

DEPARTMENT OF NURSING SCIENCE
FACULTY OF SCIENCE AND AGRICULTURE
UNIVERSITY OF ZULULAND



**MALARIA EDUCATION PROVIDED BY MIDWIVES AND NURSES TO
PREGNANT WOMEN ATTENDING ANTENATAL CLINICS WITHIN TARKWA
NSUAEM MUNICIPAL ASSEMBLY, WESTERN REGION, GHANA**

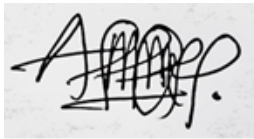
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NURSING DEGREE**

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DECLARATION

I James Mckeown Amoah (201860879) hereby declare that, except for reference to people's work which have been duly acknowledged, this dissertation is my own original work and it has not been submitted to any other University for examination.



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22nd March 2022

DATE

DEDICATION

This dissertation is dedicated to my beautiful wife Philomina Donkoh and our adorable son Tony Mckeown Amoah (Nana Kofi). You have been very supportive throughout this research period. I love you.

ACKNOWLEDGEMENT

I would like to express my sincere thanks to God for seeing me through this study.

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I thank you all.

LIST OF ABBREVIATIONS USED

ANC	-	Antenatal Clinics
CDC	-	Centre for Disease Control
GHS-ERC	-	Ghana Health Service Ethical Review Committee
HMM	-	Home Management of Malaria
IPT	-	Intermittent Preventive Therapy
ITN	-	Insecticide Treated Nets
LBW	-	Low Birth Weight
NMCP	-	National Malaria Control Program
OPD	-	Outpatient Department
PHC	-	Primary Health Care
SDG	-	Sustainable Development Goals
SPSS	-	Statistical Package for Social Sciences
SSA	-	Sub-Saharan Africa
TNMA	-	Tarkwa Nsuaem Municipal Assembly
TNMHD	-	Tarkwa Nsuaem Municipal Health Directorate
WHO	-	World Health Organization

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ABSTRACT

It is estimated that about 3.4 billion people living in 92 countries of the world are at risk of malaria infection. In 2018, WHO Africa Region accounted for 93% of global malaria cases and 94% of malaria deaths. Pregnant women in these malaria prone countries are more likely to get infected with malaria, suffer severe complications and unfortunately die from the disease, than any other group of people. In Sub-Saharan African countries like Ghana, health education forms an integral part of the methods used in the implementation of malaria control interventions. This research therefore sought to discover the malaria education midwives and nurses provide to pregnant women attending antenatal clinics within Tarkwa Nsuaem Municipal Assembly in Ghana. A cross sectional descriptive quantitative research design was used with a sample size of 356 participants using stratified random sampling method. TNMA was divided into two (2) zones and two (2) health facilities with the highest antenatal attendance were selected purposively. Pregnant women from these health facilities who met the inclusion criteria were randomly selected. These pregnant women completed a self-completion questionnaire after signing the consent form. The data collected were analysed using SPSS 16.0. Most (95.8%) of the pregnant women had heard of malaria through Home/family members, Hospital/antenatal clinics, and Television as their top three sources of malaria education. The respondents' malaria knowledge was high. The malaria health education is provided anytime they visit the antenatal clinic and includes their husbands and partners. Topics covered in the education were causes, symptoms, diagnosis, first aid, treatment, and prevention of Malaria. It is recommended that learning aids especially pictures and videos should be used during the education to make it exciting. Also, husbands and partners should be involved in the education to improve compliance to malaria education.

CHAPTER ONE

INTRODUCTION

1.1 Introduction and background

It is estimated that about 3.4 billion people were at risk of being infected with malaria and developing the disease globally. Of this number, about 1.2 billion people are at high risk (> 1 in 1000 chances of getting malaria in a year) (Erhabor et al., 2018).

Countries with indigenous cases in 2000 and their status by 2017 Countries with zero indigenous cases over at least the past 3 consecutive years are considered to be malaria free. All countries in the WHO European Region reported zero indigenous cases in 2016 and again in 2017. In 2017, both China and El Salvador reported zero indigenous cases. *Source: WHO database.*

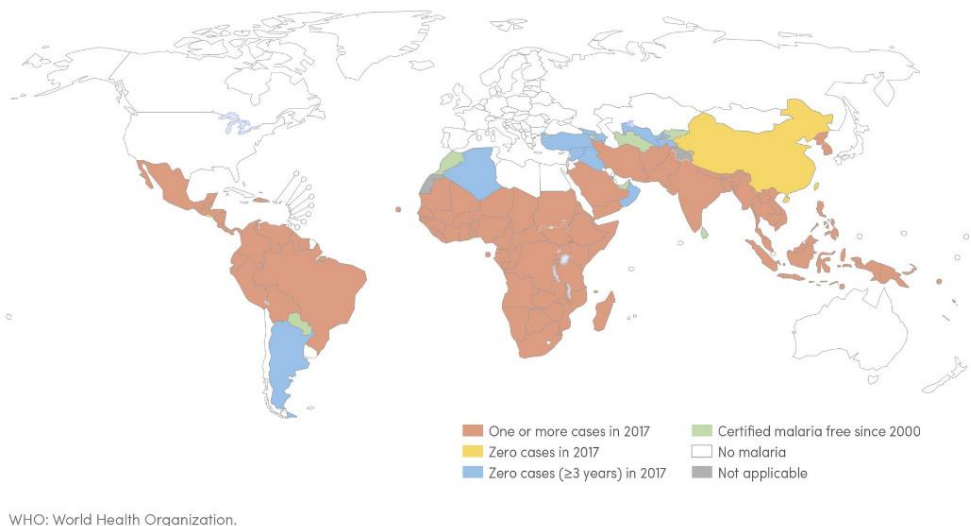


Figure 1 - A map showing the global burden of malaria

About 227 million malaria cases occurred worldwide in 2019 compared with 251 million cases in 2010 and 231 million cases in 2017. In 2020 (a year after the COVID-19 pandemic), the number of malaria cases increased from 227 million to 241 million. Most of the cases in 2019 were recorded in the WHO African Region representing 95% of all the global recorded cases. (WHO, 2021). Six (6) countries in the WHO African Region namely, Nigeria, Democratic

Republic of Congo, Uganda, Mozambique, Angola, and Burkina Faso account for about 55% of all cases recorded globally (WHO, 2021).

Although there were an estimated 20 million fewer malaria cases in 2017 than in 2010, data for the period (2015–2017) highlight that no significant progress in reducing global malaria cases was made in this timeframe (WHO, 2018). “The incidence rate of malaria declined globally between 2010 and 2018, from 71 to 57 cases per 1000 population at risk. However, from 2014 to 2018, the rate of change slowed dramatically, reducing to 57 in 2014 and remaining at similar levels through to 2018” (WHO, 2019).

In terms of malaria deaths, there has been a continuous decrease in the number of malaria deaths from 2000 to 2019. In 2018, there were an estimated 405,000 deaths from malaria globally, compared with 416,000 estimated deaths in 2017, and 585,000 in 2010. The WHO African Region accounted for 94% of all malaria deaths in 2018 (WHO, 2019). There was an increase in malaria deaths from 558,000 in 2019 to 627,000 in 2020. This represent about 12% increase in malaria deaths with an additional 47,000 deaths due to disruptions during the COVID-19 Pandemic (WHO, 2021).

Although the WHO Africa region was home to the highest number of malaria deaths in 2018, it also accounted for 85% of the 180,000 fewer global malaria deaths reported in 2018 compared with 2010. Nearly 85% of global malaria deaths in 2018 were concentrated in 20 countries in the WHO African Region and India; Nigeria accounted for almost 24% of all global malaria deaths, followed by the Democratic Republic of the Congo (11%), the United Republic of Tanzania (5%), and Angola, Mozambique, and Niger (4% each) (WHO, 2019).

Africa continues to be the continent with the highest risk of malaria, number of cases and death of malaria. Almost 80% of all malaria cases recorded worldwide were found in India and 15 African countries namely, Nigeria, Democratic Republic of the Congo, Mozambique, Uganda,

Burkina Faso, Ghana, Niger, Cameroon, Mali, Tanzania, Rwanda, Angola, Malawi, Guinea and Benin. Nigeria recorded nearly 25% of all cases globally, the Democratic Republic of the Congo (11%), Mozambique (5%), India (4%) and Uganda (4%). This means that the WHO Africa region recorded nearly 50% of all malaria cases in the world. When it comes to malaria deaths, India and the WHO Africa region - Nigeria, Democratic Republic of the Congo, Burkina Faso, Tanzania, Sierra Leone and Niger recorded 53% of all global deaths (WHO, 2018).

The malaria situation in Ghana is not different from that of other African countries. Malaria in Ghana accounts for 4% of the global burden and 7% of the West African malaria burden (WHO, 2018). According to Awine, Malm, Bart-Plange, & Silal (2017), malaria is endemic in Ghana, which means that all 27 million inhabitants are susceptible to malaria infection. It is hypoendemic in the Greater Accra Region, hyperendemic in the Upper West Region and mesoendemic in the rest of the country with a parasite prevalence of 39%. It affects all populations, but worse in children under five years and pregnant women due to reduced immunity (Ojeikere, 2016).

The incidence of malaria still accounts for 40.0% of all outpatient attendance, with the most vulnerable groups being children under 5 years of age and pregnant women (Awine et al, 2017). According to the 2016 Ghana National Malaria Control Program (NMCP) report, about 10.4 million suspected malaria cases were seen at Outpatient Departments (OPD) in 2015. This figure shows an increment of 2.5% above the 2014 data. In the same year (2015), about 28,606 suspected malaria cases were recorded on a daily basis in Ghanaian health facilities. Malaria was responsible for 19% of all recorded deaths in Ghana in 2015 but it declined significantly from 19% to 4.2% in 2016 (NMCP, 2016). Malaria in pregnancy is responsible for 14 % of OPD attendance, 11 % of hospital admission and 9 % of maternal deaths in Ghana, with prevalence rate ranging from 35.9 % to 52% in rural areas in the southern sector and the

northern sector respectively (Mwin et al., 2021). Although malaria is preventable, it remains the leading cause of outpatient department (OPD) attendance in Ghana. It is still the most reported disease, accounting for over 55.0% of all OPD attendance, 13.7% of admissions among pregnant women, and 3.4% of maternal deaths (Addai-mensah et al., 2018)

In malaria endemic countries like Ghana, pregnant women are more vulnerable to malaria than the general population as they are more likely to become infected, have reinfection, develop complications and unfortunately die from the disease than any other group of people. Despite the fact that malaria infection can affect all ages and sexes, morbidity and mortality related to malaria are very common in pregnant women and children less than five years of age (Goshu & Yitayew, 2019). “According to the Centre for Disease Control (CDC), pregnant women lose some of their immunity and are vulnerable to malaria infection because of the changes in their immune systems during pregnancy and the presence of the placenta as a new place for parasites to bind” (WHO, 2017).

The prevalence of exposure to malaria infection in pregnancy in 2018 was highest in the West African sub-region and Central Africa (each with 35%), followed by East and Southern Africa (20%). About 39% of these were in the Democratic Republic of the Congo and Nigeria. In 2018 alone, about 11 million pregnancies in moderate and high transmission sub-Saharan African countries would have been exposed to malaria infection. The 11 million pregnant women exposed to malaria infections in 2018 delivered about 872 000 children with low birthweight (16% of all children with low birthweight in these countries), with West Africa having the highest prevalence of low birthweight children due to malaria in pregnancy (WHO, 2019). Plasmodium infection during pregnancy causes placental malfunction reducing foetus sustainability and leading to abortions, stillbirths, low birth weight or premature delivery (De Moraes, Barateiro, Sousa & Penha-Gonçalves, 2018). According to Bohulu (2016), the sequestration of malaria parasites in the placenta can also lead to impeded trans-placental

nutrient transport which may result in maternal anaemia and low birth weight, both of which are risk factors for neonatal mortality. In sub-Saharan Africa (the most malaria burdened continent), as many as 10,000 malaria related deaths in pregnancy occur every year. In addition, between 75,000 and 200,000 children under the age of 12 months are estimated to die annually from malarial infection (WHO, 2016).

The prevalence of malaria in pregnancy is still high in Ghana. The 2015 NMCP report states an increase of 39.8% of malaria in pregnancy cases in 2015 over the figure in 2014. The Western region topped as the region with the highest number of malaria in pregnancy cases in 2015 with 58,644 cases. It was followed closely by the Central Region (42,902 cases) and Ashanti region (41,252 cases). The region with the least number of malaria in pregnancy cases is the Upper West Region (12,895 cases) (NMCP, 2016). Malaria accounts for 3.4% of deaths and 16.8% of all hospital admissions in pregnant women in Ghana (Owusu-Boateng & Anto, 2017)

Health education intervention has proven to be an effective strategy for disease prevention, especially for chronic and communicable diseases” (Li, Han, Guo, & Sun, 2016). According to Owusu-Addo & Owusu-Addo (2014), health education has been considered an important approach in the implementation of community-based malaria prevention and control interventions in Sub-Saharan Africa. A number of these malaria interventions have utilised participatory techniques in educating communities in malaria interventions. Malaria education provided in Ghana in the form of prevention and treatments are mostly conveyed through television, radio, newspaper and magazines, posters, leaflets and brochures, and health workers and community volunteers (Afoakwah et al., 2018).

In order to reduce the potential for malaria related maternal deaths in malaria endemic areas, it is necessary to increase malaria education among pregnant women. More important is the need

to determine what kind of malaria education pregnant women receive particularly in the first and second trimesters of their pregnancy.

1.2 Problem Statement

Pregnant women and their unborn babies continue to face a disproportionately high burden of malaria despite the effective launching of the Roll Back Malaria program in 2001 in most African countries. According to Fried & Duffy (2017), malaria susceptibility increases during pregnancy, making these women an important parasite reservoir in the community. This situation makes pregnant women at increased risk of the adverse events of malaria such as anaemia, risk of miscarriage, stillbirth, preterm delivery, foetal growth restriction and even death. In addition, Georgian, Matthew & Nte (2017) state that pregnant women are more susceptible to malaria infection, with more episodes of clinical malaria, increased prevalence and parasite density. “Anaemia during pregnancy is a global problem, and in malaria endemic areas it is usually most severe in the second trimester of gestation, following a period of acute malaria infection in the first trimester” (Fana et al., 2015).

The prevalence of malaria in pregnancy is still high in Ghana. The 2015 NMCP report states an increase of 39.8% of malaria in pregnancy cases in 2015 over the figure in 2014. The Western region topped as the region with the highest number of malaria in pregnancy cases in 2015 with 58,644 cases. It was followed closely by the Central Region (42,902 cases) and Ashanti region (41,252 cases). The region with the least number of malaria in pregnancy cases is the Upper West Region (12,895 cases) (NMCP, 2016). Malaria accounts for 3.4% of deaths and 16.8% of all hospital admissions in pregnant women in Ghana (Owusu-Boateng & Anto, 2017)

TNMA which is found in the Western Region is considered a malaria endemic area attributable to the huge deposits of gold, manganese, iron-ore and bauxite, and its associated small, medium

and large-scale mining activities. Illegal mining popularly known as “galamsey” is also on the increase in the municipality. The mining activities in the area promote environmental modifications that favour malaria vector development. The mining activities create open pits, divert watercourses, and subsequently result in bodies of stagnant water that have been instrumental in furthering the spread of malarial vectors, notably anopheles’ mosquito egg development.

Antenatal clinics are considered an important entry point to target pregnant women in preventing malaria. As part of the reproductive healthcare, ANC presents a unique and lifesaving opportunity for health promotion, disease prevention, early diagnosis, and treatment of illnesses in pregnancy using evidence-based practices (Okedo-Alex et al, 2019). The antenatal period presents opportunities for reaching pregnant women with interventions needed to maximize maternal and neo-natal health. According to Deo et al (2015), more than 69% (two-thirds) of pregnant women attended at least 4 ANC visits before delivery.

As millions of pregnancies occur every year in malaria endemic countries such as Ghana, the scope and severity of the potential adverse health outcomes make prevention of malaria in pregnant women an important priority (Bohulu, 2016). The ANCs therefore provide the right opportunity for nurses and midwives to educate their pregnant women on ways of preventing malaria.

1.3 Conceptual Framework

Conceptual framework as explained by Miles, Huberman & Saldana (2014), is an explanation either in graphical or narrative form, of the main things to be studied - the key factors, variables or constructs and the presumed relationships among them.

The conceptual framework below outlines the association between effective malaria education provided by nurses and midwives at the antenatal clinics and multi-dimensional variables such

as malaria knowledge and sources of malaria education, malaria education provided at the antenatal clinics and factors that hinder effective malaria education. This framework is developed from the conceptual framework of (Matsumoto-Takahashi et al., 2015) in the study titled “Patient knowledge on malaria symptoms is a key to promoting universal access of patients to effective malaria treatment in Palawan, the Philippines”. In that study, the researchers hypothesized that an association exists between “appropriate treatment” and the multi-directional variables such as “socio-demographic status,” “proximity to health facility,” knowledge on malaria,” and “participation in community awareness-raising activities for malaria prevention.”

In this research, the researcher hypothesizes that there is an association between “effective malaria education” and factors such as malaria knowledge and sources of malaria education, malaria education provided at the antenatal clinics and factors that hinder effective malaria education. All the variables mentioned above have a direct impact on the effectiveness or otherwise of the education provided at the antenatal clinic. For example, the content of the malaria education provided by the midwife may either increase or decrease the effectiveness of the education. In a similar manner, the malaria education provided at the antenatal clinics cannot be said to be effective if the factors that hinder effective malaria education are not solved.



Figure 2 – Conceptual Framework – Researcher’s own construct. *The researcher hypothesizes that there is an association between “effective malaria education” and factors such as malaria knowledge and sources of malaria education, malaria education provided at the antenatal clinics and factors that hinder effective malaria education.*

The researcher believes that an association exist between effective malaria education and the variables under study (Malaria knowledge and sources of education, Malaria education provided by nurses and midwives at the antenatal clinics and the factors that hinder effective malaria education). These variables have an impact on the effectiveness of malaria education. Some of the sub-variables under each of the three (3) variables have been presented in the circles of the conceptual framework.

1.4 Significance

Although some studies have been done in the area of health education in community-based malaria interventions in Africa, there is a paucity of research on malaria education provided by midwives and nurses to pregnant women attending antenatal clinics. In order to fill this gap, this study was conducted to determine the malaria education provided by midwives and nurses to pregnant women at antenatal clinics in Ghana. It also assessed the knowledge of malaria among pregnant women and determined the factors affecting the effectiveness of the education provided.

Findings from this research would help improve the prevention of malaria in pregnant women and consequently reduce maternal and neonatal morbidities and mortalities leading to the achievement of the Sustainable Development Goals (SDG) goal 3.1 – *By 2030 reduce the global maternal mortality ratio to less than 70 per 100,000 live births.*

1.5 Research Questions

1. What is the knowledge pregnant women attending antenatal clinics have of malaria?
2. What kind of education is provided by midwives and nurses to the pregnant women attending the antenatal clinics?
3. What are the factors affecting effective malaria education in antenatal clinics?

1.6 Aim

To determine the malaria education provided by midwives and nurses to pregnant women attending ANC's within the Tarkwa Nsuaem Municipal Assembly of the Western Region of Ghana.

1.6.1 Specific Aims

1. To assess the knowledge of and sources of malaria education available to pregnant women attending ANCs within TNMA.
2. Determine the kind of education provided to the pregnant women by nurses and midwives at ANCs within TNMA.
3. Determine the factors that hinder effective malaria education provided to pregnant women attending ANCs within TNMA.

1.7 Contribution of the study

1.7.1 Nursing Practice

Health education remains a major tool in the prevention of diseases. Findings from this research will reinforce the need by nurses to actively engage in health education, especially on malaria among pregnant women who visit the antenatal clinics. This research will also bring to bear the various challenges that hinder health education so that solutions can be sought for them. Ultimately the nursing practice in the area of health promotion will be enhanced and many lives will be saved.

1.7.2 Nursing Education

This research will provide literature that will guide the education of students and midwives in the area of health education. It will also make a case for the incorporation of health education theories and models in the curriculum of nursing and midwifery schools.

1.7.3 Research

This research will add to the body of knowledge available for research purposes and serve as a reference document for future research.

1.8 Outline

- Chapter One: Introduction and background.
- Chapter Two: Literature review.
- Chapter Three: Research methodology.
- Chapter Four: Presentation of findings.
- Chapter Five: Discussion of results.
- Chapter Six: Conclusion, limitations, and recommendations.

1.9 Conclusion

This chapter introduces the reader to the background of the study, problem statement, significance, the aims, and research questions of this study. The next chapter will focus on relevant literature that was reviewed in order to gain more insight, understanding and support to the study.

CHAPTER TWO

LITERATURE REVIEW

1.1 Introduction

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes. Around half of the world's population is at risk of malaria but most malaria cases and deaths occur in SSA (Goshu & Yitayew, 2019). *Plasmodium falciparum* is the most prevalent malaria parasite in the WHO African Region, accounting for 99.7% of estimated malaria cases in 2018, as well as in the WHO South-East Asia Region (50%), the WHO Eastern Mediterranean Region (71%) and the WHO Western Pacific Region (65%). Globally, 53% of the *Plasmodium vivax* burden is in the WHO South-East Asia Region, with the majority being in India (47%). *P. vivax* is the predominant parasite in the WHO Region of the Americas, representing 75% of malaria cases (WHO, 2019)

According to the WHO 2019 World Malaria Report, an estimated 228 million malaria cases occurred in 2018 worldwide (95% confidence interval [CI]: 206–258 million), compared with 251 million cases in 2010 (95% CI: 231–278 million) and 231 million cases in 2017 (95% CI: 211–259 million). Most malaria cases in 2018 were in the WHO African Region (213 million or 93%), followed by the WHO South-East Asia Region with 3.4% of the cases and the WHO Eastern Mediterranean Region with 2.1%. Nineteen (19) countries in SSA and India carried almost 85% of the global malaria burden. Six (6) countries within the WHO African Region accounted for more than half of all malaria cases worldwide. They are Nigeria (25%), the Democratic Republic of the Congo (12%), Uganda (5%), Côte d'Ivoire (4%), Mozambique (4%) and Niger (4%) (WHO, 2019).

The 2019 world malaria report by the WHO continues to state that, the incidence rate of malaria declined globally between 2010 and 2018, from 71 to 57 cases per 1000 population at risk.

However, from 2014 to 2018, the rate of change slowed dramatically, reducing to 57 in 2014 and remaining at similar levels through to 2018. The incidence rate of malaria cases in WHO African Region, declined from 294 in 2010 to 229 in 2018, representing a 22% reduction. Between 2015 and 2018, only 31 countries, where malaria is still endemic, reduced case incidence significantly and were on track to reduce incidence by 40% or more by 2020 (WHO, 2019).

In 2018, there were an estimated 405,000 malaria deaths globally, compared with 416,000 estimated deaths in 2017, and 585,000 in 2010. Children aged under 5 years are the most vulnerable group affected by malaria. In 2018, they accounted for 67% (272,000) of all malaria deaths worldwide. The WHO African Region accounted for 94% of all malaria deaths in 2018. Although this region was home to the highest number of malaria deaths in 2018, it also accounted for 85% of the 180,000 fewer global malaria deaths reported in 2018 compared with 2010. Nearly 85% of global malaria deaths in 2018 were concentrated in 20 countries in the WHO African Region and India; Nigeria accounted for almost 24% of all global malaria deaths, followed by the Democratic Republic of the Congo (11%), the United Republic of Tanzania (5%), Angola (4%), Mozambique (4%) and Niger (4%). In 2018, only the WHO African Region and the WHO South-East Asia Region showed reductions in malaria deaths compared with 2010. The WHO African Region had the largest absolute reduction in malaria deaths, from 533,000 in 2010 to 380,000 in 2018. Despite these gains, the malaria mortality reduction rate has also slowed since 2016 (WHO, 2019).

Ghana is among the 18 African countries and India that cumulatively recorded almost 85% of all malaria cases worldwide in 2018. In November 2018, Ghana was also ranked as one of the 11 countries described by the WHO and Roll Back Malaria partnership as high burden to high impact (HBHI) country. This was because Ghana and the other 10 African countries (Burkina Faso, Cameroon, the Democratic Republic of the Congo, India, Mali, Mozambique, Niger,

Nigeria, Uganda and Tanzania) accounted for 70% of the global estimated case burden and 71% of global estimated deaths in 2017. In the same year Ghana notably recorded 8% increase (0.5million more cases) in the number of cases compared to 2017 (WHO, 2019).

Although malaria is a preventable and treatable disease, it continues to remain the leading cause of outpatient department (OPD) attendance in Ghana. It is still the most commonly reported disease, accounting for over 55% of all OPD attendance, 13.7% of admissions among pregnant women, and 3.4% of maternal deaths (Addai-Mensah et al, 2018). Malaria in Ghana accounts for 4% of the global burden and 7% of the malaria burden in West Africa (WHO, 2018). The 2016 National Malaria Control Program (NMCP) report says that Ghana recorded 10.4 million suspected malaria cases at Outpatient Departments (OPD) in 2015. This represents a 2.5% increase of cases reported during the same period in 2014. On average, nearly 28,606 suspected malaria cases were recorded daily in Ghana's health facilities (NMCP, 2016). According to a study conducted by Tukei, Beke & Lamadrid-Figueroa in 2017, about 736,034 (26.5%) malaria cases were diagnosed from 2,779,246 out-patient department attendance in ten health facilities in Uganda during the study period.

Malaria in pregnancy is a major public health problem in both tropic and sub-tropical regions of the world. Every year, millions of women become pregnant in these malaria endemic regions of Africa (Kiptoo, 2016). Approximately 25 million African women become pregnant in malaria endemic areas every year. Pregnant women in malaria endemic areas are more susceptible to malaria than the general population. They are more likely to become infected, have recurrences, develop severe complications and to die from the disease than any other group of people. Pregnant women are more susceptible to malaria infection, with more episodes of clinical malaria, increased prevalence and parasite density (Georgian, Matthew & Nte, 2017).

According to WHO (2019), “about 11 million pregnancies in moderate and high transmission SSA countries would have been exposed to malaria infection in 2018. In the same year, the prevalence of exposure to malaria infection in pregnancy was highest in the West African sub-region and Central Africa (each with 35%), followed by East and Southern Africa (20%). The 11 million pregnant women exposed to malaria infections in 2018 delivered about 872,000 children with low birthweight (16% of all children with low birthweight in these countries) with West Africa having the highest prevalence of low birthweight children due to malaria in pregnancy”. In pregnancy, malaria increases the risk of maternal anaemia, spontaneous abortions, stillbirths, premature deliveries, intra-uterine growth retardation and low birth weight babies, and these are all important causes of infant mortality (WHO, 2017).

According to Aguzie (2018), about 25 million pregnancies are at risk of malaria infection every year in SSA. As these millions of pregnancies occur each year, all efforts must be brought to bear towards the prevention of malaria in pregnant women. This is necessary because, malaria during pregnancy significantly increased the overall risk of malaria in young children via indeterminate mechanisms (Park et al, 2020)

The scope of malaria control is changing worldwide with more emphasis on community and individual participation. Health education as one aspect of primary health care (PHC) is an integral part of prenatal care services, where the intention is to provide positive perinatal outcomes for the women and their babies. It is a magnificent instrument that assists to enhancing health in developing countries (Woldeyohannes & Modiba 2020).

According to Owusu-Addo and Owusu-Addo (2014), health education has been considered an important approach in the implementation of community-based malaria prevention and control interventions in SSA. This health education on malaria prevention and control interventions traditionally have been championed through radio education, Television, and newspaper

advertisements, talk shows and documentary series. Live concerts and musical shows have also been used in communities to educate people about malaria prevention and control (Thay, 2020). Health education can improve participation in malaria control, when such education is designed to address gaps in the knowledge, attitudes, and practice of individuals in the communities (Farid, 2016).

Low use of prenatal and maternal health services has been recognized as one of the major factors contributing to the high rate of adverse birth outcomes in the world. Antenatal clinics are therefore considered an important entry point to target pregnant women in the prevention of malaria. As part of reproductive healthcare, ANC presents a unique and lifesaving opportunity for health promotion, disease prevention, early diagnosis, and treatment of illnesses in pregnancy using evidence-based practices (Okedo-Alex et al, 2019). The antenatal period presents opportunities for reaching pregnant women with interventions needed to maximize maternal and neo-natal health. According to Deo et al (2015), more than 69% (two-thirds) of pregnant women attended at least 4ANC visits before delivery.

A study in Kenya indicated that 52.5% of women in rural areas and 49.2% in urban settings attended ANC once prior to delivery and the first ANC visit was after 28 weeks of pregnancy. In Ghana eighty-five percent (85%) of pregnant women attended at least one antenatal visit with a skilled provider before delivery. Seventy-three percent (73%) of pregnant women in urban areas and fifty-five percent (55%) in rural areas were more likely to attend 4 or more antenatal visits. Though it has been reported that up to 40% of pregnant women in developing countries receive no ANC, a study in Ghana reported that 14% of women did not attend ANC at all (Atieno, Damaris & George 2019). This means many pregnant women can be reached if malaria education is given at ANCs.

2.2 Pregnant women's knowledge of malaria

Studies done in SSA including Ethiopia showed that women's knowledge regarding malaria remains low. However, research done in Nigeria, Burkina Faso and Sudan revealed 64.9%, 56.1% and 55.9% of participants respectively had good knowledge on malaria. Similarly, cross-sectional studies done in Ethiopia especially in Shahsango, Bonke, and Tepi to assess knowledge on malaria among pregnant women showed that 74.1%, 16.5% and 17.7% of the respondents had good knowledge respectively (Goshu, & Yitayew, 2019).

A study was conducted in Nigeria on 200 participants using a descriptive design and a systematic sampling method with the objective of assessing women's knowledge of the risks associated with malaria during pregnancy. At the end of the study, 83.9% of the participants had knowledge of the risks of malaria during pregnancy. In a related study, 71.5% out of 403 women who participated in the study had knowledge of malaria. They stated educational status as a factor that mediated participants' knowledge. There was a significant association between knowledge of the risks of malaria during pregnancy and participant's educational status (Bohulu, 2016).

In another study conducted by Chukwurah et al., (2016) to assess the knowledge, attitude, and practice of malaria prevention and sulfadoxine-pyrimethamine (SP) utilization among pregnant women in Badagry, Lagos State, Nigeria, seventy-nine percent (79%) of the women perceived malaria as a serious illness. When it came to SP, majority of the women seventy-nine percent (79%) had knowledge of it. However only 15.2% could say that is it used for malaria prevention. Majority of them said it is used for malaria treatment.

In 2009, Paulander and his colleagues interviewed 1652 mothers in Tigray, a predominantly rural community in Ethiopia. It was revealed that 92.7% were able to mention at least one malaria symptom while 65.3% could mention three or more symptoms. Majority (74.7%) of

the women believed malaria is a preventable disease, out of which 82.3% were aware of environmental management, 46.2% Insecticide treated nets (ITNs), 15.6% Indoor residual spraying (IRS) and 15.6% chemoprophylaxis. About 65.9% believed malaria could lead to death while almost all women (92.7%) believed malaria could be cured. Despite the low educational level in this community (90.6% had just a single year of schooling), there was a relatively good knowledge about malaria in this rural community, but their source of knowledge was not revealed (Ojeikere, 2016).

There are several studies done that suggest that knowledge of malaria among pregnant women is low. An example is a study done by Oladimeji, Tsoka-Gwegweni, Ojewole and Yunga and published in 2019 with the title Knowledge of malaria prevention among pregnant women and non-pregnant mothers of children aged under 5 years in Ibadan, Southwest Nigeria. In this study almost half proportion of both the pregnant and the non-pregnant mothers of children aged under 5 years did not have knowledge on the breeding sites of mosquitoes (47.1% vs 49.7%, respectively). Majority of these participants had low knowledge of malaria symptoms and was only able to identify a maximum of 2 or less symptoms of malaria (74% among pregnant mothers and 69% among non-pregnant mothers of children aged under 5 years (Oladimeji et al, 2019).

Evidence from malaria knowledge, attitudes, and practices (KAP) studies reported that misconceptions on malaria transmission and risk factors still exist with adverse impact on malaria control programmes (Amusan, Umar & Vantsawa 2017). A study by Adebayo et al. (2015) assessed the knowledge of malaria prevention among mothers of children under age 5 and pregnant women living in a rural community in Southwest Nigeria. This study found out that there is a poor knowledge and utilization of malaria prevention measures among majority of the care givers in the rural study area.

A study was conducted in Kuje area council of Abuja, where the knowledge of malaria among mothers of children under-five years was assessed in comparison with a similar area council selected as control. The mothers in Kuje were given health information on malaria, its mode of transmission, prevention, and complications with the collection of data prior to health education and after twenty (20) weeks. Mothers in the control did not receive health information. At the end of the study, it was revealed that the mothers in both groups had poor knowledge of malaria and its prevention methods. Though there was a remarkable improvement in the knowledge level of the mothers in Kuje area council after the intervention, it was still low. There was, however, no information revealing whether it was exactly the same mothers who were interviewed pre-and-post-intervention (Orimadegun & Ilesanmi 2015).

2.3 Malaria education provided to pregnant women

When it comes to malaria education, different interventions have been used in educating pregnant women about malaria. Live concerts and musical shows have also been used in communities to educate people about malaria prevention and control. (Owusu-Addo & Owusu Addo, 2014). More recently, several malaria interventions in SSA have utilized participatory techniques in educating communities in malaria interventions (Cox et al. 2018).

There seems to be a complex relationship between health education and the use of malaria interventions. The use of health education in promoting Insecticide Treated Nets (ITN) led to an increase in ITN usage among pregnant women in Nigeria. Research further shows that malaria interventions such as home management of malaria (HMM), ITNs and intermittent preventive therapy (IPTs) which use health education often engage community members who later became innovators in disseminating information about the intervention in the community, thereby increasing uptake of these interventions (Owusu-Addo, Owusu Addo & Morhe, 2016).

Malaria education and knowledge assessment on malaria have usually centered on 1) what is the causes of malaria? 2) what are the sign and symptoms of malaria? 3) What is the mode of transmission of malaria? 4) what is the complication of malaria on pregnancy? and 5) what are the prevention mechanism of malaria? (Goshu & Yitayew, 2019). According to Oladimeji et al, (2019), the knowledge related variables which have been the basis for malaria education are (1) awareness of malaria (2) knowledge of cause of malaria (3) knowledge of breeding sites for mosquito (4) knowledge of three or more symptoms of malaria (5) knowledge of when malaria mosquito feeds (correct knowledge when at night), and (6) knowledge of malaria prevention knowledge (which include chemoprophylaxis, insecticide treated nets (ITN) and environmental sanitation).

A study was conducted by Amoran in 2013 to assess the impact of health education intervention on malaria prevention practices among nursing mothers in rural communities in Nigeria. Using a quasi-experimental study, a total of 400 respondents were recruited into the study with 200 respondents each in both the experimental and control groups and were followed up for a period of 3 months. Each batch was trained for one (1) day and the training consisted of three (3) modular units namely, knowledge about malaria transmission, its prevention and treatment, attitude on malaria prevention strategies, practice of malaria prevention and treatment practices (Ajumobi et al (2017).

2.4 Barriers to effective malaria education

Different articles revealed that knowledge of pregnant women on malaria is influenced by socio-demographic characteristics like education status, occupation, residence, ownership of television or radio, religion, ethnicity, age, and family monthly income (Goshu & Yitayew, 2019).

According to Hempler et al. (2018). Information overload is a recurrent barrier to effective education. The quantity and detailed nature of the information provided by educators often causes an imbalance between expected behavioural changes and the individual skills and resources of participants. Educators often provided similar information based on a predefined goal that does not consider participants' individual goals. The one-way communication approach and highly structured agenda does not allow time for reflection or understanding of participants' current motivation for health behaviour change. Unfortunately, educators continually overlooked cues from participants.

According to a study cited by Wongkietkachorn et al (2018), the most important barriers of patient education regarding nurses working situation were low knowledge of nurses about importance of education, feeling of ineffectiveness of it in quality of treatment and lack of interest of nurses to participate in patients' education. Other barriers include salary insufficiency, lack of educational resources and shift rotation, lack of interest in patients for learning, insufficiency of hospitalization time, patient inconvenience and feeling of lack of importance of learning in hospital. Too much or too little information during patient education can increase patient anxiety,

Karimi, Emami, and Mirhaghi (2016) categorized the main barriers to effective malaria education into Nurse-related factors, Administration-related factors and Patient-related factors. Barriers such as shortage of nurses, excessive workload, inadequate time, lack of knowledge among nurses, lack of awareness about educational methods/teaching/learning principles and nurses' lack of communication skills were categorized under Nurse-related factors. The Administration-related factors were inappropriate organizational culture, inappropriate place and facilities for patient education, inadequate support from the managers, lack of specialized nurse for patient education, no division of labour, lack of financial incentives for nurses, poor cultural adaptation for educator and patients in terms of sex, lack of coordination by other

members of the healthcare professionals with nurses and lack of evaluating patient education activities. Finally, Patient-related factors included low compliance and readiness to receive education, patient's low literacy or illiteracy, lack of awareness of patients about the educational responsibility of nurses, knowledge deficit of patient about their rights, lack of patients' interest to change their behaviour, inconsistencies in the culture, social and mental status of patients and their families, and unwillingness to adhering to advice.

A number of researchers including Bohulu (2016) have conducted studies in the areas of assessing the knowledge, attitude and perceptions of pregnant women on malaria. This current research investigates the type of malaria education the nurses and midwives provide to pregnant women who attend antenatal clinics as well as the barriers to effective education.

2.5 Conclusion

This literature review shows that several studies have been done on malaria education and knowledge among pregnant women. This study however looks at the kind of education that is provided to the pregnant women at antenatal clinics and the factors that hinder its effectiveness. The next chapter discusses the methodology for this research.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is a systematic way to solve a problem. Essentially, it is the procedures or path through which researchers formulate their problem and objective and present their result from the data obtained during the study period (Kassu, 2019). This chapter fundamentally deals with the research design, setting, study population, sample size, sampling technique, tool for data collection, procedure for data collection and the method of data analysis. Pre-testing, validity and reliability issues as well as ethical considerations and limitations of the study have been discussed in this chapter.

3.2 Study Design

A cross-sectional non-experimental descriptive research design was used for this study. This research is non-experimental because the researcher does not manipulate the variables under study. The researcher only relies on the observation and interpretation of the variables under study to come to a conclusion.

A descriptive research design is a scientific research method which seeks to describe the current status of an identified variable or phenomenon without influencing it in any way (Rhodes, 2015). This research is descriptive because the researcher only describes the health education provided by midwives and nurses to pregnant women attending antenatal clinics in TNMA without influencing the outcome.

Quantitative research can be explained as the method of explaining a phenomenon by collecting numerical data that is analysed using mathematically based methods. It employs the use of numbers and accuracy (Rutberg & Bouikidis, 2018). This study is quantitative in nature and

findings are expressed in statistical form, analysed, and interpreted using simple statistical procedures like statistical package for social sciences (SPSS16.0).

3.3 Research Paradigm

Underpinning every research methodology, by necessity, is a philosophical stance (Paradigm). A research paradigm is a way of describing a world view that is informed by philosophical assumptions about the nature of social reality (Ontology), ways of knowing (Epistemology) and ethics and value systems (Axiology). Research paradigms guide scientific discoveries through their assumptions and principles. Understanding paradigm-specific assumptions helps illuminate the quality of findings that support scientific studies and identify gaps in generating sound evidence (Park, Konge, & Artino, 2020)

The philosophical underpinning of this study is positivism. Positivism adheres to the view that only 'factual' knowledge gained through observation is trustworthy and for that matter depends only on quantifiable observations which lead to statistical analysis. The world exists according to Positivist as an objective entity, outside of the mind of the observer, and in principle it is knowable in its entirety. The task of the researcher is to describe and analyse this reality. Positivist approaches share the assumption that, in natural as in social sciences, the researcher can be separated from the object of his/her research and therefore observe it in a neutral way and without affecting the observed object (Khaldi, 2017). Research findings in these types of studies are usually observable and quantifiable. The role of the researcher is limited to data collection and interpretation in an objective way. Moreover, in positivism the researcher is independent from the study and there are no provisions for human interest within the study.

The positivist understanding of the philosophical assumptions about ontology (what do we believe about the nature of reality?), epistemology (how do we know what we know?), and axiology (what do we believe is true?) are as follows.

Ontology: Positivism holds the ontological view that the world is an objective reality comprising of discrete, observable elements and events that interact in observable, determined and regular manner (Choge 2016). This reality which is single and tangible is relatively constant across time and setting and it is one of the researcher's duties to discover this reality. The researcher can therefore discover this reality within a certain realm of probability.

Epistemology: Epistemology in positivism, is inherent in the natural science paradigm and views knowledge as those statements of belief or fact that can be tested empirically, can be confirmed and verified or disconfirmed, and are stable and can be generalized (Günbayi, & Sorm 2018). This knowledge is objective and it is independent of the values, interest and feelings of the researcher. To achieve this objectivity, positivists believe that researchers only need the right data gathering instrument or tools to produce an absolute truth for a given inquiry.

Axiology: On the axiological view of positivism, all inquiries concerning the research should be value-free and the researcher should use scientific methods of gathering data to achieve objectivity and neutrality during the inquiry process (Günbayi, & Sorm 2018). The researcher in this case is detached, neutral and independent of the research and holds an objective stance as far as this research is concerned and concentrates only on the facts of the study. The researcher ensures independence by maintaining a minimal interaction with the research participants when conducting the research.

3.4 Study Site

Research Setting or study site refers to the physical, social, and cultural site in which the researcher conducts the study (Bhattacharya, 2017). This study was conducted within the Tarkwa Nsuaem Municipal Assembly – one (1) of the 22 district assemblies in the Western Region of Ghana. It shares boundaries with Prestea Huni-Valley to the north, Ahanta West to the south, Nzema East to the West and Wassa Mpohor to the East.

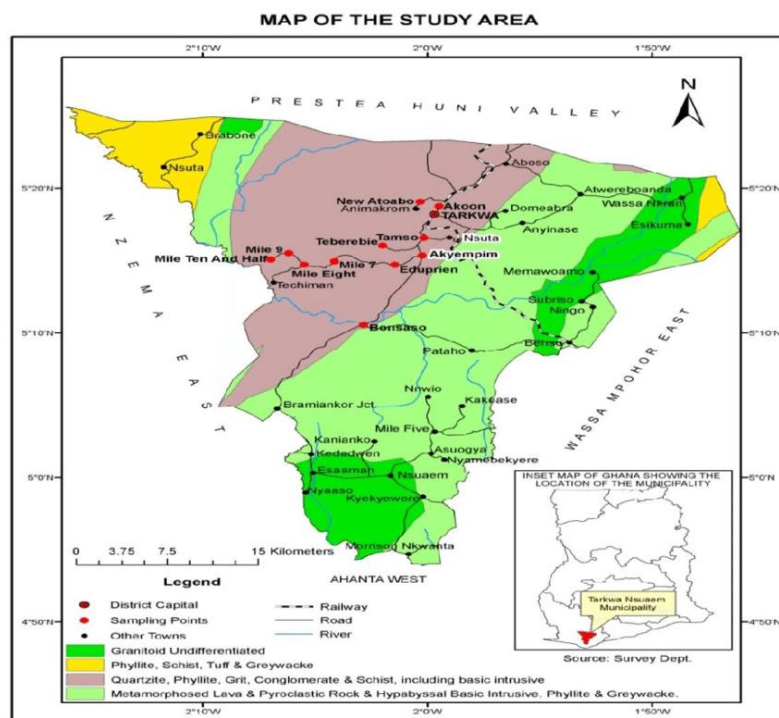


Figure 3: Map of Tarkwa Nsuaem Municipal Assembly (TNMA)

Tarkwa is the capital town of Tarkwa Nsuaem Municipal Assembly. At the last national census in 2010, the municipality had a total population of 114,895 out of which 51.6% are males and 48.4% are females. The major economic activities in the district are mining, agriculture, forestry, livestock and tourism. There are 28 public and private health facilities within the municipality taking care of the health needs of the people. The municipality has a General Fertility Rate (GFR) of 99.7 which means that 12 months prior to the census, there

were 99 live births per 1000 women age 15-49 (Ghana Statistical Service, 2014). The municipality is considered as a malaria endemic area because of the mining activities.

3.5 Study Participants/Population

With respect to research design and statistical analysis, a population refers to the entire group of people the researchers want to investigate (Ooko et al, 2018). The participants for this study were pregnant women attending antenatal clinics in health facilities within the Tarkwa Nsuaem Municipal Assembly.

3.5.1 Inclusion Criteria

The following inclusion criteria were applied:

- Pregnant women who have attended an antenatal clinic more than once
- Pregnant women who live within the municipality
- Pregnant women between the ages of 15 and 45.

3.5.2 Exclusion Criteria

Based on the initial assessment of the pregnant women's records at the antenatal clinic and confirmation by the nurses and midwives, the following exclusion criteria were applied:

- Pregnant women who are deaf
- Pregnant women who are health workers (Nurses, doctors etc.)
- Pregnant women whose husbands are health workers

The reasons below explain why the categories of pregnant women above were excluded from the study.

- Pregnant women who are deaf were excluded because most if not all antenatal clinics in Ghana do not have people to interpret the education for the deaf. These pregnant women are mostly left behind in the education.

- Pregnant women who are health workers (eg. Nurses and doctors) were excluded from the study because the researcher believes that their knowledge on malaria will not be from the antenatal clinic but from their field of training such as medicine or nursing. Adding them will distort the findings of the study.
- Finally, pregnant women whose partners are health workers were excluded because the researcher believes that their knowledge of malaria will be from their partners.

3.5.3 Variables

A variable is defined as a factor or characteristic of interest that a researcher wishes to investigate in an attempt to explore the existing relationships between them (Rwegoshora, 2016).

The variables that were studied in this research can be found in the table below.

Table 1: Table showing the Variables of this study

Variable	Measurement scale
Knowledge of malaria	Ordinal
Malaria education	Ordinal
Factors affecting effective malaria education	Nominal

3.6 Recruiting

3.6.1 Sample Size Determination

A total of 356 participants were recruited for the study. The sample size was arrived at using

$$n = (z^2pq) / (d^2)$$

Where n = Representative sample size

z = Z statistic for a level of confidence (constant figure of 1.96)

p = Expected prevalence or proportion based on previous studies

d = Absolute error or precision

q = $1 - \text{expected prevalence or proportion based on previous studies}$

Then;

$$z = 1.96$$

$$p = 47\% \text{ (According to Bohulu, 2016)}$$

$$q = 1 - 0.47 = 0.53$$

$$d = \text{margin of error (0.05)}$$

$$n = (1.96^2 * 0.47 * 0.53) / (0.05^2) = 323$$

Considering a 10% non-response rate (32.3), the final sample size was 356.

3.6.2 Sampling

Sampling is a technique (procedure or device) employed by researchers to systematically select a relatively smaller number of representative items or individuals (a subset) from a pre-defined population to serve as subjects (data source) for observation or experimentation as per objectives of his or her study (Sharma, 2017).

A stratified random sampling method was used for this study. With this method, the entire Tarkwa Nsuaem Municipal Assembly was divided into two (2) Strata/zones (North and South). Two (2) health facilities reporting the highest antenatal clinic attendance from each zone was purposively sampled for the study. The selection of the facilities with the highest antenatal attendance was done using the ANC register and data from the Municipal Health Directorate.

Using a simple random sampling method, pregnant women attending antenatal clinics more than once in these selected health facilities were enrolled to participate in the study until the required sample size was obtained. The number of antenatal attendances by the pregnant women were determined using the ANC book given to the pregnant women and the register at the ANC clinics. The total number of participants from each zone was proportional to the total number of antenatal attendances in that zone.

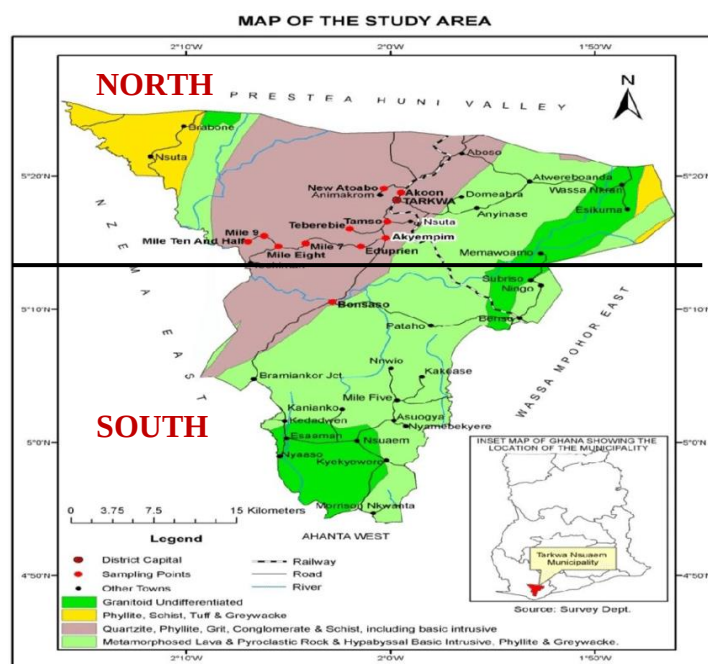


Figure 4: Map of TNMA showing the 2 zones

3.7 Data collection

The data for this study were collected using a structured questionnaire which was developed by the researcher. Questionnaires as a data collection tool have become very popular in scientific research and have become known to be the most frequently used data collection instrument in health and social science research (Bolarinwa, 2015). The use of questionnaires for data collection is often considered a method for quantitative research (Chu & Ke, 2017). The questionnaire was designed by the researcher. The questions in the questionnaires were

influenced by the conceptual framework of this research. Questions were asked to address the various variables in the framework. The data collection was done between 10th August 2020 and 21st August 2020 with the help of three (3) data collection assistants. These data collection assistants are students from the University of Mines and Technology (UMaT) located within the TNMA on the recommendation of a friend who is an alumnus of the University. They were oriented and trained to hand over the questionnaires to the pregnant women and assist them to answer the questions. They were also trained to answer any questions the respondents may ask when answering the questionnaires. At the end of the data collection, one of them brought the answered questionnaires to me in Accra (where I live). The data collection assistants visited the four (4) antenatal clinics selected for this study and administered the questionnaires.

The questionnaire covered the following sections:

- Socio-demographic
- Knowledge on malaria and sources of information
- Malaria education provided by midwives and nurses
- Factors affecting the effectiveness of the education.

3.8 Data analysis

According to LeCompte & Schensul (2015), research data analysis is a process used by researchers for reducing data to a story and interpreting it to derive insights. The data analysis process helps in reducing a large chunk of data into smaller fragments.

Data gathered from the questionnaire were analysed using the Statistical Package for Social Sciences (SPSS) 16.0 version. First of all, the questionnaires were given unique numbers and all the 29 questions were also given different codes. After that, the information about all the various questions were entered into the variable tab and the responses into the data view tab of

the SPSS software. When all the responses from the questionnaires were entered into the software, the analysis was done using the descriptive statistics command under the analyse tab of the software. The results from the findings were organised into frequency distribution tables and expressed with the aid of descriptive statistics such as frequency tables and means (with their corresponding standard deviations and graphical representation such as bar graph and pie chart. Knowledge levels and malaria education provided were categorised into 2 levels-low and high and expressed as frequencies and proportions and represented as graphs. Chi square tests were done to test the association between knowledge on malaria and the socio-demographic data of the participants. Factors affecting effectiveness of education were categorised into strongly disagree, disagree, agree and strongly agree. These were organised as proportions and frequencies and represented as graphs.

3.9 Reliability and Validity

Reliability and validity are the two most important and fundamental features in the evaluation of any measurement instrument or tool for good research (Mohajan, 2017). Reliability concerns the extent to which a measurement of a phenomenon provides stable and consistent results. In other words, reliability is concerned with repeatability of the study. Validity on the other hand explains how well the collected data covers the actual area of investigation. It basically means “measure what is intended to be measured” (Taherdoost, 2016).

To ensure validity, content validity and face validity were done on the questionnaire. To determine the content validity of the questionnaire, the researcher clearly defined the conceptual framework by undertaking a thorough literature review and seeking opinions from people who have done similar work on malaria education. After the conceptual framework was established, the questionnaires were reviewed by 5 senior nurses and midwives for content and cultural sensitivity as well as ensure consistency with the conceptual framework. To ensure

face validity, an evaluation was done on the questionnaire to ensure that there was clarity of the wording, the layout and font were clear and that the respondents will be able to answer the questions on their own. A pre-test was conducted to test the ability of the questionnaire to answer the objectives of this study.

To ensure reliability of the questionnaire, Cronbach's Alpha test was done for question 29 which used the Likert scale to determine the barriers to effective malaria education at the antenatal clinics. Using the SPSS version 16.0 for the analysis, the Cronbach's alpha score for question 29 was 0.905. This score means that question 29 is reliable since the score of 0.905 is higher than the minimum required score of >0.70 .

In addition to the above, all the information needed for the replication of this study such as questionnaire, information sheet and consent form have also been provided in this thesis for reliability purposes.

3.10 Pretest / Pilot study

A pilot study refers to a small-scale of a complete survey or a pre-test for a particular research instrument such as a questionnaire or interview guide. It is the first step of the entire research protocol and is often a smaller-sized study assisting in planning and modification of the main study (In, 2017). The pilot study was carried out by administering the questionnaire to 10 pregnant women attending ANC at a polyclinic in Accra. This was done in an attempt to identify any flaws within the questionnaire requiring correction and to determine whether the questions would sufficiently answer the objectives of the study. On 6th January 2020, the pilot study was conducted at the antenatal clinic of Maamobi polyclinic. After the pilot study, no flaws were found in the questionnaire hence no change was made to the questionnaires.

3.11 Limitation

The outbreak of COVID-19 pandemic brought immense limitations to this research. Researcher could not collect the data per schedule because the Government of Ghana introduced restrictions on movement as a means of controlling the pandemic. For this reason, the data were collected in August 2020 instead of April 2020. There was no selection bias since pregnant women who were willing were given the opportunity to participate in the research. Before handing over the questionnaire to the participants, they received thorough information about the study including how to answer the questionnaires. The research assistants were also available to provide clarification when necessary to the participants. All the participants could read English hence the questionnaires were not translated into the Akan (the local language of the people)

3.12 Ethical considerations

Ethical clearance was obtained from the Ghana Health Service Ethics Review Committee (GHS-ERC 015/11/19) after receiving ethical approval from the University of Zululand Ethics Committee (UZREC 171110-030 PGM 2019/55). The GHS-ERC, by giving clearance, provided an independent review of this study (Aims, Objectives, and Methodology) before providing the approval. There was collaboration between the researcher and the Western Regional Director of Health Service, Municipal Director of Health, and Heads of the selected antenatal clinics before and during the study. A letter was written to the Municipal Health Directorate to seek their consent and permission to collect data from the antenatal clinics in the municipality. After receiving the permission, the heads of the selected antenatal clinics were also briefed by the researcher on the aims and methodology of the study before collecting the data.

On the day of data collection at the selected antenatal clinic, a comprehensive information of the study was presented to all the pregnant women present at the clinic. This information included the background, aims and objectives as well as the methodology of the study. Participants who met the inclusion criteria and agreed to participate in the study, were given the information sheet, consent form and questionnaire to complete. Participation was not compulsory and so the pregnant women were at liberty to either participate or withdraw from the study. Participation was purely voluntary. Data collected were coded to ensure confidentiality as respondents' names were excluded during data collection. For confidentiality purposes, data files were password protected, stored in a cloud and access limited to the researcher and his supervisor. After five years the information provided by the pregnant women will be destroyed by shredding and burning the questionnaires and permanently removing any of the information from computer hard drives and portable drives.

3.13 Conclusion

This chapter has described the methodology used for this study – research design, paradigm, study site, study participants, variables, recruitment (sampling and sample size), data collection, data analysis, validity and reliability, pilot study and ethical consideration. The next chapter will present findings from the data.

CHAPTER FOUR

FINDINGS

4.1 Introduction

This chapter presents the findings from the data that were collected from the four (4) selected antenatal clinics within TNMA from 10th August to 21st August 2020. The entire TNMA was divided into two zones (North and South). Two (2) antenatal clinics with the highest antenatal visits from each zone were selected for the study. TMH and AGC were selected from the North whilst SHC and NHC were selected from the south.

This chapter has been organized according to the sections of the questionnaire.

- Section A - Demographic Data
- Section B – Malaria knowledge
- Section C - Malaria education provided by nurses and midwives at antenatal clinics
- Section D – Factors affecting effective malaria education

4.2 Demographic Data

The demographic characteristics of the 356 respondents who answered the questionnaires during the data collection are as follows:

The ages of the respondents ranged between 15 and 45 years, with the majority being between 26 years and 35 years old representing 59.3% (n=211). This is followed by 15 years to 25 years (29.5%, n=105), and 36 years to 45 years (11.2%, n=40) respectively. The majority of respondents representing 77.8% (n=277) were married, 21.6% (n=77) were single/unmarried and 0.6% (n=2) were divorced/separated. Christians accounted for 88.2% (n=314) and 11.8% (n=42) were Muslims.

The educational level of the majority of the respondents was secondary education (41.0%, n=146). This was followed by primary education (33.1%, n=118) and tertiary education (19.1%, n=68). Those who had attained no formal education were 6.8% (n=24) of the respondents. When respondents were asked about their employment, 61.0% (n=217) were self-employed, 18.0% (n=67) were employees of other people, 14.9% (n=53) were unemployed and 5.4% (n=19) were students and were not employed. The majority of the respondents, 28.4% (n=101) earned less than 500 Ghana cedis (\$87 or 1,282 ZAR) per month, - while 14.3% (n=51) earned between 500 (\$87 or 1,282 ZAR) and 1000 cedis (\$175 or 2566 ZAR). About 46.3% (n=167) of the respondents did not want to disclose their income, hence they did not answer this question.

The majority of respondents had either one (1) pregnancy - 27% (n=96) or two (2) pregnancies - 27%, (n=96), while 21.6% (n=77) had three (3) and 23.9% (n=87) had more than four (4) pregnancies. The mean and standard deviation of the number of pregnancies were 2.43 and 1.127 respectively. The number of deliveries by respondents were once - 27.0%, (n=96) and twice - 22.5% (n=80), while 24.2% (n=86) had never been pregnant before. The mean of the number of deliveries was 2.86 and the standard deviation was 1.573.

The table below provides the details of the demographic data.

Table 2: A table showing the demographic data

Variable name	Frequency (n=356)	Percentage (%)
1. Age		
15 – 25	105	29.5
26 – 35	211	59.3
36 – 45	40	11.2

Variable name	Frequency (n=356)	Percentage (%)
2. Marital Status		
Single	77	21.6
Married	277	77.8
Divorced/Separated	2	0.6
3. Religion		
Christian	314	88.2
Muslim	42	11.8
4. Level of Education		
Primary	118	33.1
Secondary	146	41.0
Tertiary	68	19.1
No formal education	24	6.8
5. Employment		
Unemployed	53	14.9
Employed	67	18.8
Self-employment	217	61.0
Student	19	5.4
6. Monthly Income level (GHC)		
≤ 500	101	28.4
500 – 1,000	51	14.3
1,000 – 1,500	20	5.6
1,500 – 2,000	12	3.4
2,000 and above	7	2.0
No Response	165	46.3

Variable name	Frequency (n=356)	Percentage (%)
7. Number of pregnancies (M=2.43, SD=1.127)		
One (1)	96	27.0
Two (2)	96	27.0
Three (3)	77	21.6
Four (4) and more	85	23.9
No Response	2	0.6
8. Number of deliveries (M=2.86, SD=1.573)		
Zero (0)	86	24.2
One (1)	96	27.0
Two (2)	80	22.5
Three (3)	33	9.3
Four (4) and more	50	14.0
No Response	11	3.1

4.3 Malaria Knowledge

Most of the respondents, 95.8% (n=341) said they had heard of malaria. Of this number, 49.3% (n=174) heard it from Home/Family member. This was followed closely by Hospital/Antenatal care (42.2%, n=149) and television (7.1%, n=25).

The bar chart below explains it further.

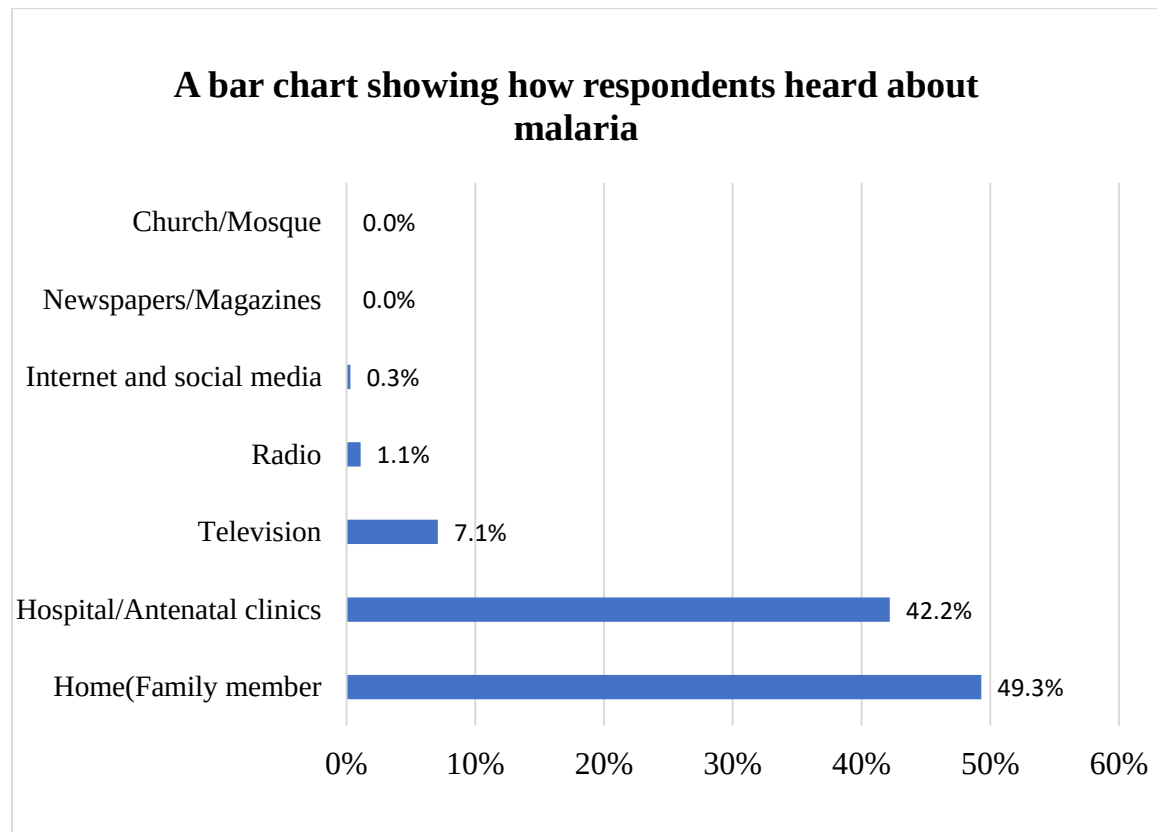


Figure 5 – A bar chart showing how the respondents heard about malaria.

The majority of respondents - 61.6%, (n=218) selected dirty environment as the common cause of malaria as opposed to mosquito bites at night - 35.0%, (n=124). Most respondents selected the following as some of the symptoms of malaria: headache - 68.5%, (n=244), high body temperature - 66.7%, (n=231), chills/shivering - 55.4%, (n=196), general body weakness - 51.1%, (n=181) and a bitter tasting tongue – (48.6%, n=172).

With regards to the effects of malaria in pregnancy, many of the respondents selected low birth weight babies - 40.2%, (n=142) followed by jaundice in new born babies - 37.3%, (n=132), Anaemia - 36.4%, (n=129) and the death of the pregnant woman - 24.0%, (n=85). In respect of knowledge related to the prevention of malaria, 91.0% (n=322) of the respondents selected sleeping under insecticide treated bed nets, 57.9% (n=205) selected clearing stagnant water and gutters and 52.5% (n=186) chose using mosquito sprays, repellents and coils.

The table 4 below provides the detail.

Table 3: A table showing the data for knowledge of malaria

Variable name	Frequency (n=356)	Percentage (%)
9. Have you heard of malaria?		
Yes	341	95.8
No	15	4.2
10. How did you hear about malaria?		
Home (Family member)	174	49.3
Hospital/Antenatal clinic	149	42.2
Television	25	7.1
Radio	4	1.1
Internet and social media	1	0.3
11. What is the common cause of malaria		
Dirty Environment	218	61.6
Eating contaminated food	11	3.1
Mosquito bites at night	124	35.0
Witchcraft	1	0.3

Variable name	Frequency (n=356)	Percentage (%)
12. Which of the following are common signs and symptoms of Malaria?		
High Body Temperature	231	66.7
Headache	244	68.5
Chills / Shivering	196	55.4
Loss of Appetite	159	44.9
Vomiting	132	37.3
Bitter tongue	172	48.6
General Body Weakness	181	51.1
Diarrhoea	51	14.4
Abdominal Pains	40	11.3
Convulsion	16	4.5
Knee/joint pain	59	16.7
Dizziness	122	34.5
13. What are the effects of malaria in pregnancy?		
Mental illness	34	9.6
Anaemia	129	36.4
Low birth weight babies	142	40.2
Abortion	83	23.4
Jaundice in new-born babies	132	37.3
Death of pregnant woman	85	24.0
14. How do we prevent malaria?		
Sleeping under treated mosquito bed nets	322	91.0
Using mosquito sprays, repellents etc	186	52.5
Clearing stagnant water and gutters	205	57.9

Variable name	Frequency (n=356)	Percentage (%)
Taking preventive malaria medication	94	26.6
Covering windows with mosquito free nets	80	9.3
Drinking herbal preparation	33	9.3

4.3.1 – Association between socio-demographic data and knowledge on malaria

The respondents exhibited high levels of knowledge on malaria. About 93% out of the 356 respondents had high level of knowledge on malaria. Most of them were able to correctly select the causes, symptoms, effects of malaria in pregnancy, and how to prevent malaria. Chi-squared test was done using SPSS version 16.0 to test the association between respondents' knowledge of malaria and their socio-demographic data. A P-value of less than 0.05 was considered to be statistically significant. Except for number of deliveries which had p-value of 0.02 (P-value: <0.05), all the other socio-demographic data collected do not show any statistical significance. These findings provide statistical support for the null hypothesis that says that there is no association between respondents' knowledge on malaria and their socio-demographic characteristics such as age (0.25), marital status (0.95), religion (0.58), level of education (0.19), employment (0.41), monthly income (0.24), and number of pregnancies (0.35). It is worth stating that statistical insignificance does not mean clinical insignificance. Although the association between the respondents' knowledge on malaria and some of their socio-demographic characteristics are not statistically significant, it does not mean that clinically no association exist between these variables.

The table below gives the details

Table 4: A table showing the association between socio-demographic data and level of knowledge on Malaria

		Level of Knowledge on malaria			
Socio-demographic variable		High n (%)	Low n (%)	Total	P-value
1. Age	15 – 25	101 (28.4)	4 (1.1)	105	0.25
	26 – 35	204 (57.3)	5 (1.4)	209	
	36 – 45	37 (10.4)	3 (0.8)	40	
2. Marital Status	Single	74 (20.8)	3 (0.8)	77	0.95
	Married	266 (74.7)	9 (2.5)	275	
	Divorced/Separated	1 (0.28)	0 (0.0)	1	
3. Religion	Christian	303 (85.1)	39 (10.9)	342	0.58
	Muslim	10 (2.8)	2 (0.6)	12	
4. Level of Education	Primary	114 (32.0)	4 (1.1)	118	0.19
	Secondary	143 (40.1)	3 (0.8)	146	
	Tertiary	63 (17.7)	5 (1.1)	68	
	No formal education	20 (5.6)	0 (0.0)	20	
5. Employment	Unemployed	51 (14.3)	2 (0.6)	52	0.41
	Employed	63 (17.7)	4 (1.1)	67	
	Self-employment	210 (59.0)	5 (1.4)	215	
	Student	17 (4.8)	0 (0.0)	17	
6. Monthly Income level (GHC)	≤ 500	95 (26.7)	5 (1.4)	100	0.24
	500 – 1,000	50 (14.4)	1 (0.28)	51	
	1,000 – 1,500	18 (5.1)	2 (0.6)	20	
	1,500 – 2,000	10 (2.8)	2 (0.6)	12	
	2,000 and above	7 (1.9)	0 (0.0)	7	
7. Number of pregnancies	One (1)	94 (26.4)	2 (0.6)	96	0.35
	Two (2)	90 (25.3)	6 (1.6)	96	
	Three (3)	75 (21.1)	2 (0.6)	77	
	Four (4) and more	81 (22.8)	2 (0.6)	83	

8. Number of deliveries	One (1)	88 (24.7)	8 (2.3)	96	0.02
	Two (2)	79 (22.2)	1 (0.28)	82	
	Three (3)	32 (9.0)	1 (0.28)	33	
	Four (4) and more	48 (13.5)	0 (0.0)	48	

4.4 Malaria education provided by nurses and midwives at Antenatal clinics

The majority of respondents were in their third trimester of pregnancy - 54.8%, (n=188). The respondents in their second and first trimesters were 32.9% (n=113) and 12.2% (n=42) respectively. Forty nine percent - 49.0%, n=172) of the respondents with mean and standard deviation of 3.09 and 1.052 respectively had visited the antenatal clinic more than 4 times at the time of data collection.

The majority of the respondents representing 78.7% (n=277) said they receive malaria education anytime they visit the antenatal clinic. About 21% (n=75) of them said they don't receive malaria education anytime they visited the antenatal clinic. For the respondents who said they received malaria education anytime they visit the antenatal clinics, 78.5% (n=216) said the malaria education takes place first thing in the morning. The malaria education is reported to be provided to all the people at the clinic representing 70.7% (n=195) of the respondents, while 25.7% (n=71) and 3.6% (n=10), chose small group < 10 and one-on-one education respectively.

The majority of the respondents representing 61.7% (n=171) said nurses or midwives use learning materials for the malaria education. Those who refuted that nurses or midwife use learning materials for the malaria education were 38.3% (n=106). According to 45.3% (n=126) of respondents, posters are used as learning material by the nurses or midwives during the education. The other learning materials used include Flip charts - 9.7%, (n=27), Magazines / Newspapers - 3.2%, (n=9), flyers - 1.8%, (n=5) and videos - 1.1%, (n=3). The duration of the

education as stated by the respondents are 15 – 30 minutes (55.7%, n=152), less than 15 minutes (37.0%, n=101), 30 – 45 minutes (5.5%, n=15), 45 minutes – 1 hour (1.1%, n=3) and more than 1 hour (0.7%, n=2).

Respondents stated that during the education, the nurses or midwives talk about causes (71.8%, n=199), prevention (69.0%, n=191), signs and symptoms (54.5%, n=151), treatment (41.9, n=116) and definition (41.5%, n=115) of malaria.

The diagram below gives a pictorial explanation to these findings.

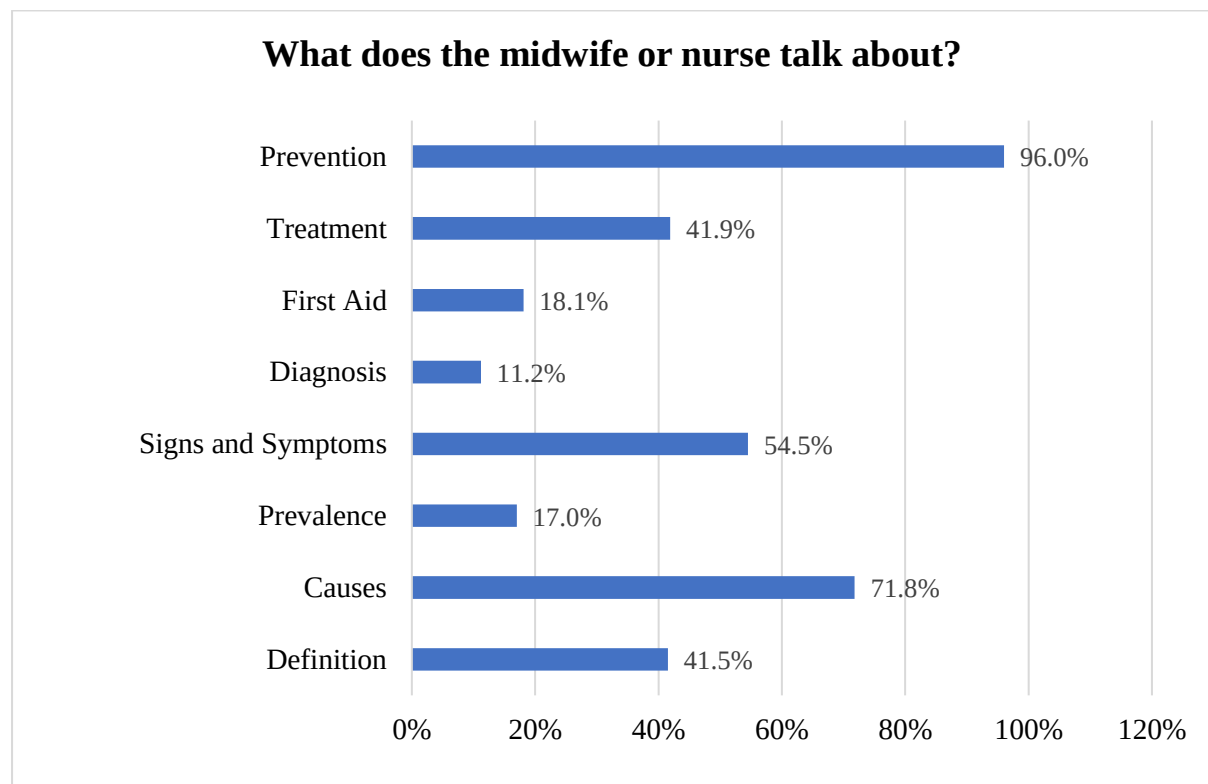


Figure 6 – A bar chart showing what the nurse or and midwife talk about?

The majority of respondents, 97.8% (n=269) said that the nurse or midwife gives them the chance to ask questions. Of this number, 94.9% (n=259) are satisfied with the answers the nurses or midwives give to the questions they asked.

When asked about the involvement of their husbands or partners in the education, 55.3% (n=151) of them said the nurses or midwives involve their husbands, while 44.7% (n=122) stated that their husbands are not involved. The majority of the respondents 52.2%, (n=145) rated the malaria education they receive as good.

The figure below gives the details.

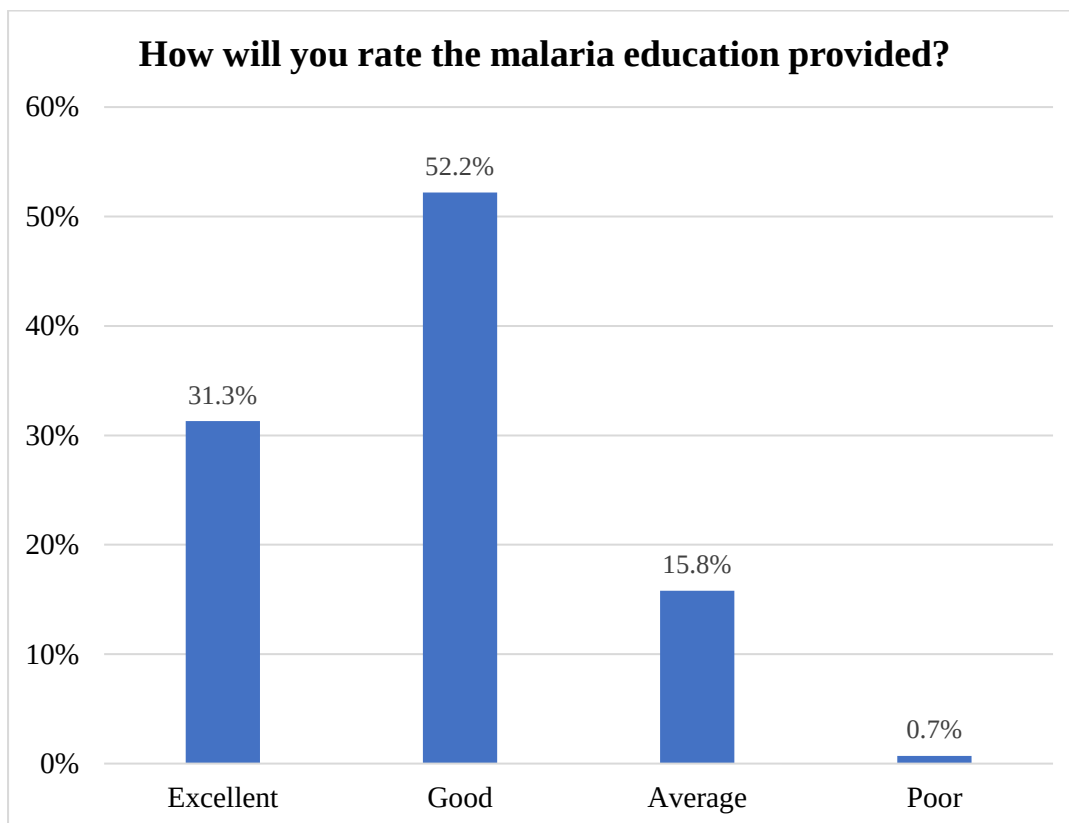


Figure 7 - A bar chart showing how the respondents rated the education they receive.

In responding to question of whether the education they receive has changed their behaviour relative to preventing mosquito bites, the majority representing 98.2%, (n=269) said Yes and 5 (1.8) said No.

This finding is presented by the pie chart below:

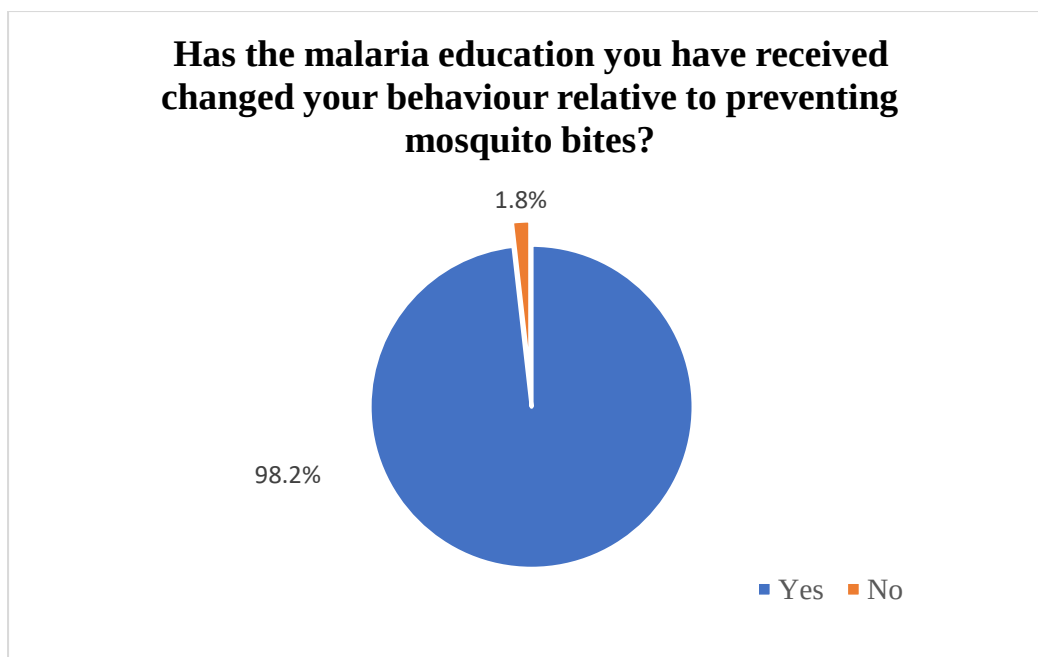


Figure 8 – A pie chart showing whether the malaria education they receive has changed respondent behaviour relative to preventing mosquito bites?

The table below gives the details of the findings under section C of the questionnaire.

Table 5: A table showing the data for malaria education provided by nurses and midwives

Variable name	Frequency (n=356)	Percentage (%)
15. How far are you in your pregnancy?		
First trimester (0 – 3 months)	42	12.2
Second trimester (4 – 6 months)	113	32.9
Third trimester (7 – 9 months)	188	54.8

Variable name	Frequency (n=356)	Percentage (%)
16. How many times have you visited the antenatal clinic? (M=3.09, SD=1.052)		
One (1)	39	11.1
Two (2)	62	17.7
Three (3)	78	22.2
Four (4) and more	172	49.0
17. Do you receive malaria education anytime you visit the antenatal clinic?		
Yes	277	78.7
No	75	21.3
18. When does the malaria education take place at the antenatal clinic?		
First thing in the morning	216	78.5
During the day	15	6.5
At the end of the clinic	3	1.1
Anytime	38	13.8
19. How is the education given at the antenatal clinics?		
One-on-one	71	25.7
Small group (< 10)	10	3.6
All people at the clinic	195	70.7
20. Does the nurse or midwife use learning material in the education?		
Yes	171	61.7
No	106	38.3
21. Which of these learning materials are used?		
Posters	126	45.3
Flip chart	27	9.7
Flyers	5	1.8
Magazines / Newspapers	9	3.2

Variable name	Frequency (n=356)	Percentage (%)
Videos	3	1.1
22. How long does the malaria education take?		
Less than 15 minutes	101	37.0
15 – 30 minutes	152	55.7
30 – 45 minutes	15	5.5
45 minutes – 1 hour	3	1.1
More than one (1) hour	2	0.7
23. What does the midwife or nurse talk about?		
Definition	115	41.5
Causes	199	71.8
Prevalence	47	17.0
Signs and Symptoms	151	54.5
Diagnosis	31	11.2
First Aid	50	18.1
Treatment	116	41.9
Prevention	191	69.0
24. Are you given the chance to ask questions in the course of the education?		
Yes	269	97.8
No	6	2.2
25. Does the nurse or midwife answer the questions to your satisfaction?		
Yes	259	94.9
No	14	5.1
26. Does the nurse or midwife involve your husbands/partners in the education?		
Yes	151	55.3
No	122	44.7

Variable name	Frequency (n=356)	Percentage (%)
27. How will you rate the malaria education provided?		
Excellent	87	31.3
Good	145	52.2
Average	44	15.8
Poor	2	0.7
28. Has the malaria education you have received changed your behaviour relative to preventing mosquito bites?		
Yes	269	98.2
No	5	1.8

4.4.1 – Association between malaria education provided at the ANC and Change of behaviour towards preventing malaria

A Chi-squared test was conducted to check the association between malaria education provided at the ANCs and change in the pregnant women's behaviour towards preventing malaria. A p-value which is less than 0.05 was considered statistically significant. The p-value for the test for association between malaria education provided at ANCs and change in pregnant women's behaviour towards preventing malaria was 0.01. This means that the null hypothesis has been rejected and that, statistically, an association exist between the malaria education provided at ANCs and change in pregnant women's behaviour towards preventing malaria. In simple terms, the malaria education provided at the antenatal clinics leads to an adoption of preventive measures to prevent malaria by the pregnant women.

The tables below give the details

Table 6: A table showing the association between malaria education provided at ANC and change in behaviour towards malaria prevention.

Malaria education provided at ANC	Change in Behaviour towards malaria prevention			
	Yes n (%)	No n (%)	Total	P-value
Yes	262	4	266	0.01
No	6	5	7	

4.5 Factors affecting effective malaria education

The respondents were presented with a list of possible factors that may affect effective malaria education at the antenatal clinics. These factors included time constraints, language barriers, hostile attitudes of nurses, lack of learning materials, poor delivery of the education and shortage of nurses and midwives.

They were asked to rate, using a Likert scale, at what point any of the factors could serve as a barrier to effective malaria education at the antenatal clinics. The key words used were; 0 = Strongly Disagree, 1 = Disagree, 2 = Agree and 3 = Strongly Agree.

From the data, the majority of the respondents either disagreed or strongly disagreed to all the factors listed in the questionnaire. This suggests that majority of the respondents do not see them as factors that affect effective malaria education delivery. For the minority who either agreed or strongly agreed to the factors listed, lack of learning materials topped at 47% (n=130). It was followed by a low literacy rate among the pregnant women - 36%, (n=100), shortage of nurses and midwives - 29.4%, (n=81), work overload on the part of the nurses - 25.7%, (n=71) and time constraints - 22.5%, (n=52). The respondents' ratings of the listed factors affecting effective malaria education has been presented in the bar chart below.

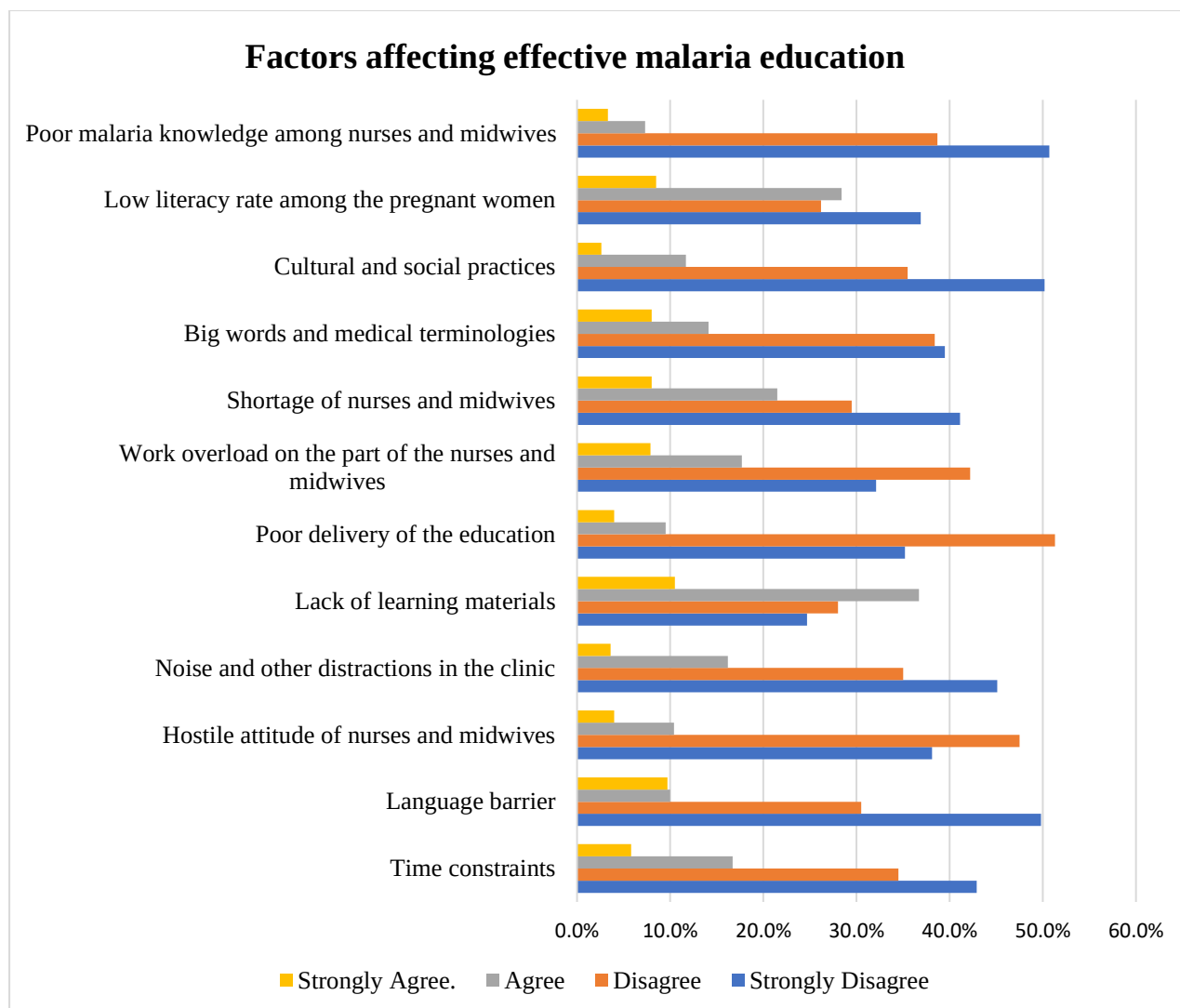


Fig 9 – A bar chart showing the barriers to effective malaria education

4.6 Conclusion

This chapter presented the findings from the analysis of the data. These findings were presented under the four (4) sections in the questionnaire namely, Demographic data, Malaria knowledge, Malaria education provided by nurses and midwives at antenatal clinics and Factors affecting effective malaria education. The next chapter looks at the discussion of the findings.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter discusses the findings obtained from analysis of the 356 responses received from the data collection and how they relate to other studies. This discussion will be done according to the specific objectives of this research as stated in chapter one.

- To assess the knowledge of and sources of malaria education available to pregnant women attending ANCs within TNMA.
- Determine the kind of education provided to the pregnant women by nurses and midwives at ANCs within TNMA.
- Determine the factors that hinder effective malaria education provided to pregnant women attending ANCs within TNMA.

5.2 Knowledge and sources of malaria education

As many as 95.8% of the respondents have heard of malaria. This finding is impressive and supported by many studies including a study conducted by Girum, Hailemikaël and Wondimu (2017) where as many as 99.5% of their 800 respondents had heard about malaria. As many as 98% of the respondents were aware of malaria according to a study conducted by Konlan, Japiong, Dodam, Afaya, Salia, and Kombat in 2019. According to Oladimeji et al (2019), there was a low proportion of respondents who were not aware of malaria, less than one-tenth among the pregnant women (7%) and even lower among non-pregnant mothers of children aged under 5 years (2.9%).

The top three (3) sources of malaria education to the pregnant women according to this study were Home/family members (49.3%), Hospital/antenatal clinics (42.2%) and Television

(7.1%). These three (3) sources of malaria education are cited in other studies as a common source of malaria education. Dhawan et al., (2014) state that among several interpersonal sources of information, the largest proportion of respondents had received information regarding malaria from a hospital, health centre or doctor (50.0%), followed by a family member (42.5%). According to Kimbi, Nkesa, Ndamukong-Nyanga, Sumbele, Atashili, and Atanga (2014), health facilities were the most popular source of information (74%), followed, in decreasing order, by the radio (55%), television (46%), posters (8%) and other sources such as relatives and mobile telephone networks (MTN - 4%). In this era of advanced technology and social media it is surprising that only one (1) person representing 0.3% chose internet and social media as his source of malaria education. This finding contrasts with the findings of a study done by Konlan et al (2019), that says that the internet served as a source of information for nearly half of their respondents (51%). In addition, Bello-Bravo and Litomia (2017) say that most of their study participants (75%) used the internet as means for finding information about malaria.

The respondents exhibited high levels of knowledge in malaria. About 96.1% of respondents chose a dirty environment and mosquito bites at night as the causes of malaria. Although 35.0% out of the 96.1% chose mosquito bites at night, which is the most appropriate answer, dirty environment was considered a contributing factor of malaria. Most of the respondents were able to identify the symptoms of malaria, effects of malaria on pregnancy and malaria preventive measures. This finding is supported by Bohulu (2016), where respondents were able to identify the common signs and symptoms such as fever, headache, loss of appetite and vomiting. According to Adebayo, Akinyemi and Cadmus (2015), a good proportion (83.5%) of the pregnant women were aware of the use of ITN for malaria prevention. This finding is different from other studies that suggest that pregnant women have low malaria knowledge. One of such is a study by Oladimeji et al (2019) where almost half of both the pregnant and

the non-pregnant mothers of children aged under 5 years did not have knowledge on the breeding sites of mosquitoes (47.1% and 49.7%, respectively). The majority of these participants had a low knowledge of malaria symptoms and were only able to identify a maximum of 2 or less symptoms of malaria [74% among pregnant mothers and 69% among non-pregnant mothers of children aged under 5 years] (Oladimeji et al, 2019).

5.3 Malaria education provided by nurses and midwives at Antenatal clinics

The majority of the respondents (78.7%) say that they receive malaria education anytime they visit the antenatal clinic. This finding suggests that on a daily basis, the nurses and midwives give malaria education to the pregnant women at the antenatal clinics. This malaria education according to 78.5% of the respondents happens first thing in the morning, and the duration does not exceed 30 minutes according to 92.7% of the respondents. The morning is the best time to give the malaria education since the majority of the pregnant women would have arrived and will be in the right frame of mind to listen. A maximum duration of 30 minutes for the malaria education is supported by Sonibare, Bello, Olowookere, Shabi, and Makinde (2020) where the researchers developed four modules for quality health education sessions with each session lasting for 30 minutes.

The nurses and midwives provide the education to all present at the antenatal clinic. This is according to 70.7% of the respondents. On the issue of learning aids, 61.7% of the respondents said that nurses and midwives use learning aids during the malaria education. The common learning aid that the nurses and midwives use according to 45.3% of the respondents was poster followed by flip charts (3.7%) and newspapers (3.2%). Previous research has found that the use of teaching aids is beneficial to enhance students' perceptions of learning, and learning process (Husin, Din, Jamaluddin, Fadzillah, & Ahmad, 2015).

The nurses, during the education, talk about causes (71.8%), prevention (69.0%), signs and symptoms (54.5%), definition (41.5%) treatment (41.9%), first aid (18.1%), prevalence (17.0%) and diagnosis (11.2). This finding does not depart from other studies like Goshu & Yitayew (2019) in which malaria education and knowledge assessment on malaria are usually centered on 1) what is the causes of malaria? 2) what are the sign and symptoms of malaria? 3) What is the mode of transmission of malaria? 4) what is the complication of malaria on pregnancy? and 5) what are the prevention mechanism of malaria?

It is interesting to note from the data that the partners of the pregnant women are involved in the education at the antenatal clinics. According to 55.3% of the respondents, the nurses and midwives involve their husbands and partners in the malaria education. This finding is supported by a study conducted in Tanzania by Gibore, Bali and Kibusi (2019) that says, more than half (53.9%) of men had high level of involvement in ANC. This phenomenon should be encouraged as it helps the husbands to support their wives with the prevention of malaria in pregnancy. In the UK for example, fathers are encouraged to be involved in antenatal and maternal health care, in the belief that involving men as early as possible lays the foundation for better, more involved fatherhood (Atkin, Berghs, & Dyson, 2015). According to Gibore, Bali and Kibusi (2019), men's involvement in ANC has potential to reduce delays in decisions to utilize antenatal health care services. In African countries, men's involvement in ANC has been shown to increase utilization of maternal health services

The majority of respondents (97.8%) say that they are allowed to ask questions during the education. This gives the pregnant women the opportunity to clarify any issue they may not understand. Most of the respondents (94.9%) say that they are satisfied with the answers the nurses and midwives gave to their questions. Generally speaking, the respondents are very satisfied with the malaria education they received at the antenatal clinics. About 92.7% of them

rated the education as either excellent, good and average. Only 0.7% of the respondents rated the malaria education as poor.

5.4 Factors that hinder effective malaria education provided to pregnant women

The majority of respondents either disagreed or strongly disagreed to all the factors which could hinder effective education as listed in the questionnaire. These factors were time constraints, language barriers, hostile attitudes of nurses and midwives, noise and other distractions in the clinic, lack of learning materials, poor delivery of the health education, work overload on the part of the nurses and midwives, shortage of nurses and midwives, use of big words and medical terminologies, cultural and social practices, low literacy rates among the pregnant women, and poor malaria knowledge among nurses and midwives. Although other studies including Karimi, Emami, and Mirhaghi (2016) consider the factors above as barriers to effective malaria education, this study does not support it. The majority of respondents did not see the preceding factors as barriers to malaria education.

Some respondents, who are in the minority, agreed or strongly agreed to the factors mentioned above. The top five (5) possible barriers to effective malaria education as chosen by the respondents are; lack of learning materials (47.2%), low literacy rate among the pregnant women (36.4%), shortage of nurses and midwives (29.4%), work overload on the part of the nurses and midwives (25.7) and time constraints (22.5%). This finding is supported by Karimi, Emami, and Mirhaghi (2016) which categorized the barriers above under Nurse-related factors (nursing shortage, excessive workload and inadequate time and lack of knowledge among nurses). Other barriers include salary insufficiency, lack of educational resources and shift rotation, insufficiency of hospitalization time, patients' being inconvenienced and feelings of a lack of the importance of patient learning in hospitals. In addition, Badiyepymaiejahromi, Isfahani, Parandavar, and Rahmanian (2016) state that the most important challenges regarding patient education were; lack of resources and educational tools, lack of enough time, inadequate

knowledge and skills of the nurse, and lack of patient readiness both physically and psychologically.

In a study conducted and published by Arian, Mortazavi, TabatabaeiChehr, Tayebi, and Gazerani, (2015), the major barriers to effective malaria education from the nurses' point of view were: nurses' lack of knowledge toward patient education (71.9%), illiteracy or low literacy of the patients (70.8%), not identifying the requirements of patients' education and lack of nursing manpower (66.7%), lack of educational textbooks (62.5%), lack of regular plans for patient education (60.4%), patients unfavorable general condition and lack of legislation about patient education (59.4%). From managers' point of view, the barriers were: lack of nurses' knowledge toward patient education (97.1%), lack of patient cooperation (91.4%), lack of manpower and sex difference between educator and patient (77.1%), the inability of patient to take care of him/herself (71.4%), lack of time for nurses (68.8%), illiteracy or low literacy of patients (68.6%), rejection of education from patients (60%), low budget for patient education (54.3%).

5.5 Conclusion

In this chapter, the researcher has discussed the findings obtained from analysis of the 356 responses received from the data collection and how they relate to other studies. This discussion was done according to the three (3) aims of this research and the conceptual framework. As it has been discussed above, effective malaria education is affected by the variables of the conceptual framework which are content of the education, malaria knowledge and sources of malaria education, approach/presentation method and barriers. There will be no effective malaria education if the content does not contain the right information such as causes, prevalence, signs and symptoms, treatment, and prevention.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The purpose of this study was to assess the knowledge and sources of malaria education available to pregnant women attending ANC's within TNMA, determine the kind of malaria education provided to the pregnant women by nurses and midwives at ANC's within TNMA and determine the factors that hinder effective malaria education provided to pregnant women attending ANC's within TNMA

From the study, most (95.8%) of the pregnant women who answered the questionnaires had heard of malaria. The top three (3) sources of malaria education to these pregnant women were Home/family members (49.3%), Hospital/antenatal clinics (42.2%) and Television (7.1%). The respondents exhibited high levels of malaria knowledge. This is evidenced by the fact that about 96.1% of them were able to correctly identify the causes of malaria. They were also able to mention the symptoms of malaria, effects of malaria on pregnancy and malaria preventive measures.

The pregnant women receive malaria education anytime they visit the antenatal clinic. This education usually takes place first thing in the morning when the pregnant women arrive at the clinic and does not usually exceed 30 minutes. The education is given to everyone who is present at the antenatal clinic. The husbands and partners of the pregnant women are not left out of the education. The nurses and midwives involve the husbands and partners of the pregnant women in the education. Learning aids are used by the nurses and midwives in the delivery of the education. Posters, flip charts and newspapers are the commonest learning aids used for the education. During the education, the nurses and midwives talk about causes (71.8%), prevention (69.0%), signs and symptoms (54.5%), definition (41.5%), treatment

(41.9%), first aid (18.1%), prevalence (17.0%) and diagnosis (11.2). The respondents are allowed to ask questions during the education, and they are answered accordingly. Generally speaking, the respondents are very satisfied with the malaria education they received at the antenatal clinics.

The majority of the respondents either disagreed or strongly disagreed to all the possible barriers to effective malaria education listed in the questionnaire, meaning that the majority of the respondents did not see them as barriers to effective malaria education. This notwithstanding, a minority of respondents agreed or strongly agreed to them as factors that hinder effective malaria education. The top five (5) barriers to effective malaria education as chosen by the respondents are lack of learning materials, low literacy rates among the pregnant women, shortage of nurses and midwives, work overload on the part of the nurses and midwives and time constraints.

6.2 Recommendations

The following recommendations when implemented will help in drastically reducing malaria in pregnancy in Sub-Saharan Africa and Ghana in particular.

- 1 Malaria health education that takes place in the ANCs should be encouraged since it remains one of the best times to communicate to the pregnant women. The education should take place first thing in the morning when the pregnant women are in the right frame of mind to receive the education.
- 2 Nurses and midwives should continue to involve the partners of these pregnant women in the education.
- 3 In giving the education, nurses and midwives should speak in simple and plain language devoid of medical jargons. The use of big medical jargons can be a big barrier to effective malaria education.

- 4 Nurses and midwives should emphasize first aid treatment of malaria during the education at the ANCs.
- 5 More learning aids especially pictures and short videos/you tube videos should be used during the education. These pictures and videos can be loaded onto the television at the antenatal clinics and played throughout the day.
- 6 In this era of advanced technology, mobile applications and social media handles like Facebook, Twitter, Youtube, Viber and Whatsapp should also be employed in malaria education. Social media is one of the most effective means of getting information to many young people of today.
- 7 Finally, although the work of nurses and midwives at ANCs are very stressful, they should still make time to educate the pregnant women on malaria when they come for antenatal care.

6.3 Limitations

In the first place, this research is a cross-sectional study, which means that the data analysed were collected in a particular time frame. For this reason, different findings may be recorded if the study is conducted within another time frame. Secondly these results cannot be generalized to include men, non-pregnant women and pregnant women who do not attend antenatal clinics since only pregnant women attending antenatal clinics were included in the study. Lastly, data for this study were collected from antenatal clinics in Ghana. The findings from this research may not be generalizable to other countries as the activities at antenatal clinics may differ from country to country.

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APPENDICES

Appendix 1: Information Sheet

Introduction

My name is James Mckeown Amoah, a Master of Nursing student at University of Zululand, South Africa. You are being invited to participate in a study to determine the malaria education provided by midwives and nurses to pregnant women attending antenatal clinics within the Tarkwa Nsuaem Municipal Assembly of the Western Region. The specific aims of this research are to:

1. To assess the knowledge and sources of information of malaria provided to pregnant women attending antenatal clinics within the Tarkwa Nsuaem Municipal Assembly.
2. Determine the kind of education given to pregnant women.
3. Determine the factors that affect effective malaria education provided to pregnant women in antenatal clinics.

This information sheet is meant to provide you with the basic information about this research which will guide you in making a decision to participate or not. This document is very important because you need to understand fully what this research entails before you decide to respond. In case you have any question(s), which is/are not fully explained in this document, please feel free to ask the researcher/research supervisor and/or the University of Zululand Research office.

This study is expected to enrol 356 pregnant women from four antenatal clinics within the Tarkwa Nsuaem Municipality who have visited the antenatal clinics more than once. You will be given a consent form to complete if you agree to participate in this study. After completing the consent form, you will be given a questionnaire which is made up of 9 multiple-choice questions to complete. You will be given ample time to answer all the questions in the questionnaire and the questionnaire shall be collected the same day.

I will be available to provide clarification in case you do not understand any of the questions. The information you provide in the questionnaires will be analysed and the data will be kept securely for at least five years after the research, by the research supervisor, locked in a safe lockable cupboard in her office at the University of Zululand. After the five years the information you provide will be destroyed by shredding the questionnaires and permanently removing any of the information from computer hard drives and portable drives.

The results from this study will be published in journals, online and national newspapers as well as presented at academic conferences.

Possible Risks and Discomforts

This study and its procedures will involve no foreseeable physical, social and psychological risks to you as a person or to your health.

Possible Benefits and Confidentiality

You will be acknowledged in the thesis that will be submitted. I will submit to my supervisor. All information obtained during the course of this study will be treated as confidential and will not be used for any other purpose except for this research. Your name will not be collected or mentioned anywhere in the study. The study questionnaire you complete will be coded with a number so that it will not be linked to you in any way.

Voluntary participation and right to leave the research

Your participation in this study will be strictly voluntary. You are at liberty to participate, to the end or withdraw from the study at any time without any effect on the services you will receive. harm to you.

If I have any further questions/concerns or queries related to the study, I understand that I may contact the researchers at;

Name: James M. Amoah (Researcher)

Email: mcjameson1990@yahoo.com

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Name: Prof Jane Kerr (Supervisor)

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Appendix 2: Consent Forms

I _____ have been thoroughly briefed on the entire significance and methodology of this research, which is being conducted by JAMES MCKEOWN AMOAH, a Master of Nursing student at University of Zululand, South Africa.

I hereby consent, on my own accord, to be part of this study based on my understanding of what the research entails. I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting the care I am receiving at the antenatal clinic. Also, I am doing this on condition that under no circumstances should any reference be made to my actual identity to other persons outside this study as promised by the researcher.

If I have any further questions/concerns or queries related to the study, I understand that I may contact the researchers at;

Name: James M. Amoah (Researcher)
Email: mcjameson1990@yahoo.com
Tel: +233245849122

Name: Prof Jane Kerr (Supervisor)
Email: KerrJ@unizulu.ac.za
Tel: +27836269423

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers, then I may contact:

University of Zululand
Office of Research and Innovation
KwaDlangezwa Campus
1 Main Road Vulindlela
KwaDlangezwa 3886
Email: Info@unizulu.ac.za
Tel: 0359026000

RESPONDENT

.....

SIGN / THUMBPRINT

.....

DATE

RESEARCHER

.....

SIGN

.....

DATE

Appendix 3: Questionnaire

My name is JAMES MCKEOWN AMOAH, a Master of Nursing student at the University of Zululand, South Africa. I am conducting a research study titled “***Malaria education provided by midwives and nurses to pregnant women attending antenatal clinics within Tarkwa Nsuaem Municipal Assembly, Western Region, Ghana.***”

This research is part of the requirements for the award of Master of Science in Nursing degree. I would be grateful if you could assist me by answering these questions as honestly as possible. Responses will be used only for the purpose of this study and would be treated with confidentiality. The questionnaire has four sections. **You are required to tick where applicable.**

SECTION A: DEMOGRAPHIC DATA

		<i>Place a tick or cross next to the MOST RELEVANT response</i>
1. Age (years)		
	15 – 25	
	26 – 35	
	36 – 45	
	46 and above	
2. Marital Status		
	Single	
	Married	
	Divorced/Separated	
	Widow	
3. Religion		
	Christian	
	Muslim	
	Traditional	
4. Level of education		
	No formal education	
	Primary	
	Secondary	
	Tertiary	
5. Employment		
	Unemployed	
	Employed	

	Self-employment	
	Student	
6. Monthly income level (GHC)		
	≤ 500	
	500 – 1,000	
	1,000 – 1,500	
	1,500 – 2,000	
	2,000 and above	
7. Number of pregnancies		
	One (1)	
	Two (2)	
	Three (3)	
	Four (4) and more	
8. Number of deliveries		
	One (1)	
	Two (2)	
	Three (3)	
	Four (4) and more	

SECTION B - KNOWLEDGE OF MALARIA

		<i>Place a tick or cross next to the MOST RELEVANT response</i>
9. Have you heard about malaria?		
	Yes	
	No	
10. How did you hear about malaria?		
	Home/Neighbours	
	Hospital/Antenatal clinics	
	Radio / TV / Newspapers	
	Church / Mosque	
	Social media	
11. What is the common cause of malaria?		
	Dirty Environment	
	Eating contaminated food	
	Mosquito bites at night	
	Witchcraft	

12. Which of the following are common signs and symptoms of Malaria?		
	High Body Temperature (Fever)	
	Headache	
	Chills / Shivering	
	Loss of Appetite	
	Diarrhoea	
	General Body Weakness	
	Abdominal Pains	
	Convulsion	
	Body / Joint Pains	
	Nausea and Vomiting	
13. What are the effects of malaria in pregnancy?		
	Mental illness	
	Anaemia	
	Low birth weight babies	
	Abortion	
	Jaundice in new born babies	
	Death of pregnant woman	
14. How do we prevent malaria?		
	Sleeping under insecticide treated mosquito bed nets	
	Using mosquito sprays and coils	
	Clearing stagnant water / gutters	
	Taking malaria prophylaxis	
	Covering window and door with mosquito free nets	
	Drinking herbal preparation	

**SECTION C – MALARIA EDUCATION PROVIDED BY NURSES AND MIDWIVES
AT ANTENATAL CLINICS**

		<i>Place a tick or cross next to the MOST RELEVANT response</i>
15. How far are you in your pregnancy?		
	First trimester (0 – 3 months)	
	Second trimester (4 – 6 months)	
	Third trimester (7 – 9 months)	
16. How many times have you visited the antenatal clinic		
	One (1)	
	Two (2)	
	Three (3)	
	Four (4) and more	
17. Do you receive malaria education anytime you visit the antenatal clinic?		
	Yes	
	No	
18. When does the malaria education take place at the antenatal clinic?		
	First thing in the morning	
	During the day	
	At the end of the clinic	
	Anytime	
19. How is the education given at the antenatal clinics?		
	One-on-one	
	Small group (< 10)	
	All people at the clinic	
20. Does the nurse or midwife use learning material in the education?		
	Yes	
	No	
21. Which of these learning materials are used?		
	Posters	
	Flip chart	

	Flyers	
	Magazines / Newspapers	
	Videos	
22. How long does the malaria education take?		
	Less than 15 minutes	
	15 – 30 minutes	
	30 – 45 minutes	
	45 minutes – 1 hour	
	More than one (1) hour	
23. What does the midwife or nurse talk about?		
	Definition	
	Causes	
	Prevalence	
	Signs and Symptoms	
	Diagnosis	
	First Aid	
	Treatment	
	Prevention	
24. Are you given the chance to ask questions in the course of the education?		
	Yes	
	No	
25. Does the nurse or midwife answer the questions to your satisfaction?		
	Yes	
	No	
26. Does the nurse or midwife involve your husbands/partners in the education?		
	Yes	
	No	
27. How will you rate the malaria education provided by nurses and midwives at the antenatal clinics?		
	Excellent	
	Good	
	Average	
	Poor	

28. Has the malaria education received by you changed your behaviour related to you preventing mosquito bites?		
	Yes	
	No	

SECTION D – FACTORS AFFECTING EFFECTIVE MALARIA EDUCATION

29. Which of the factors below is a barrier to effective malaria education in antenatal clinics? (**Key: 0 = Strongly Disagree, 1 = Disagree, 2 = Agree, 3 = Strongly Agree**)

NO	<i>Barriers</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>
1.	Time constraints				
2.	Language barrier				
3.	Hostile attitude of nurses and midwives				
4.	Noise and other distractions in the clinic				
5.	Lack of learning materials				
6.	Poor delivery of the education				
7.	Work overload on the part of the nurses and midwives				
8.	Shortage of nurses and midwives				
9.	Use of big words and medical terminologies				
10.	Cultural and social practices				
11.	Low literacy rate among the pregnant women				
12.	Poor malaria knowledge among nurses and midwives				

Appendix 4: GHS Ethical Clearance

*In case of reply the
number and date of this
Letter should be quoted*

MyRef. GHS/RDD/ERC/Admin/App/19/663
Your Ref. No.

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE



Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra.
GPS Address GA-050-3303
Mob: +233-50-3539896
Tel: +233-0302681109
Fax: +233-0302685424
Email: ethics.research@ghsmai.org
3rd December, 2019

James Mckeown Amoah
University of Zululand
South Africa

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	GHS-ERC 015/11/19
Project Title	Malaria Education Provided by Midwives and Nurses to Pregnant Women Attending Antenatal Clinics within Tarkwa Nsuaem Municipal Assembly, Western Region, Ghana
Approval Date	3 rd December, 2019
Expiry Date	2 nd December, 2020
GHS-ERC Decision	Approved

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report **after completion** of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
Dr. Cynthia Bannerman
(GHS-ERC Chairperson)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

Appendix 5: University of Zululand Ethical Clearance

UNIVERSITY OF ZULULAND RESEARCH ETHICS COMMITTEE

(Reg No: UZREC 171110-030)



RESEARCH & INNOVATION

Website: <http://www.unizulu.ac.za>

Private Bag X1001

KwaDlangezwa 3886

Tel: 035 902 6731

Fax: 035 902 6222

Email: DlelanaM@unizulu.ac.za

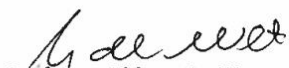
ETHICAL CLEARANCE CERTIFICATE

Certificate Number	UZREC 171110-030 PGM 2019/55						
Project Title	MALARIA EDUCATION PROVIDED BY MIDWIVES AND NURSES TO PREGNANT WOMEN ATTENDING ANTENATAL CLINICS WITHIN TARKWA NSUAEM MUNICIPAL ASSEMBLY, WESTERN REGION, GHANA						
Principal Researcher/ Investigator	James M. Amoah						
Supervisor and Co-supervisor	Dr Jane Kerr						
Department	Nursing Sciences						
Faculty	Science and Agriculture						
Type of Risk	Med Risk – Data Collection from people						
Nature of Project	Honours/4 th Year		Master's	x	Doctoral		Departmental

The University of Zululand's Research Ethics Committee (UZREC) hereby gives ethical approval in respect of the undertakings contained in the above-mentioned project. The Researcher may therefore commence with data collection as from the date of this Certificate, using the certificate number indicated above.

- Special conditions:**
- (1) This certificate is valid for 1 year from the date of issue.
 - (2) Principal researcher must provide an annual report to the UZREC in the prescribed format [due date-03 October 2020]
 - (3) Principal researcher must submit a report at the end of project in respect of ethical compliance.
 - (4) The UZREC must be informed immediately of any material change in the conditions or undertakings mentioned in the documents that were presented to the meeting.

The UZREC wishes the researcher well in conducting research.


Professor Gideon De Wet

Chairperson: University Research Ethics Committee

Deputy Vice-Chancellor: Research & Innovation

04 October 2019

CHAIRPERSON
UNIVERSITY OF ZULULAND RESEARCH
ETHICS COMMITTEE (UZREC)
REG NO: UZREC 171110-30

04-10-2019

RESEARCH & INNOVATION OFFICE