli chipwirikiti
   - ☐ Ngati kuli zina fotokozani………………………..

NDIME YA B: MAGWIRITSIDWE

9. Kodi muli nao ukonde waudzudzu?
   - ☐ Inde
   - ☐ Ayi
10. Ngati yankho lanu ndi INDE pa funso 16, kodi muli nao ukonde waudzudzu ungati?
    - ☐ Umodzi
    - ☐ Uwiri
    - ☐ Utatu
    - ☐ Wambiri wopitilira utatu
11. Ngati yankho lanu ndi INDE pa funso 16, kodi mumatengera kuti ukonde waudzudzu?
    - ☐ Kuchipatala
    - ☐ Kwinakwake
12. Ngati yankho lanu ndi AYI pa funso 16, cifukwa chiyani?

Lankhulani:……………………………………………………………………………………

13. Kodi mutunda wautali bwanji kuchokera komwe mukhala kukafika komwe mungalandire ukonde waudzudzu?
    - ☐ Kuchepkera kilomita limodzi
    - ☐ Pakati pa kilomita limodzi ndi asanu
    - ☐ Kupitilira makilomita asanu
14. Kodi mwana kapena ana anu anogonapo kale mu ukonde waudzudzu?
    - ☐ Inde
    - ☐ Ayi

15. Ngati yankho lanu ndi INDE pa funso 20, kodi angona mu ukonde waudzudzu liti?
    - ☐ Usiku uliwonse mucaka chilochonse
    - ☐ Anagonamo koma sinthawi zonse
16. Ngati yankho lanu ndi AYI pa funso 20, kodi cifukwa ndi chiani mwana wanu kapen ana anu cinapangitsa kuti asagone mu ukonde waudzudzu?...............

NDIME YA C: NZERU

17. Kodi munamvapo za matenda ya Malungo?
    - ☐ Inde
    - ☐ Ayi
18. Ngati yankho lanu ndi INDE pa funso 9, kodi munazimva kuti?
    - ☐ Pa wailesi
    - ☐ Pa wailesi yakanema
    - ☐ Kucipatal
    - ☐ Kwa abale.
    - ☐ Kwa abwenzi
19. Kodi mukuudziwa ukonde wa udzudzu?
    - ☐ Inde
    - ☐ Ayi
20. Ngati yanko yanu ndi INDE pa funso 11, Kodi ukonde wa udzudzu ndi ciani?...
21. Kodi kukoma kwa kusewenzetsa ukond wa udzudzu ndi chiyani?
    - ☐ Uchingiridza ku udzudzu
    - ☐ Matenda amalungo amapola mwa msanga
    - ☐ Sadziwa yankho
22. Pali dzimene muziwa zimene boma lacitapo pofunafuna kucinjiriza udzudzu?
    - ☐ Inde
    - ☐ Ayi
23. Ngati yakho yanu ndi INDE pa funso 14, laknhulani zimene boma lacitapo pofunafuna kucinjiriza udzudzu ……………………………………………………….…

NDIME YA D: MAKHALIDWE

Chongani yankho yomwe ndiyo yenera

Funso	**Yankho**				
	Kuvomera koposa	Kuvomera	Kusadziwa	Kusavomera	Kusavomera koposa
24. N'chofunika kuti ana ocepa pa zaka zisanu azigona mu ukonde waudzudzu ngakhale kuti udzudzu sunaoneke munyumba.					
25. Zikhulupiliro zingapangitse anthu amene asunga ana azaka zocepa pa zisanu kuti azitsewenzetsaukonde waudzudzu kapena ayi..					
26. Anthu amene akhala ndi bambo panyumba ama thandizidwa muku ontsetsa kuti mwana/ana ocepa pa zaka zisanu kugona mu ukonde waudzudzu usiku ulionse.					
27. Ana ocepa pa zaka zisanu afuka kugona mu ukonde waudzudzu pokhapo ngati ali ndi malungo.					

KWATHA.

APPENDIX VII: MARKING KEY FOR THE VARIABLES KNOWLEDGE AND ATTITUDE TOWARDS LLITNS.

SECTION C: KNOWLEDGE ON LLITNs

28. Have you heard of or do you a Long Lasting Insecticide Treated Net?

    Answer: Yes

29. If your answer is YES to Question 9, where did you hear it from?

    Answer: Radio, Television, Hospital, Relative, A friend

30. What is an LLITN?

    Answer: An LLITN is an ITN that forms a protective barrier around people who sleep under them and remains effective for at least three years and 20 washes.

31. How often should under – five children sleep under an LLITN?

    Answer: Every night

32. What is the importance of using an LLITN?

    Answer: Barrier against mosquito

33. Do you know any/other measures which the government is implementing to prevent mosquitoes?

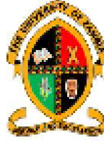
    Answer: Yes

34. If your answer is YES to question 14, mention some of the preventive measures against mosquitoes. Answer IRS,LLITNs, Clearing tall grass near the houses

SECTION D: ATTITUDE

Tick the correct responses below

Question	**Response**				
	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
35. It is important for under-five children to sleep under LLITNs even if you have not seen mosquitoes in the house.	**Answer**				
36. Cultural beliefs can make caregivers either use or not use LLITNs.	**Answer**				
37. The partner/spouse is important in supporting your under - five child/children to sleep under LLITN every night.	**Answer**				
38. Under-five children should only sleep under LLITNs when they have malaria.					**Answer**



UNIVERSITY OF ZAMBIA
BIOMEDICAL RESEARCH ETHICS COMMITTEE

Telephone: 260-1-256067
Telegrams: UNZA, LUSAKA
Telex: UNZALU ZA 44370
Fax: + 260-1-250753
Federal Assurance No. FWA00000338

Ridgeway Campus
P.O. Box 50110
Lusaka, Zambia
E-mail: unzarec@unza.zm
IRB00001131 of IORG0000774

15th September, 2020.

Your **REF. No. 1177-2020**.

Ms. Besnart Banda,
University of Zambia,
Department of Public Health Nursing,
PO BOX 50110,
Lusaka.

Dear Ms. Banda,

RE: "CAREGIVERS' UTILISATION OF LONG LASTING INSECTICIDE TREATED NETS (LLITNS) FOR UNDER FIVE-YEAR-OLD CHILDREN AT SELECTED CLINICS IN PETAUKE DISTRICT." (REF. NO. 1177-2020)

The above-mentioned research proposal was presented to the Biomedical Research Ethics Committee 26th August, 2020 and the following concerns were raised:

CORRECTIONS:

1. Refine specific objectives so that they are aligned with the main one. For example, specific objectives 2 should be reflected in main objective.
2. Justification for purposive sampling for Petauke and the two clinics not adequate. How will the results be representative of Petauke if randomization (and removal of bias) will not be done?
3. It must be made clear how the recruitment will be apart from the use of clinic records. How will that reflect on the physical participants? How will they be accessed?
4. Where will be pre-testing of questionnaire be done? Where will the questionnaire be administered from? Process for the questionnaire study is missing. Will it be a health post/hospital based study or a community based enquiry?
5. Where and when will the consent be sought? This must be planned with the sampling for a questionnaire survey.

Approval will only be granted after the raised concerns have been addressed. Please Resubmit **An ELECTRONIC** copy of the revised proposal to unzarec@unza.zm, with **highlighted** changes. This should be done within **TWO (2)** weeks period.

NATIONAL HEALTH RESEARCH AUTHORITY

Paediatric Centre of Excellence, University Teaching Hospital, P.O. Box 30075, LUSAKA

Tell: +260211 250309 | Email: znhrasec@gmail.com | www.nhra.org.zm

Ref No: NHRA00017/15/10/2020 **Date: 15th October, 2020**

The Principal Investigator
Besnart Banda
The University of Zambia
P.O. Box 32379
Lusaka, Zambia

Dear Ms Banda,

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for authority to conduct research titled **"CAREGIVERS'UTILISATIONOFLONG-LASTINGINSECTICIDE TREATEDNETSFORUNDERFIVE–YEAR-OLDCHILDRENATSELECTEDCLINICS INPETAUKEDISTRICT-ZAMBIA."** I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA quarterly from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,

Prof. Victor Chalwe
Acting Director/CEO
National Health Research Authority

All correspondences should be addressed to the Director/CEO National Health Research Authority

Telephone: 260 (6) 221513

Fax: 260 (6) 221219...

in Reply Please Quote

PMOEP/101/18/1

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

PROVINCIAL HEALTH OFFICE
EASTERN PROVINCE
P.O. BOX 510023
CHIPATA

14th December, 2020

Ms. Besnart Banda
University of Zambia
LUSAKA

RE: PERMISSION TO CONDUCT A PILOT STUDY IN CHIPATA: YOURSELF

Reference is made to the above subject matter.

I write to inform you that authority has been granted for you to carry out a research study at some selected clinics in Petauke District, Eastern Province as a partial fulfillment of your Master of Science in Public Health.

Upon completion of your study, you are required to write a comprehensive report to Provincial Health Director.

Dr. Jairos Mulambya
Public Health Specialist
For/Provincial Health Director
EASTERN PROVINCE

SHOT ON S15
itel DUAL CAMERA

REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH

DISTRICT HEALTH OFFICE
P O Box 560008
Telephone: 260(6)371075/371029
PETAUKE

2nd November, 2020

Dr. Dorothy Chanda

University of Zambia

School of Nursing

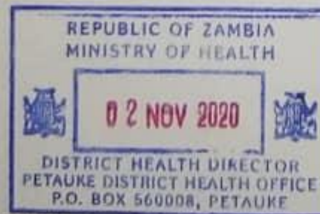
P.O Box 50110

Lusaka.

RE: **REQUEST FOR PERMISSION TO CONDUCT A STUDY**

The subject matter above refers. I write to inform you that authority has been granted for Miss **Besnart Banda** who is a student pursuing a Master of Science Degree in Public Health Nursing to undertake a study in Petauke District at Petauke Urban Clinic and Kakwiya RHC. Further, my office will support her where ever possible so that she completes the assignment in time.

Yours faithfully,



Mazala Mazala

Planner

For District Health Director