

**SCHOOL OF PUBLIC HEALTH  
DEPARTMENT OF HEALTH POLICY, PLANNING  
AND MANAGEMENT**

**ASSESSMENT OF THE QUALITY OF HEALTH CARE  
RENDERED TO CHILDREN UNDER- FIVE WITH  
MALARIA AT THE PRINCESS MARIE LOUIS  
HOSPITAL, ACCRA**

**BY**

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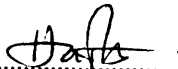
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## DECLARATION

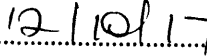
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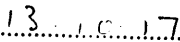
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## ABSTRACT

**Background:** In Ghana, there have been gradual declines in malaria mortality over the years, with the institutional case fatality rate among children under five falling from 14.1% in 2000 to 0.6% in 2012 and recently 0.5% in 2015. It is contended that the amount of resources committed to malaria prevention and case management is higher than the gains made. This has raised concerns about the quality of intervention delivered to patients with or at risk of malaria. While there is increasing policy and research interest in this field, there is little attention paid to the quality of care for under-five children suffering from malaria. This study, thus, assesses the quality of care delivered to children under five with malaria at the Princess Marie Louis hospital.

**Methodology:** A quantitative approach using cross-sectional survey design was used to examine the quality of care delivered to children under five diagnosed with malaria. A computer generated random sample of 74 staff and 301 parents of children under five who were treated for malaria at the hospital were recruited for the study. The data was statistically analysed with using the Statistical Package for Social Sciences (SPSS) software version 20. Descriptive summary statistics was complemented with regression analysis preceded by Pearson's correlation analyses to draw inferences.

**Results:** The study showed that overall, inputs availability for standard malaria case management was as high as 81.1% and highest in the area of general inputs such as staff, triaging and basic equipment including weighing scales and thermometers (88.8%) whilst anti-malaria medications was the least available (66.6%). Also, staff compliance with the Ghana Health Service standard protocols for malaria case management was quite high (89.4%) but less than previously reported rate of 90.8%. Parental caretaker satisfaction (as proxy for patient satisfaction) was also moderate (66.1%) and lower than national average. Finally, technical quality indicators had no significant influence on patient satisfaction as postulated in quality of care models.

**Conclusion:** Staff adherence to standard treatment malaria case management protocols is high but appears to be declining when compared with other studies. Also, anti-malarial availability is much lower than the 98% availability of essential drugs in public health institutions as estimated by the Ghana health service. Addressing these would improve technical quality of care; they may not necessarily impact positively on subjective quality which was moderate and below reported national average. In-depth exploration for innovative and customer-oriented approaches is recommended to boost patient satisfaction.

## **DEDICATION**

This study is dedicated to my family most especially my kids **Kobby MbirAhor-Essel**,  
**MaameEkuaAduaAhor-Essel** and **Papa KojoAhor-Essel**.

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I wish to express my profound gratitude to all who in diverse ways contributed to the success of this study. My heartfelt gratitude is expressed particularly to my supervisor Dr. Reuben Esena for his encouragement and support during all the phases of the research.

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Certainly, this achievement is not by my might and power but by the grace of God. I therefore give God the honour and the glory.

**TABLE OF CONTENT**

DECLARATION	i
ABSTRACT	ii
ACKNOWLEDGMENT	iv
TABLE OF CONTENT	v
LIST OF FIGURES	viii
LIST OF TABLES	ix
LIST OF ACRONYMS	x
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the study	1
1.2 Problem statement	5
1.3 Aim and objectives of the study	6
1.4 Research Questions	7
1.5 Variables	7
CHAPTER TWO	9
LITERATURE REVIEW	9
2.1 Introduction	9
2.2 Conceptual Framework: Donabedian Quality of Care Model	9
2.2.1 Structure/Inputs of Quality of Care of the Model	12
2.2.2 Process of Quality of Care of the model	12
2.2.3 Outcomes of Quality of Care of the Model	13
2.3 Empirical Literature	13
2.3.1 Level of care quality and patient satisfaction with care rendered in Ghanaian hospitals	14
2.3.2 Patient Satisfaction with Care Quality	17
2.3.3 Availability of Inputs for Quality Malaria Care	19
2.3.4 Malaria Treatment Protocol in Ghana	21
CHAPTER THREE	25
METHODOLOGY	25
3.1 Introduction	25
3.2 Research design	25
3.3 Research setting	26
3.4 The Study Population	26
3.5 Inclusion and Exclusion Criteria	26

3.6 Sample size and sampling procedure	27
3.7 Data gathering instrument	28
3.8 Data analysis	28
3.9 Validity and reliability	29
3.10 Ethical considerations	30
3.11 Limitation of the study	32
CHAPTER FOUR	33
FINDINGS	33
4.1 Introduction	33
4.2 Staff Demographic Characteristics	33
4.3 Availability of Inputs for Quality Malaria Case Management in Under-Five Children	34
4.4 Compliance with Standard Malaria Case Management Protocols for Children Under-Five Years	37
4.5 Influence of Inputs Availability on Compliance with Standard Malaria Care	41
4.6 Patient and Caretakers Demographic Characteristics (Patient Survey)	45
4.7 Patient Satisfaction with Malaria Care Quality at PML Hospital	46
4.8 Influence of Technical Quality Indicators on Patient Satisfaction with Malaria Care	49
CHAPTER FIVE	51
DISCUSSION OF FINDINGS	51
5.1 Demographic Characteristics	51
5.2 Availability of Inputs for Quality Malaria Case Management in Under-Five Children	53
5.3 Compliance with Standard Malaria Case Management Protocols at PML Hospital	54
5.4 Influence of Inputs Availability on Compliance with Standard Malaria Care	55
5.5 Patient Satisfaction with Malaria Care Quality at PML Hospital	55
5.6 Influence of Technical Quality Indicators on Patient Satisfaction with Malaria Care	56
CHAPTER SIX	58
CONCLUSIONS AND RECOMMENDATIONS	58
6.1 Conclusions	58
6.2 Recommendations	59
REFERENCES	60
APPENDICES	71
Appendix 1: Consent Form	71
Appendix 2: Informed Consent for Staff at Princess Marie Louis Hospital	74
APPENDIX 3: Patient Satisfaction Questionnaire on the Quality of Health Rendered To Children Under-Five with Malaria at Princess Marie Louis Hospital	77

**APPENDIX 4: Staff Questionnaire on Quality of Care Rendered to Children Under-five with Malaria at Princess Marie Louis Hospital**

84

## **LIST OF FIGURES**

<b>Figure 1: Conceptual framework of quality of care (Adapted from Donabedian, 1980)</b>	<b>9</b>
<b>Figure 2: Flowchart for the diagnosis and treatment of malaria</b>	<b>23</b>

## LIST OF TABLES

Table 1: Study variables	29
Table 2: Staff Demographic Characteristics	34
Table 3: Availability of Inputs for Management of Malaria	36
Table 4: Compliance with Standard Malaria Case Management Protocols	39
Table 5: Influence of Inputs Availability on Compliance with Standard Malaria Care	43
Table 6: Demographic Characteristics of Parents/caretakers	45
Table 7: Patient Satisfactions with Malaria Care	47
Table 8: Influence of Technical Quality Indicators on Patient Satisfaction with Malaria Care	50

## LIST OF ACRONYMS

<b>ACT</b>	-	<b>Artemisinin-based Combination Therapy</b>
<b>ART-AQ</b>	-	<b>Artesunate plus Amodiaquine</b>
<b>CHAG</b>	-	<b>Christian Health Association of Ghana</b>
<b>CHPS</b>	-	<b>Community based Health Planning Services</b>
<b>DHA</b>	-	<b>Dihydroartemisin</b>
<b>IPT</b>	-	<b>Intermittent Preventive Treatment</b>
<b>MOH</b>	-	<b>Ministry of Health</b>
<b>OPD</b>	-	<b>Out Patient Department</b>
<b>PML</b>	-	<b>Princess Maria Louis</b>
<b>RDT</b>	-	<b>Rapid diagnostic test</b>
<b>SP</b>	-	<b>Sulphadoxine-pyrimethamine</b>
<b>WHO</b>	-	<b>World Health Organization</b>

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the study

**There are 300-500 million malaria cases and 2-3 million deaths annually, thus, malaria remains the most important infectious disease, with multifaceted consequences facing humankind in the tropical and sub-tropical regions of the world (Iheukwumere, Nwachukwu, & others, 2013)**

Malaria is a life-threatening infection caused by a protozoan parasite, which invades the red blood cells. Characterised by fever, malaria is mainly transmitted through the bite of the female Anopheles mosquitoes in tropical and subtropical regions of the world (WHO, 2015). It is estimated that 95 countries have endemic malaria transmission while 3.2 billion people were at risk of malaria in 2015 (WHO, 2015). Furthermore, the World Health Organisation (WHO, 2015) estimates that by the end of 2015, there were 214 million cases of malaria and a recorded 438,000 deaths globally. However, between 2000 and 2015, malaria incidence among populations at risk fell by 37% globally. In that same period, malaria death rates among populations at risk fell by 60% globally among all age groups and by 65% among children under five.

However, Sub-Saharan Africa carries a disproportionately high share of the global malaria burden (WHO, 2015; Rezai, Enayati, & Heamingway, 2013). For instance, in 2015, the region recorded 88% of global malaria cases and 90% of malaria deaths and the vast majority of cases (more than 90%) were composed of children aged 6 months to 5 years (Achan et al., 2011a). Only 15 countries, mainly in sub-Saharan Africa account for 80% of malaria cases and 78% deaths

globally. Added to this, the malaria burden is not only a public health threat but also appear to be of higher threat to children under 5 who are particularly susceptible to infection, illness and death. It is, thus, reported that more than two-thirds (70%) of all malaria deaths occur in this age group (children under 5) (WHO, 2015). This has caused significant morbidity and mortality especially among the under-five age group, pregnant women, persons with sickle cell disease and those migrating from non-endemic areas among others (MOH, 2010). Of the four human malaria parasites, namely, *Plasmodium falciparum*, *Plasmodium ovale*, *Plasmodium vivax* and *Plasmodium malariae*, the most dangerous type, *Plasmodium falciparum* is predominant in sub-Saharan Africa accounting for 1.4-2.6 million deaths per year (Rezai et al., 2013). Consequently, malaria has for a long time remained the number one killer of young children in Sub-Saharan Africa, responsible for at least one death per minute (Theukwumere et al., 2013).

Owing to a concerted global effort, between 2000 and 2015, the under-5 malaria mortality rate declined by 65% globally. This decline translates into 5.9 million children saved from dying out of malaria (WHO, 2016). However, this progress has not been universal across countries. For example, since 2000, whilst there has been a decline in malaria incidence in the 15 most affected countries (32%), it lagged behind that of the global average of 53% (WHO, 2015).

In Ghana, malaria, the foremost public health challenge, is prevalent in all the regions. This puts Ghana's entire population of 28.6 million (2016 projection based on 2010 population and housing census) at risk of infection. From 2008 to 2013, 3.1- 3.5 million cases of clinical malaria were reported in public health facilities annually. Also, malaria cases are seen at health facilities increased from 250 per 1,000 population in 2000 to 437 per 1,000 population in 2012. This translates into an increase in total Out Patients Department cases from 4.9 million to 11.3 million over the 12-year period. This has, however, been partly attributed to improved data reporting, increasing financial access due to the expanding coverage of the National Health Insurance

Scheme, improved geographical access to health care due to the increasing number of Community Health Planning Services, and continued presumptive diagnosis of malaria (GHS, 2015; PMI, 2015). During this period, malaria admissions increased from approximately 5 per 1,000 population to approximately 17.5 per 1,000 population, driven by the same reasons as those driving up OPD cases (GHS, 2015; PMI, 2015).

However, there have been gradual but significant declines in malaria mortality over the years, with the institutional case fatality rate among children under five falling from 14.1% in 2000 to 0.6% in 2012 and recently 0.5% in 2015. This represents 96 percentage points decrease in malaria case fatality over a 15-year period. Though fluctuations in the number of outpatient department cases were seen between 2013 and 2015, the national parasitemia prevalence among children under-five has remained stable at approximately 27% between 2011 and 2014 (PMI, 2015). These reductions in national mortalities of malaria in under-five could be largely due to pragmatic control measures adopted by industry players, increasing resources, and adopting revised international technical standards for malaria control. The above improvements notwithstanding, malaria still accounts for about 37.5% of all outpatient visits, 36% of health centres' admissions, and 33.4% of all deaths in children under-five years of age as well as 9.4% of deaths among pregnant women (DHS, 2015; MOH, 2015). By this, malaria undoubtedly does not only adversely affect socioeconomic productivity but threatens the future and wellbeing of the population (Rezai et al., 2013).

In Ghana, owing to improved case management, the trend of malaria fatalities in children under five years of age has been gradually declining (Figure 1). However, against the backdrop of massive investments in malaria control and treatment, the rate of decline in malaria case fatality, especially in children under-five years, appear to be slow, giving cause for concerns about the quality of malaria case management. It has, thus, compelled health professionals and experts to

focus their attention on improving the quality of malaria case management especially for the most vulnerable ones such as children under five years and pregnant women with malaria.

The quality of health care is often defined as a degree of performance in relation to a specified standard of interventions known to be safe and have the capacity to improve health within available resources (Fenny, Hansen, Enemark, & Asante, 2014a). This encompasses technical (or objective) and subjective (or patient defined) aspects of quality (Fenny, Hansen, et al., 2014a). However, patient satisfaction perspective of hospital care had gained more attention in recent times and studies have shown that patients are most satisfied with interpersonal interactions such as staff-patient relationships and constant provisions of necessary care to them when they visit health facilities (Fenny, Hansen, et al., 2014a).

In Ghana, despite efforts by the Government, through the Ministry of Health (MOH) and its service delivery agencies like the Christian Health Association of Ghana (CHAG) and the Ghana Health Service (GHS) to improve the quality of care using different approaches such as Health Quality Improvement Framework and Quality assurance surveys, still health service provision is constrained by a number of factors including poor infrastructure, frequent shortages of drugs and/or medical equipment and limited human resource for health among others (Young, Wolfheim, Marsh, & Hammamy, 2012). However, patient's satisfaction with the quality of service delivery in the hospitals is largely dependent on the Nurses and Physician human relations and how they explain issues for the full understanding of the patients and the relatives under their care (Ofosu-Kwarteng, 2012). Others have, thus, asserted that, in order to improve the quality of care, there should be a corresponding improvement in communication skills by all staff to show compassion, be more polite with active listening. These also need to be underpinned by improved

availability of essential drugs and improvement in clinicians' prescription skills (Khamis&Njau, 2014a).

Indeed, it has been shown that quality of health service is driven not only by inter-personal factors but also care inputs factors like availability of logistics, medical equipment, drugs and technical skills among others. For instance, the introduction and distributions of malaria rapid diagnostic tests in June 2005 show the facilities greatly increased parasitological diagnostic capacity, from 17% (16/94) in 2004 to 73% (76/ 104) in 2006 (Zurovac et al., 2007).

The MOH has identified improving the quality of healthcare as one of its priority areas of action in the Health Sector Medium-Term Development Plan (HSMTP, 2014-2017). It envisages that quality of care might be improved through paying more attention to the viewpoints of clients, improving the competencies and skills of health workers and provision of modern medical equipment and supplies among others (Ofosu-Kwarteng, 2012; Turkson, 2009a). However, no local studies have examined how the issue of quality care is addressed in relation to malaria case management in children under 5 years. Guided by Donabedian's quality of care model, the study seeks to assess the quality of health care rendered to children under- five with malaria at the Princess Marie Louis Hospital.

## **1.2 Problem statement**

Malaria is endemic and perennial in all parts of Ghana, with seasonal variations and more pronounced in the northern part of the country with 24.2 million of the population being at risk of malaria infection, and children under five years of age and pregnant women are at higher risk of severe illness due to lowered immunity (PMI, 2015). Also, for the 3<sup>rd</sup> quarter of 2015, the country recorded about 2.7 million suspected under-five malaria cases, translating into approximately 30,508 cases seen per day compared to an average of approximately 24, 639 of such cases seen in

the 3rd quarter of 2014 (NMCS, 2015). There appears, however, to be rural-urban variations in the incidence of malaria in children, especially those under five years of age. For instance, the proportion of children with a recent fever who tested positive for malaria was 80.2% in rural areas, but as low as 6.6% in the metropolitan areas of Accra and Kumasi (PMI, 2015).

Available data indicates that malaria in children accounted for at least 26% of all hospital attendance at PML, 12% of admissions and 4.6% of all deaths in the hospital in 2016 (MOH, DHIMS-2, 2017). Whereas these statistics appear to indicate an improvement in overall survival of children with malaria, it is unclear if the quality of care for children with malaria is guaranteed in Princess Marie Louis hospital, the only public Paediatric hospital in Accra.

### **1.3 Aim and objectives of the study**

The general objective of the study is to assess the quality of care delivered to children under five with malaria at the Princess Marie Louis hospital.

The specific objectives of the study are to:

1. Assess the availability of inputs (staff, medicines, logistics and standard protocols) for quality malaria case management.
2. Compare current practices of malaria management with standard treatment

Guidelines /protocols

3. Determine parental satisfaction with care quality at PML hospital.

4. Assess the influence of inputs availability and use of standard care procedures on clients' satisfaction with care quality.

#### **1.4 Research Questions**

1. To what extent are patient care inputs such as staff, medicines, logistics and standard protocols available for quality malaria care of children under-five years at the Princess Marie Louis hospital?
2. Is the current practice of malaria management in children under five years at Princess Marie Louis hospital consistent with standard treatment guidelines/protocols?
3. Are parents satisfied with care given to their children with malaria?
4. What is the influence of inputs availability (such as staff, medicines, logistics and standard protocols) and compliance with standard care procedures on quality care rendered to U5 with malaria?

#### **1.5 Variables**

The variables to be measured in the study are as follow.

##### **Dependent variables:**

1. Malaria care quality index (computed in a standardized score)

##### **Independent variables:**

1. Inputs availability (staff, equipment & drug, logistics, treatment guidelines).

2. **Current usage of (or compliance with) standard guidelines/protocols**
  
3. **Patient (parental) level of satisfaction**

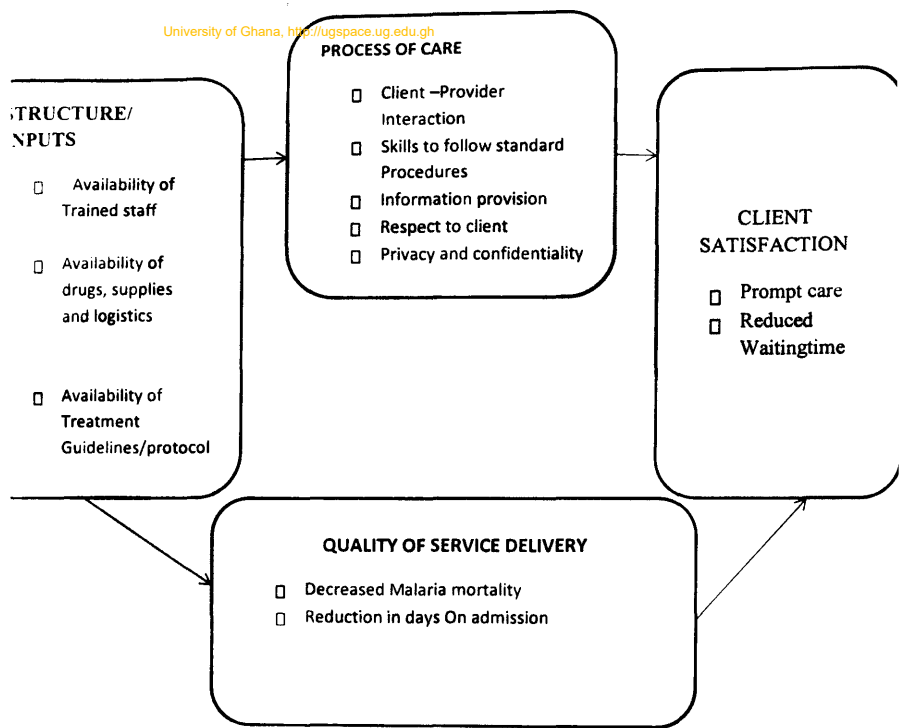
## CHAPTER TWO LITERATURE REVIEW

### 2.1 Introduction

This chapter reviews the theoretical model of health care quality by Donabedian (1992) and it centres on relevant literature related to the objectives of the study. This review synthesised the availability of inputs for quality care in patients with malaria, a comparison of practices of malaria management with that of standard protocols. Parental satisfaction with care quality and how care inputs availability influences the satisfaction with care quality are examined and they are presented as follows:

### 2.2 Conceptual Framework: Donabedian Quality of Care Model

On account of increasing population and improved financial and geographical access, there are growing demands for healthcare (Jehu-Appiah et al., 2008). However, this has been associated with rising costs of healthcare amidst limited resources. The concomitant effect has been variations in clinical practice within and across countries, raising interest in measuring and improving the quality of healthcare (Atinga, Kuganab-Lem, Aziato, & Srofenyoh, 2015; Campbell, Roland, & Buetow, 2000; Mitchell, Ferketich, & Jennings, 1998). As shown in figure 1, the framework divides factors impacting quality into inputs/structures, processes and outcomes, linked by unidirectional arrows.



**Figure 1: Conceptual framework of quality of care (Adapted from Donabedian, 1980)**

The concept of quality in healthcare is multifaceted and difficult to define and measure (Donabedian, 1983; Fenny, Hansen, et al., 2014). The Institute of Medicine (IOM) has defined the quality of care as the degree to which health services for populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge (IOM, 2001). In principle, quality is assured if patients can get the services they need and if the services provided are beneficial to them. Thus, inputs, the process of care and outputs/outcomes are of concern to those interested in the concept of health care quality (Abuosi&Atinga, 2013).

Consequently, others researchers are of the view that quality of care is meant by two key elements of effectiveness - clinical effectiveness and the effectiveness of interpersonal care and both of these should promote the best care quality environment of the client (Boateng, 2016; Campbell et al., 2000a; Peabody, Taguiwalo, Robalino, &Frenk, 2006a). These elements are discussed with reference to the structure of the healthcare system, processes of care and outcomes resulting from care.

Offei and colleagues also argue that quality of health care demands attention to the needs of patients and clients, using tested methods that are safe, affordable and reduce deaths, illness, and disability (Offei et al. 2004). Again, quality healthcare has been described in terms of striving for and reaching excellent standards of care and this may involve assessing the appropriateness of medical tests, treatments and measures that may continually improve personal health care in all fields of medicine (Atinga et al., 2015; Boateng, 2016).

The effects of a multiplicity of definitions of the concept of quality healthcare have been differing conceptual models for the study of healthcare quality. However, Donabedian's model of quality of care which has been widely used across the spectrum of medical specialities and illness diagnoses (Donabedian, 1983) and has received substantial empirical support for its ability to generate information from which inferences can be drawn on quality of care to client (Khamis&Njau, 2014b).

According to the Donabedian's model, three key domains, namely inputs/structure, process and outcome are interrelated in the context of quality of care. Donabedian posit that a good structure increases the likelihood of good process, which increases the likelihood of good outcomes, such as patients' satisfaction (Donabedian, 1983; Khamis&Njau, 2014a).

### **2.3.1 Structure/Inputs of Quality of Care of the Model**

From Donabedian model structure or inputs are made up of all factors that affect the context for health care delivery. These are the health institutions related factors, care provider and client related factors like transportation and communication, equipment supplies and availability of drugs, the economic status of the clients, human resources, as well as organisational characteristics such as supervision are some of the areas classified under structure (Donabedian, 1983). The inputs/structure appears to be easier to observe and measure.

Specifically, to this study, the structure/inputs would be measured in terms of availability of standard guidelines/protocols, equipment, drugs supplies, trained staff availability and waiting time. It has been shown that these are critical determinants of care quality in the Ghanaian healthcare context (Abuosi, 2015).

### **3.1.2 Process of Quality of Care of the model**

Under the process, Donabedian refers to the interaction between providers and their patients and how the providers' tasks and clinical processes are organised and performed (AvedisDonabedian, 2002). It also involves health workers' ability to effectively communicate and build mutual trust and understanding with their clients (Donabedian, 1980). Donabedian simplifies this as interpersonal care and it includes how the social and psychological interaction between client and health workers are managed (Donabedian, 1983). Basically, client and care provider interaction, skills to follow standard procedures, provision of relevant information and respect for client form the main components of process elements in driving quality of care. In operationalizing the concept in this study, the process of care is considered in the dimensions of technical quality (adherence to clinical guidelines) and interpersonal aspects of care (attitude of staff towards clients' care) (Abuosi&Atinga, 2013; Campbell, Roland, &Buetow, 2000b; Duff, 1992).

It has been argued that measurement of the process tend to be easier and better since it is relatively under the control of providers, needs a shorter time frame for results and can directly inform improvements in health care delivery (Peabody, Taguiwalo, Robalino, &Frenk, 2006b).

### **3.1.3 Outcomes of Quality of Care of the Model**

This has to do with client's satisfaction of health care delivery and the quality of care received by the client. Outcomes compose of the effects of healthcare on patients or populations, changes to health status, health behaviour, patient satisfaction and health-related quality of life (Donabedian, 1983; Mitchell, Ferketich, & Jennings, 1998b; Peabody et al., 2006a). However, accurately measuring outcomes that can be attributed exclusively to healthcare is very difficult. Consequently, patient satisfaction is considered as an intermediate outcome which should lead to the ultimate outcome of health improvement and quality of care (AyimbillahAtinga, AbekahNkrumah, &AmeyawDomfeh, 2011; Nketiah-Amponsah&Hiemenz, 2009; Peprah&Atarah, 2014). Therefore, in this study, patient satisfaction would be measured as a proxy of service quality. However, an index of service quality taking into account, the inputs, process and outcome would be determined using a weighted average.

### **3.2 Empirical Literature**

The review of literature discusses the various findings and studies that best explain the quality of health care delivered to children under five with malaria, structure or inputs of quality care, the process of quality of care and outcome of the health care delivered to clients. It also reviewed studies that will aid in explaining the influence of inputs availability, use of standard care procedures and clients (parental) satisfaction with care quality. Apart from that, the reviews will also concentrate on parental satisfaction with the quality of care and use of standard treatment guideline/protocol in the management of malaria in children under five. All this information was

retrieved from various database sources like Science Direct, Google Scholar, Pubmed, SAGE, EBSCOHOST, and CINAHL. The keywords that will be used for the search are Quality of care, structure/inputs availability, the process of health care, treatment outcomes, the satisfaction of health care, children-under-five with malaria and standard treatment guidelines/protocols for malaria.

### **3.2.1 Level of care quality and patient satisfaction with care rendered in Ghanaian hospitals**

Ghana's Ministry of Health (MOH) has prioritised quality of care improvement in its policies and programme of work (MOH, 2007, 2014, 2016b). Offei, Bannerman, &Kyeremeh (2004) posits that the key approach for improving quality of care to implement quality assurance programmes which were expected to become part of the routine health service delivery in Ghana. Quality of health care is often considered as a degree of performance in relation to a specified standard of interventions known to be safe, accurate and have the potential to improve health within available resources (Fenny, Hansen, Enemark, & Asante, 2014a). This encompasses technical (or objective) and subjective (or patient defined) aspects of quality (Fenny, Hansen, et al., 2014a). Accordingly, the issue of quality care has gained momentum in the healthcare landscape (Nketiah-Amponsah and Hiemenz, 2009) leading to a plethora of studies that attempts to measure or explain the quality of patient care in Ghanaian healthcare settings (Atinga, Abekah-Nkrumah, et al., 2011; Dzomcku, 2011; Essiam, 2013; Haran, Iqbal, &Dovio, 1993; Sika Avortri, Beke, &Abekah-Nkrumah, 2011; Turkson, 2009).

However, it appears that few or no studies focused on the care quality of either malaria patients or children under five years. For instance, in one exploratory survey, Abuosi and Atinga, (2013) based on a sample of 250 patients reported wide gaps between patients' expectations of quality care and

what they experienced/perceived to have received in Ghanaian healthcare institutions. Worst of all, patients gave lower ratings in terms of service reliability (providing promised services - 62.4%; getting things done the first time – 65.8%) and responsiveness or staff providing prompt services – 65.8%).

Conversely, others (Peprah&Atarah, 2014), guided by the service quality (SERVQUAL) model also assessed the quality of care rendered in a large hospital BrongAhafo Region. The researchers contended that, generally, only 8.8% amongst a sample of 214 rated the level of service quality as poor, thus, 91.2% of patients rated the care quality highly. Patients were most gratified with the Tangibility and Empathy dimensions of care whilst their expectations were generally not met in terms of Reliability (gap score -2.91), Responsiveness (gap score -2.31), Assurance (gap score - 0.95) and Communication/interpersonal relationship (gap score -0.81) dimensions. Peprah and colleague (2014) then concluded that even though patients' view of the overall quality of care was high, there is more room for improvement in relation to the abovementioned dimensions with the negative gap scores.

Likewise, based on a purposive sample of 803 people across 13 communities, Turkson (2009b) put forward that the general quality of healthcare delivery in Central Region of Ghana was perceived to be high. However, patients reported not being told of their diagnosis or informed about the management modalities for their illness.

The foregoing corroborates the assertion that, generally the technical quality of healthcare delivery may be perceived to be high but same cannot be said of the patients' perspective of quality care (Campbell et al., 2000b). Patients perceived poor attitude of some health workers, long waiting times, high cost of services, inadequate staff to attend to their needs, out of pocket payment for health services, frequent referrals to hospitals, lack of ambulances at facilities and

unavailability of some drugs as being detrimental to **effective delivery of quality healthcare** (Abuosi, 2015; Turkson, 2009). The issues of concern relative to care quality may be perceived differently from the perspective of service providers.

In a large cross-sectional survey of 17 Ghanaian hospitals, by Abuosi (2015) it was observed that whilst both patients and service providers generally rated levels of quality of care fairly favourably, significant differences existed in the overall perception of quality of care between patients and healthcare providers point of view ( $p=0.001$ ). The researcher, therefore, contended that Management of hospitals needs to evaluate patients' perceptions of quality of care to inform measures aimed at improving the quality of care, since what may be considered as good quality service from the provider perspective may be rated less favourably by patients. However, patients did not perceive significant quality differences in terms of fairness of care and adequacy of resource availability for insured and non-insured patients. Significant differences were predominantly observed in financial access to healthcare and perceived effectiveness of treatment given to insured and non-insured patients (Abuosi, 2016).

In other African contexts, one Tanzanian study (Nyberg & Nilsson, 2013) specifically examined the experience of managing children with malaria infection. Whilst overall quality of care was perceived as sub-optimal, one key reason advanced by both health workers and patients as being responsible for the sub-optimal quality was increasing workload. A nurse explained that "... as long as the number of bed and patients are consistent with each other it is no problem, but when they start to put children in extra beds along the walls and corridors it becomes too crowded to do a good work" (Nyberg & Nilsson, 2013, p. 5). Such a study, has, however, not been replicated in Ghana.

It has, thus, apparent from the aforesaid that, whilst there appear to be a large volume of empirical work assessing healthcare quality in the Ghanaian setting, there is a lacuna in the literature with regards to the quality of care for malaria patients especially those under-five years of age probably because it is difficult to directly elicit quality of care related responses from this group of patients.

### **3.2.2 Patient Satisfaction with Care Quality**

Patient satisfaction is viewed as both an outcome and an indicator of care quality, which offers a simple first step into understanding the quality of care as perceived by the patient (Fenny et al., 2014). As a result, the health service delivery agencies within the MOH undertakes routine patient satisfaction surveys using standardized and commonly adopted tool (Offei et al., 2004). However, there appear to be no quantitative or qualitative synthesis of the patient satisfaction survey reports across hospitals to give a global picture of the situation in Ghana. Nonetheless, a number of studies have relied on patient perspectives as the mainstay for appraising the quality of healthcare (Aditi, 2009; Sodani, 2010; Atinga; 2011; Fenny et al., 2014). There appear to be only little heterogeneity in findings reported by various studies; suggesting that overall, patients tend to be satisfied with service delivery albeit having concerns (Aaron A. Abuosi et al., 2015; Aaron A. Abuosi&Atinga, 2013; Aaron AsibiAbuosi, 2015; Atinga, Abekah-Nkrumah, et al., 2011; Dzomeku, 2011; Essiam, 2013; Nketiah-Amponsah&Hiemenz, 2009). For instance, it is reported that about 90% of patients are satisfied with the treatment and care received, principally because they were physically examined, told what was wrong, or given advice about their illness (Turkson, 2009c; Wong, Butt, Symington, &Pinelli, 2011).

On another hand, it appears that long waiting times between registration and receiving consultations from clinicians and when receiving other services from pharmacy and laboratory

are issues of concern to clients at the public hospitals in Ghana (Ishijima, Eliakimu, & Mshana, 2016).

Also, Atinga, Abekah-Nkrumah, and Domfeh, (2011) accentuated that long waiting times arising out of technical and administrative processes tend to be the critical factor for patient's satisfaction with health service quality. This implies that health services delivered with little or no long waiting time could potentially improve patients' satisfaction. This is, therefore, a wake-up call for the health institutions to consider and reengineer its operations to ensure that these factors are managed to meet the satisfaction of patients (Peprah, 2014).

Again, one Kenyan study (Wambua et al., 2015), it was reported that patient satisfaction in public healthcare facilities was found to be statistically associated with waiting time whereas in private-for-profit health facilities, patient satisfaction appeared to be associated with the type of visit and the duration of consultation. Aside from that, a study to quantify differences in family planning (FP) service quality at public and private providers in Tanzania, Ghana and Kenya, found that FP client's satisfaction was considerably higher in the private facilities than that of the public hospitals. These differences were influenced by factors like waiting times, methods and supplies of treatment from their various service points (Wambua et al., 2015).

On the hand, some researchers (Ahenkan&Aduo-Adjei, 2017; Aiken et al., 2012) indicated that patients trust that having emotional attachments with health providers in a way to be able to share their pain makes embodies their definition of satisfaction with quality of care. Considering the environment as a factor that enhances service quality, some authors (AyimbillahAtinga, Abekah-Nkrumah, & AmeyawDomfeh, 2011) asserts that since hospitals exist as healing institutions, a very tidy environment is necessary not only as a primary measure to control disease outbreak but also to provide some form of psychological relieve to the patient's.

### 3.2.3 Availability of Inputs for Quality Malaria Care

Ghana Health Service has over the years, increased service delivery with wide coverage due to the introduction of a national health insurance scheme in 2003 by the government of Ghana (MOH, 2010). This increasing level of utilisation of health services has also triggered the need for increased availability of resources in the health facilities for quality care to be delivered (Witter & Garshong, 2009).

Unfortunately, in some countries especially in Sub-Saharan Africa, in addition to geographical and financial barriers to healthcare, the healthcare systems are characterised by frequent shortages of drugs and equipment supplies, the supply of essential medicines that are safe and efficacious (Annan and others, 2013). Often, the supply chain is unreliable and do not guarantee a regular supply of these essential medicines (Khuluza, Kadammanja, Simango, & Mukhuna, 2016; Nyberg & Nilsson, 2013). Since medicines and health commodities in general form the backbone of all health systems all over the world, there is always the need to ensure their quality and regular availability in the right quantities as well as affordable prices (Annan & others, 2013; Annor, 2012; Campbell, Roland, & Buetow, 2000)

In the Ghanaian context, there has been a strain on health workers against the backdrop of limited improvement in infrastructure, logistics and staffing levels (Turkson, 2009d). For instance, in one Ghanaian qualitative study, Boadu et al. (2016) adopted focus groups discussion augmented with direct observations to examine the challenges with implementing malaria Rapid Diagnostic Tests (RDT) at primary care facilities. The researchers reported that the use of RDT in district hospitals was hampered by a number of factors, principally, healthcare delivery constraints such as weak supply chain, limited quality assurance and control, inadequate guideline emphasis, staffing limitations among others. The resultant effect of the inadequate inputs for malaria is not only the

poor quality of service delivered but also the treatment options patients tend to consider, thus, a public provider of health care, a private provider, purchase of drugs from a drug store, or self-medication (Dzator&Asafu-Adjaye, 2004).

Similarly, it was found in Yemen that availability of medication in line with national guidelines for anti-malaria drugs was only 38% even after interventions towards improvement (Ghouth, 2013). A similar plight of non-availability of drugs has been reported in Malawi (Khuluza et al., 2016).

In the Ghanaian context, the National Health Insurance Authority (NHIA) has been largely been blamed for late or non-reimbursement claims which have contributed to health facilities not been able to purchase drugs and other consumables. This situation undoubtedly affects the delivery of quality care to patients especially children in affected health facilities leading to patient dissatisfaction (Abuosi&Atinga, 2013; AyimbillahAtinga, Abekah-Nkrumah, et al., 2011; Sika Avortn et al., 2011). Patient dissatisfaction resulting from the poor quality of care has also been shown to affect patient's decisions to remain enrolled with the National Health

Insurance Scheme (NHIS) which ultimately makes the scheme less attractive to new members (Fenny et al., 2016; Turkson, 2009d). Therefore, quality of care does not only affect patient outcomes but also plays an important role in the cycle of events influencing healthcare affordability. Thus, it has been argued that the sustainability of the NHIS requires continuous patients' feedback to improve the quality of service provided (Fenny, Enemark, Asante, & Hansen, 2014).

The foregoing literature underlines that quality care cannot be provided timely unless the required materials such as consumables, drugs (especially anti-malarials), updated clinical guidelines and staff are available in adequate qualities and quantities. It thus, appears that access to essential

medicines and adequate supplies is fundamental to the performance of hospitals in terms of the quality of care provided to their patients (Annan & others, 2013; Annor, 2012).

### 3.2.4 Malaria Treatment Protocol in Ghana

Across malaria endemic countries, linked to the challenge of inputs availability for quality care is contentious one of adherence to standard treatment guidelines (Dodoo et al., 2009; Ghouth, 2013; Mbacham et al., 2014). This has the grave potential of spurring drug resistance and increased morbidity and mortality, undermining technical quality (Aaron A. Abuosi&Atinga, 2013). Similar situation necessitated malaria treatment policy changes across 41 African countries from previously used monotherapies such as chloroquine and sulphadoxinepyrimethamine (SP) to artemisinin-based combination therapies (ACT) as the choice of treatment for malaria (WHO, 2016).

In Ghana, the Ministry of Health (MOH) in line with WHO recommendations made the policy change in 2004 to use artesunate plus amodiaquine (ART-AQ) as first-line therapy for uncomplicated malaria. Despite initial public outcry about reports of adverse effects with ARTAQ, this has remained part of the policy position except for pregnant women in the first trimester that shall be given oral quinine (GHS, 2004; MOH, 2010). Patient's not tolerating artesunate plus amodiaquine (ART-AQ) are given Artemether plus Lumefantrine or Dihydroartemisinin plus Piperaquine as alternatives (MOH, 2010). The standard treatment guidelines provide that oral and parenteral quinine, parenteral Artemether or rectal Artesunate are the mainstay of severe malaria management in Ghana whilst Sulphadoxine-Pyrimethamine (SP) is reserved only for use in the prevention of malaria during pregnancy under observation (IPT).

In furtherance of ensuring technical quality in malaria treatment and care, standard flowchart for Malaria testing, diagnosis, and treatment, as shown in Figure 2, were introduced to guide

clinicians (MOH, 2009). The flowchart indicates all the different scenarios and steps to be taken in the treatment process of malaria especially children under five. Uncomplicated malaria is mainly clinically diagnosed based on fever as case definition. In health facilities, the current approach is to confirm the clinical diagnosis with a confirmatory parasitological test using either Rapid Diagnostic Test (RDT) or microscopy (MOH, 2009). Currently, the use of RDTs is recommended for the diagnosis of malaria in lower level peripheral health facilities such as the Community-based Health Planning and Services (CHPS), but not in health centers and hospitals where microscopy is recommended. Microscopic testing should be the standard at health facilities, including district hospitals and higher-level facilities including PML, the site for this study (Achan et al., 2011b; Fenny, Hansen, Enemark, & Asante, 2014b; Programme, 1986; Rezai et al., 2013). WHO Guidelines, however, recommend a parasitological confirmation of diagnosis in all patients suspected of having malaria before treatment (WHO, 2010).

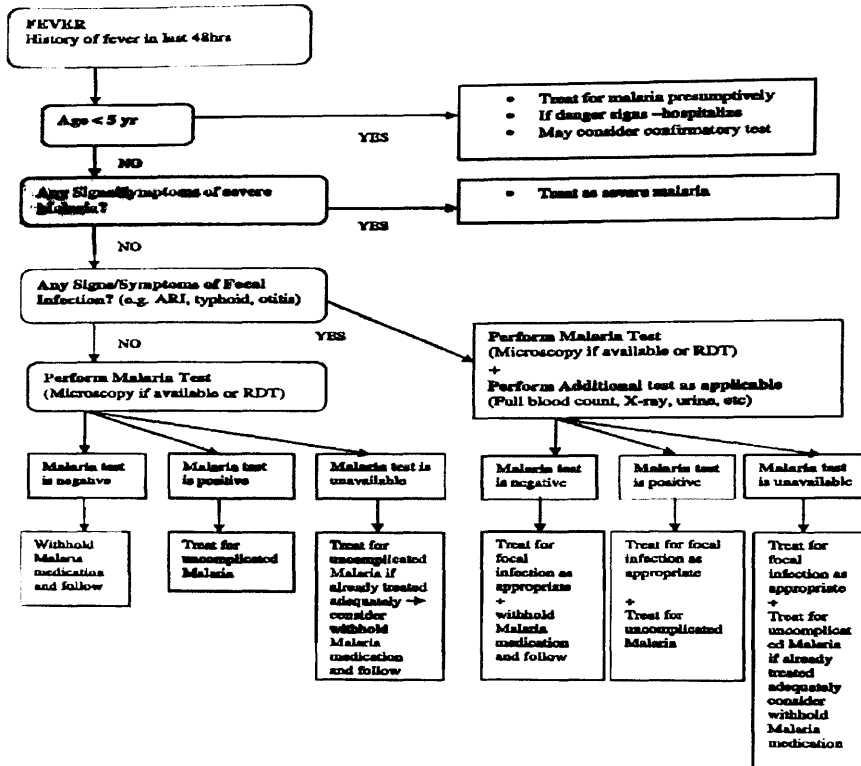


Figure 2: Flowchart for the diagnosis and treatment of malaria

Source: Training Manual for Malaria care in Ghana (MOH, 2009)

The standard protocol for Ghana currently specifies that under-five children with a febrile illness should be treated for malaria without testing (Figure 2) (Fenny, Hansen, et al., 2014). Other issues clarified include how patients should be managed if malaria testing is not available. In line with WHO guidelines the protocol highlights the importance of performing malaria tests and other tests where necessary before malaria medication is supplied to patients. However,

antimalarial prescription inconsistent these established guidelines have been reported (Kazaura, Lugangira, & Kalokola, 2016). In Ghana, for instance, Dodoo et al., (2009) in a prospective pharmacovigilance study examined the pattern of drug utilisation for the treatment of uncomplicated malaria. The researchers reported that of the patient cohort of 2,831, the majority (90.8%) received an artemisinin-based compound in their treatment regimen. However, only 43.0% received the recommended first-line therapy of ART-AQ. The alternative first line treatment, Dihydroartemisinin (DHA) was also used either alone (20.4%) or combined with another anti-malarial (9.4%). Dodoo and colleagues (2009) also noted that only 91 (3.2%) of cases were microscopically confirmed, 86.8% (n = 79) of who were prescribed ART-AQ. A similar pattern of disregard for treatment protocols have been reported across Africa especially Tanzania and Malawi (Khuluza et al., 2016; Minzi & Haule, 2008; Nyberg & Nilsson, 2013).

It is, however, worth noting that treatment of malaria in children under the age of five years tends to follow established treatment guidelines as compared to older patients (Dodoo et al., 2009; Ghouth, 2013; Mbacham et al., 2014). On the other hand, others have expressed concerns about the poor management of malaria in children by either over-diagnosis or over-treatment including wrong treatment (Kazaura et al., 2016).

In summary, the literature suggests that whereas standard treatment protocols abound, adherence by clinicians in terms of diagnostic procedure and drug use tend to be a thorny one and require further investigation, especially in the Ghanaian context.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

This chapter describes how the research problem was investigated and why particular designs and techniques were used. It also described the setting in which the study was carried out. Other concerns of the method such as sampling, tools for data collection, data gathering procedure, analysis, validity and reliability, limitations of the study and ethical issues are all contained in this section.

#### **3.2 Research design**

This study adopted quantitative approach employing a cross-sectional discipline design to examine the quality of care delivered to children under-five diagnosed with malaria at the Princess Marie Louis hospital, Accra.

A cross-sectional survey enabled the researcher to obtain a snapshot description of the status care quality of malaria in under-five children and how it relates to inputs and processes for healthcare quality espoused in the theoretical framework (Polit& Beck, 2013). Cross-sectional design is also economical and relatively manageable but is often constrained by the problem of using 'snapshot' to make generalisations (Babbie, 2005). However, the survey approach to cross sectional design usually allows for the collection of original data sufficient enough for generalisation to the population of interest (Babbie, 2005; Parahoo, 2006; Polit& Beck, 2013).

### **3.3 Research setting**

The study was carried out at Princess Marie Louis children hospital (PML) in Accra. The facility was established in 1926 to treat children with malnutrition. The hospital has, however, been expanded as the only paediatric hospital in Accra. PML currently has a bed capacity of 74 with 81 nurses, 5 paediatricians, 5 medical officers, 4 physician assistants, 3 pharmacist and 2 laboratory technicians respectfully (MOH, 2016a).

### **3.4 The Study Population**

The study population is defined as the entire set of individuals or elements who meet the sampling criteria (Khan, 2012; Polit& Beck, 2013). The population of this study comprised of parents of under-five children diagnosed with malaria as well as clinicians including medical, nursing and para-medical staff who are directly involved in providing malaria care at PML hospital.

### **3.5 Inclusion and Exclusion Criteria**

The inclusion criteria included full-time clinicians of PML hospital who provide direct patient care to children diagnosed with malaria. The clinicians should have been working at the hospital for at least 6 months. Also, parents of children under five years who have been discharged after been admitted and treated for malaria at PML hospital for at least 48 hours were included in the study.

Clinicians who are interns or temporary employees were excluded even if they had more than six months working experience at the hospital. Clinicians on leave were also excluded from the study.

### 3.6 Sample size and sampling procedure

Available records at the Princess Marie Louis Hospital (PML) showed that at the end of 2015 there was a total of 91 staff including doctors, nurses, pharmacists and physician assistants who are directly involved in the care of children, including those that have malaria (Ghana Health Service, 2013). Also, an average number of 1,142 malaria cases are seen monthly at the Princess Marie hospital. Using the aforesaid figures as accessible populations and based on an alpha of 0.05, Yamane (1967) simplified sample size formula was used to determine the sample size as shown below.

$$n = \frac{N}{1+N(e)^2} \quad \dots \text{Equation 1}$$

Where: n = required sample size

N= Accessible population

e = alpha level or significance level

$$\text{Thus, the number of staff to recruit} = \frac{87}{1+87(0.05)^2} \approx 71 \quad \dots \text{Equation 2}$$

$$\text{And the number patients' (parents) to recruit} = \frac{1142}{1+1142(0.05)^2} \approx 296 \quad \dots \text{equation 3}$$

Therefore, 71 staff and 296 clients (parents of children under five who were treated for malaria) were recruited for the study.

A computer generated random sampling technique was used to select parents and proportional quota sampling for the clinicians who met the inclusion criteria. The data collection was spanned through a period of four (4) weeks.

### **3.7 Data gathering instrument**

Questionnaires were used to gather information and data from the respondents. Standard tools were adapted for the data collection but some contextual observations were made to augment the data obtained through questionnaires.

The questionnaire was made up of two separate parts. The first part was administered to staff, was contained three sections. Section A collected demographic information of the respondents. Section B contained items that explored the availability of inputs (staff, medicines, logistics and treatment protocols) for quality care of malaria patients under five years of age. Section C also contained the relevant steps and procedures of the standard malaria case management in Ghana compared with current practices at the Princess Marie Louis hospital.

The second part, which was administered to parents of children under-five years treated for malaria were made up of two sections. The first section collected relevant demographic data whilst the second section contained the adapted patient satisfaction questionnaires.

### **3.8 Data analysis**

In this study, analysis of the data was carried out using the Statistical Package for Social Sciences (SPSS) version 20. In analysing the data, descriptive statistics such as mean, standard deviation and percentages was used to summarise the data while inferential statistics is also used to make the appropriate inferences. Specifically, the Pearson Product Moment Correlation.

Coefficient (Pearson's  $r$ ) followed by multiple regression analyses (Gujarati, 2009) were used to determine the relationships between parental satisfactions with care quality and the availability of inputs (staff, medicines, logistics and protocol) for quality of malaria care for under-five children.

**Table 1: Study variables**

Variable	OPERATIONAL DEFINITION	LEVEL OF MEASUREMENT
Malaria care quality index (computed in a standardized score)	A measure of quality of care given to children under five with malaria.	Interval
Inputs availability (staff, equipment & drug, logistics, treatment guidelines)	This is availability of resources needed for the provisions of quality care in the PML	Interval
Current usage of (or compliance with) standard guidelines/protocols	This is a standardised procedure laid down by Ghana Health Service in the management of Malaria under-five years.	Interval
Patient (parental) level of satisfaction	Satisfaction of care rendered to patient who attended the facility for their care with children under five.	Interval

### 3.9 Validity and reliability

Standard questionnaires were adapted for the context of this study, guided by the objectives of the study and extensive literature review. The questionnaire was subjected to vetting and corrections by research supervisors.

In order to ensure reliability, the questionnaire was pre-tested among 10 prospective participants in the study area. The data from pre-test was analysed and used to guide essential amendments of the questionnaire to address ambiguities. Also, the Cronbach's alpha coefficient was calculated to determine the level of internal consistency.

### **3.10 Ethical considerations**

Ethics is mostly associated with morality and deals with issues of right and wrong among groups, society or communities (Babbie, 2005). It is, therefore, important that all studies address ethical concerns adequately (Panneerselvam, 2010). Issues of major ethical concern include but not limited to respondents being fully informed about the aims, methods and benefits of the research; granting voluntary consent and maintaining the right of withdrawal. Babbie (2005) further highlights the importance of ensuring anonymity of the respondents and the protection against any physical or psychological harm.

**Ethical clearance:** The research proposal was submitted to Ghana Health Service Ethics Review Committee for review, ethical clearance and approval was given before the data collected for the study.

**Study area approval:** The Principal Investigator seeks permission from the Greater Accra Regional Health Directorate and thereafter from the management of Princess Marie Louis Hospital for the approval of the study.

**Subjects involved in the study:** The study was involved parents of children under five treated for malaria and health personnel of the facility.

**Potential risks of the study:** The study does not have any perceived potential risk but the participants were asked questions about their perception on the quality of care given and staffs were also asked questions on availability of inputs for quality of malaria care.

**Benefits of the study:** The findings from the study will help in formulation of policies that have improved malaria care management in children under five.

**Description of consenting process:** Participants that have been approached was taken through a consenting process by informing them about the study, this was done in the language they prefer and understand, based on their literacy level, and they were asked to read the consent form personally. Participants who agreed appended their signature on the consent form given or thump print.

**Privacy and Confidentiality:** All participants were given unique numbers on the questionnaire to conceal their identity. No names was used when the data is been analyzed.

**Data storage, security and usage:** Data collected was stored in computers under passwords and hardcopies (questionnaires and interview guides) was kept in lockable safe. The data collected is accessed by the Principal Investigator and the Supervisor of the study only.

**Compensation:** There was no form of compensation however participants were highly appreciated.

**Voluntary withdrawal:** Participation in the study was voluntary and participants could withdraw from the study at any point in time this does not caused any hindrance to the assessment of care.

**Conflict of interest:** The Principal Investigator declared no conflicting interests.

**Research project funding:** The study was basically funded by Principal investigator

### 3.11 Limitation of the study

Limitations are considered as conditions beyond the control of the researcher that may place restrictions on the conclusion of the study and their application to other situations (Utts&Heckard, 2004). This study was conducted only at Princess Marie children hospital in Accra to examine the state and process of providing quality of health care to children under five with malaria. The major challenge in this study was funding which the study could have extended the scope to other places like the paediatric unit of korle-bu Teaching Hospital and Ridge Regional Hospital. Data analysis was therefore limited to only complete questionnaires from PML. However, caution was taken during adaptation and modification of the questionnaire to make it clear and unambiguous so as to obtain the needed data.

## **CHAPTER FOUR**

### **FINDINGS**

#### **4.1 Introduction**

This chapter presents the findings of the study which are organised according to the objectives of the study. Demographic characteristics are first presented and followed by the findings that answer the specific objectives and research questions. They are presented as follows:

#### **4.2 Staff Demographic Characteristics**

Majority of the staff sampled were in the age bracket of 31-39 years (43.2%, n=32) with 55.4% (n=41) of them being females. Also, about 60.8% (n=45) of the staff sampled were married whilst as large as 97.3% (n=72) had tertiary education. In terms of professional background, majority (52.7%, n=39) were professional nurses and midwives while 6.8% (n=5) were medical doctors. Details of the staff demographic characteristics are presented in Table 2.

**Table 2: Staff Demographic Characteristics**

DEMOGRAPHIC VARIABLES		FREQUENCY (N)	PERCENT (%)
<b>Age Bracket</b>	Below 30 years	26	35.1
	31-39 years	32	43.2
	40-49 years	13	17.6
	Over 50 years	3	4.1
	<b>Total</b>	<b>74</b>	<b>100.0</b>
<b>Gender</b>	Male	33	44.6
	Female	41	55.4
	<b>Total</b>	<b>74</b>	<b>100.0</b>
<b>Marital Status</b>	Married	45	60.8
	Single	29	39.2
	<b>Total</b>	<b>74</b>	<b>100.0</b>
<b>Educational background</b>	Secondary school	1	1.4
	Tertiary	72	97.3
	Others	1	1.4
	<b>Total</b>	<b>74</b>	<b>100.0</b>
<b>Professional Background</b>	Doctor	5	6.8
	Physician Assistant	5	6.8
	Nurse/Midwife	39	52.7
	Pharmacist	11	14.9
	Biomedical	10	13.5
	Scientist/Laboratory Technician		
	Others, please specify	4	5.4
	<b>Total</b>	<b>74</b>	<b>100.0</b>

#### 4.3 Availability of Inputs for Quality Malaria Case Management in Under-Five Children

Technical quality was measured using the availability of inputs for malaria case management and the extent to which standard malaria case management protocols were adhered to.

Therefore, one of the fundamental objectives of the study was to determine the availability of inputs such as medicines, standard protocols/procedures and laboratory equipment among others for quality malaria care for children under five years. Using a five-point scale, staffs were asked to rate the extent to which various service delivery inputs were available. The responses were summarised using means and standard deviations (SD). Also, the 95% confidence intervals (CI) of the mean estimate were calculated.

The overall mean score of inputs availability from the hospital staff point of view was high (mean = 4.06, SD= 0.41, 95% CI: 3.96 – 4.15). This translates into 81.1% overall inputs availability at the hospital for the management of malaria in children under five years of age. Based on the 95% confidence interval, the overall input availability is estimated to be between 79.2% and 83.0%. The highest input availability score was recorded in the area general inputs such as staff, triaging and basic equipment including weighing scales and thermometers among others (mean = 4.44, SD = 0.60, 95% CI: 4.30 – 4.58). This translates into 88.8% availability of general inputs at the hospital.

Similarly, the mean score for availability of laboratory inputs such as functional microscopes, laboratory staff, rapid diagnostic test and training among others was 4.23 on the 5-point scale (SD = 0.83, 95% CI: 4.13 – 4.34). This also translates into 84.6% availability of laboratory inputs at the hospital. Also, there was 88.1% availability of supportive medicines such as blood for transfusion, infusions of all kind, oxygen, anti-pyretics and consumables including gloves, syringes and needles among others (mean = 4.41, SD = 0.55, 95% CI: 4.28 – 4.53).

However, the availability of the core anti-malaria medication was lowest of all the inputs parameters assessed (mean = 3.33, SD = 0.83, 95% CI: 3.14 – 3.52). On the 5-point scale, this translates 66.6% availability of anti-malaria medicines at the hospital. Details of the input availability at the hospital are presented in Table 3.

**Table 3: Availability of Inputs for Management of Malaria**

INPUT DIMENSION	Mean (Scale of 1- 5)	Mean in Percent (%)	Std. Error of Mean	Std. Deviation	95% CI of M	
					Lower	Upper
<b>GENERAL INPUTS</b>	<b>4.44</b>	<b>88.8%</b>	<b>0.07</b>	<b>0.60</b>	<b>4.30</b>	<b>4.58</b>
<i>Practice of Triageing</i>	4.12	82.4%	0.10	0.84	3.93	4.31
<i>Private Consulting Rooms for severely ill children at the OPD</i>	4.59	91.8%	0.10	0.83	4.40	4.78
<i>Thermometers available</i>	4.65	93.0%	0.07	0.58	4.52	4.78
<i>Functional scale for weighing</i>	4.64	92.8%	0.07	0.63	4.50	4.78
<i>Powered Staff</i>	4.43	88.6%	0.07	0.63	4.29	4.57
<i>Medicine box/fridge</i>	4.32	86.4%	0.09	0.80	4.14	4.50
<b>LABORATORY CAPACITY</b>	<b>4.23</b>	<b>84.6%</b>	<b>0.05</b>	<b>0.47</b>	<b>4.13</b>	<b>4.33</b>
<i>Medical laboratory staff</i>	4.28	85.6%	0.09	0.73	4.11	4.45
<i>Availability of functional microscope (from Laboratory Technician)</i>	3.85	77.0%	0.09	0.75	3.68	4.02
<i>Fast Diagnostic Test (RDT) availability</i>	4.58	91.6%	0.07	0.60	4.44	4.72
<i>Staff trained to perform RDTs</i>	4.27	85.4%	0.09	0.73	4.10	4.44
<i>Malaria testing using Functional microscopy</i>	4.16	83.2%	0.07	0.62	4.02	4.30
<i>Malaria testing using both microscopy &amp; RTD</i>	4.09	81.8%	0.09	0.74	3.92	4.26
<b>AVAILABILITY OF MALARIA MEDICINES</b>	<b>3.33</b>	<b>66.6%</b>	<b>0.10</b>	<b>0.83</b>	<b>3.14</b>	<b>3.52</b>
<i>Artemisinin-based Combination Therapies</i>	4.03	80.6%	0.10	0.84	3.84	4.22
<i>Chloroquine</i>	3.92	78.4%	0.11	0.92	3.71	4.13
<i>Sulfadoxin-based Combination</i>	3.01	60.2%	0.14	1.21	2.73	3.29
<i>Other Injections</i>	3.00	60.0%	0.14	1.19	2.73	3.27
<i>Oral Quinine</i>	2.81	56.2%	0.14	1.21	2.53	3.09
<b>SUPPORTIVE MEDICINES</b>	<b>4.41</b>	<b>88.1%</b>	<b>0.06</b>	<b>0.55</b>	<b>4.28</b>	<b>4.54</b>
<i>Dextrose</i>	4.27	85.4%	0.10	0.83	4.08	4.46
<i>Normal Saline</i>	4.08	81.6%	0.11	0.96	3.86	4.30
<i>Normal Saline for transfusion</i>	4.16	83.2%	0.10	0.88	3.96	4.36
<i>Normal transfusion sets</i>	4.11	82.2%	0.09	0.80	3.93	4.29
<i>Transfusing sets</i>	4.30	86.0%	0.08	0.68	4.15	4.45
<i>Insulin syringe availability</i>	4.38	87.6%	0.08	0.68	4.23	4.53
<i>Syringes and needles availability</i>	4.65	93.0%	0.07	0.63	4.51	4.79
<i>Thermometers availability</i>	4.64	92.8%	0.07	0.61	4.50	4.78
<i>Thermometers availability</i>	4.59	91.8%	0.08	0.66	4.44	4.74
<i>Infusion machine availability and functionality</i>	4.15	83.0%	0.09	0.79	3.97	4.33
<b>GENERAL INPUTS AVAILABILITY SCORE</b>	<b>4.06</b>	<b>81.1%</b>	<b>0.05</b>	<b>0.41</b>	<b>3.96</b>	<b>4.16</b>

*Input Availability was measured from staff point of view with a 5-point Scale. Higher mean scores reflect higher inputs availability for malaria case management and care*

#### **4.4 Compliance with Standard Malaria Case Management Protocols for Children Under-Five Years**

Another proxy of technical quality is the use of standard protocols to guide care and treatment. The study examined the compliance rate of the hospital staff (Doctors, nurses, laboratory technicians, pharmacy and among others) with standard malaria case management protocols (GHS, 2015).

Based on a 3-point scale, staffs were asked how often various protocols for malaria case management for under-five children is followed or complied with. The responses were summarised using means, standard deviations (SD) and percentage compliance rate.

The analysis showed that, overall compliance with malaria case management protocol at the hospital was 2.68 on the 3-point scale (mean =2.68, SD = 0.10). This translates into an overall compliance rate of 89.4%. However, six (6) parameters of standard protocols/guidelines in malaria case management were assessed and averaged into the compliance score. One of these parameters was general care of children with malaria at the outpatients' department (OPD). This comprised of mandatory testing before treating malaria and the use of only Artemisinin-based Combination Therapies (ACT). The results reveal a compliance rate of 93% in this dimension (mean = 2.79, SD = 0.11). Also, initial evaluation of patients admitted with complicated malaria was complied with about 93.1% of the time (mean = 2.79, SD = 0.32). This dimension of compliance included assessment of the airway, breathing and Circulation; dehydration; anaemia and level of consciousness using Glasgow or Blantyre Coma scales among others.

Furthermore, the compliance rate for standard laboratory investigations to be conducted for children with severe or complicated malaria was about 87.2% (mean = 2.62, SD = 0.27). This dimension included blood test for haemoglobin level, microscopy of malaria parasites, grouping and cross-matching for possible transfusion (where Hb<5gm/dl and HCT<15 - 20%) and blood glucose. Others

investigations assessed include Lumbar Puncture (LP) in patients with convulsions or coma and fundus copy to rule out raised intracranial pressure.

Moreover, compliance with initiating and maintaining treatment according to the standard protocols was 89.6% (mean = 2.69, SD = 0.23) whilst compliance with standard monitoring of patients on admission was rated at 89.9% (mean = 2.70, SD = 0.11) at the hospital.

Finally, compliance with standard protocols for assessment of patients during the recovery period was 80.9% (mean = 2.43, SD = 0.26). Details of staff/providers compliance with standard malaria case management protocol are presented in Table 4.

**Table 4: Compliance with Standard Malaria Case Management Protocols**

ASPECTS OF GHANA MALARIA CASE MANAGEMENT PROTOCOL (GHS, 2015)	COMPLIANCE RATE			
	Mean (Scale:1-3)	Std. Error	Std. Deviation	Percentage Compliance
<b>GENERAL CARE OF A CHILD WITH MALARIA FOR OUTPATIENTS</b>	<b>2.79</b>	<b>0.04</b>	<b>0.31</b>	<b>93.0%</b>
<i>Testing using RDT or microscopy before malaria treatment</i>	2.78	0.05	0.41	92.7%
<i>Use of only Artemisinin-based Combination Therapies (ACT)</i>	2.82	0.05	0.38	94.0%
<b>INITIAL EVALUATION OF PATIENT ADMITTED WITH COMPLICATED MALARIA</b>	<b>2.79</b>	<b>0.04</b>	<b>0.32</b>	<b>93.1%</b>
<i>Airway, Breathing and Circulation.</i>	2.77	0.05	0.42	92.3%
<i>Dehydration</i>	2.89	0.04	0.31	96.3%
<i>Repeated Convulsions</i>	2.90	0.03	0.29	96.7%
<i>Signs of shock and collapse</i>	2.84	0.04	0.37	94.7%
<i>Anaemia</i>	2.82	0.05	0.42	94.0%
<i>Pulmonary Oedema</i>	2.71	0.05	0.45	90.3%
<i>Level of Consciousness using Glasgow or Bluntyre Coma scales</i>	2.33	0.06	0.53	77.7%
<i>Hyperpyrexia</i>	2.90	0.03	0.29	96.7%
<i>Urine Output</i>	2.79	0.05	0.44	93.0%
<b>LABORATORY TEST CONDUCTED</b>	<b>2.62</b>	<b>0.03</b>	<b>0.27</b>	<b>87.2%</b>
<i>Microscopy for malaria parasites- thick and thin blood films</i>	2.73	0.06	0.48	91.0%
<i>Haemoglobin (Hb) and/or Haematocrit (HCT).</i>	2.82	0.05	0.38	94.0%
<i>Grouping and cross-matching for possible transfusion where Hb&lt;5gm/dl and Hct&lt;15 - 20%</i>	2.76	0.06	0.49	92.0%
<i>Lumbar Puncture (LP) in patients with convulsions or coma</i>	2.39	0.06	0.54	79.7%
<i>Funduscopy to rule out raised Intracranial Pressure before LP</i>	2.04	0.07	0.63	68.0%
<i>Urea, creatinine, and electrolytes</i>	2.28	0.06	0.51	76.0%
<i>Blood glucose</i>	2.82	0.05	0.42	94.0%
<i>Full blood cell count, platelet count, clotting studies, blood culture, plasma bicarbonate, plasma lactate.</i>	2.85	0.05	0.40	95.0%
<b>INITIATING AND MAINTAINING TREATMENT</b>	<b>2.69</b>	<b>0.03</b>	<b>0.23</b>	<b>89.6%</b>
<i>Start treatment whilst waiting for laboratory results</i>	2.80	0.05	0.47	93.3%
<i>Secure the airway in an unconscious patient.</i>	2.77	0.05	0.46	92.3%
<i>Intubate patient where appropriate</i>	2.24	0.07	0.64	74.7%
<i>Insert an IV cannula.</i>	2.76	0.06	0.49	92.0%
<i>Using body weight to calculate dosages of medicines &amp;fluid</i>	2.89	0.05	0.39	96.3%
<i>Administer parenteral anti-malarial medications</i>	2.76	0.05	0.46	92.0%
<i>Provide additional supportive therapy</i>	2.73	0.06	0.48	91.0%
<i>Full parenteral course based on parasitological confirmation</i>	2.69	0.06	0.50	89.7%
<i>Order parenteral drug choice: Artesunate, Artemether and Quinine.</i>	2.73	0.06	0.48	91.0%
<i>Parenteral treatment continued until patient can swallow</i>	2.69	0.06	0.52	89.7%
<i>Parenteral treatment for at least 24 hours even if patient can swallow</i>	2.70	0.06	0.54	90.0%
<i>Treatment completed using full 3-day course of an oral ACTs</i>	2.84	0.06	0.47	94.7%
<b>MONITORING WHILE ON ADMISSION</b>	<b>2.70</b>	<b>0.01</b>	<b>0.11</b>	<b>89.9%</b>

ASPECTS OF GHANA MALARIA CASE MANAGEMENT PROTOCOL (GHS, 2015)	COMPLIANCE RATE			
	Mean (Scale:1-3)	Std. Error	Std. Deviation	Percentage Compliance
<i>Level of consciousness using Blantyre or Glasgow coma scale</i>	2.31	0.06	0.50	77.0%
<i>Vital Signs taken at least four (4) hourly.</i>	2.93	0.04	0.34	97.7%
<i>Fluid intake/output, including the rate of infusion of fluids.</i>	2.91	0.04	0.34	97.0%
<i>Urine volume monitored hourly</i>	2.64	0.06	0.49	88.0%
<i>Blood glucose check 4-hourly while patient is unconscious.</i>	2.76	0.05	0.43	92.0%
<i>Mandatory parasitaemia obtained on admission</i>	2.31	0.06	0.52	77.0%
<i>Parasitemia while hospitalised - repeated at least 6 hourly</i>	2.08	0.06	0.54	69.3%
<b>ASSESSMENT OF RECOVERY</b>	<b>2.43</b>	<b>0.03</b>	<b>0.26</b>	<b>80.9%</b>
<i>Check for neurological sequelae (deficit)</i>	2.09	0.05	0.44	69.7%
<i>Assess vision and hearing and refer if deficits are found</i>	2.36	0.06	0.51	78.7%
<i>Assess neuro-motor functioning.</i>	2.23	0.06	0.48	74.3%
<i>Perform follow-up laboratory tests on the 7th and 14th days</i>	2.74	0.06	0.47	91.3%
<b>OVERALL COMPLIANCE WITH PROTOCOLS FOR MALARIA CASE MANAGEMENT</b>	<b>2.68</b>	<b>0.01</b>	<b>0.10</b>	<b>89.4%</b>

*Compliance was measured from staff point of view with a 3-point Scale. Higher mean scores reflect higher compliance with standard protocols for malaria case management.*

#### 4.5 Influence of Inputs Availability on Compliance with Standard Malaria Care

A hierarchical regression analysis was performed to determine the influence various input factors on the staff overall compliance with standard malaria case management protocols and guidelines (GHs, 2015). The overall compliance with standard malaria case management protocol was entered as the dependent variables the following were entered consecutively as predictor variables: general inputs (model 1), laboratory capacity (model 2), Anti-malaria medicines availability (model 3), supportive medicines availability (model 4) and interaction term between anti-malaria and supportive medicines availability (model 5).

In the first model, general inputs availability explained only 3.3% of the variance in staff compliance with standard malaria care protocols. However, the model was not statistically significant in correctly predicting compliance with standard malaria ( $R^2 = 0.033$   $F_{(1,73)} = 2.450$ ,  $P = 0.122$ ).

In the second model, when laboratory capacity was added as a predictor, the two predictors produced a statistically insignificant model which explains 6.6% of the variance in staff compliance with standard malaria care guidelines in the management of malaria under five ( $R^2 = 0.066$   $F_{(2,73)} = 2.516$ ,  $P = 0.589$ ). Similarly, when anti-malaria medicines availability was added to the model (model 3), the explanatory power of the model improved to 7.2% albeit statistical insignificance ( $R^2 = 0.072$   $F_{(3,73)} = 1.823$ ,  $P = 0.151$ ).

In the final regression model, the availability of supportive medicines added to the predictor variables which dramatically improved the explanatory power of the model to 15.9% of the variance in staff compliance with standard malaria care ( $R^2 = 0.159$   $F_{(4,73)} = 3.262$ ,  $P = 0.016$ ). However, when individual contribution of the predictors were assessed, only supportive medicines availability was statistically significant, accounting for 6% of the explanatory power of the model ( $\beta = 0.06$ ,  $p = 0.01$ ). Considering the interactive effect of anti-malaria and supportive medicines availability in the fifth

model, further improved the predictive power of the model to 22.6% which is statistically significant ( $R^2 = 0.226$   $F_{(5,73)} = 3.977$ ,  $P = 0.003$ ). The interaction effect of anti-malaria and supportive medicines accounted for 6% of the explanatory ability of the model ( $\beta = 0.06$ ,  $p = 0.02$ ) but more importantly, anti-malaria medicines availability which was in previous model statistically insignificant also accounted for as much as 26% of the model's ability to predict staff compliance with standard malaria care protocols ( $\beta = 0.26$ ,  $p = 0.02$ ). Similarly, supportive medicines availability contributed 22% of the predictive power of the model ( $\beta = 0.22$ ,  $p = 0.02$ ).

Details of the hierarchical regression models (the influence of inputs availability on compliance rate with standards malaria care protocols) are presented in Table 5.

**Table 5: Influence of Inputs Availability on Compliance with Standard Malaria Care**

Model	Independent variables/Predictors	Unstandardized Coefficients		Standardized Coefficients	t-value	P-Value	95% Confidence Interval	
		Beta	Std. Error	Beta			Lower Bound	Upper Bound
1	Intercept	2.55	0.08		30.60	0.00	2.39	2.72
	General Inputs	0.03	0.02	0.18	1.57	0.12	-0.01	0.07
	<i>Model 1 Summary: <math>R^2 = 0.033</math> <math>F_{(1,73)} = 2.450</math>, <math>P = 0.122</math></i>							
2	Intercept	2.45	0.11		23.35	0.00	2.24	2.66
	General Inputs	0.01	0.02	0.05	0.36	0.72	-0.04	0.05
	Laboratory Capacity	0.05	0.03	0.22	1.59	0.12	-0.01	0.10
	<i>Model 2 Summary: <math>R^2 = 0.066</math> <math>F_{(2,73)} = 2.516</math>, <math>P = 0.88</math></i>							
3	Intercept	2.45	0.11		23.27	0.00	2.24	2.66
	General Inputs	0.01	0.02	0.04	0.29	0.78	-0.04	0.05
	Laboratory Capacity	0.04	0.03	0.19	1.26	0.21	-0.02	0.10
	Anti-Malaria Medicines Availability	0.01	0.02	0.09	0.69	0.49	-0.02	0.04
	<i>Model 3 Summary: <math>R^2 = 0.072</math> <math>F_{(3,73)} = 1.823</math>, <math>P = 0.151</math></i>							
4	Intercept	2.33	0.11		21.10	0.00	2.11	2.55
	General Inputs	-0.01	0.02	-0.04	-0.26	0.79	-0.05	0.04
	Laboratory Capacity	0.02	0.03	0.11	0.78	0.44	-0.04	0.08
	Anti-Malaria Medicines Availability	0.01	0.02	0.05	0.37	0.71	-0.02	0.04
	Supportive Medicines Availability	0.06	0.02	0.34	2.67	0.01	0.02	0.10
	<i>Model 4 Summary: <math>R^2 = 0.159</math> <math>F_{(4,73)} = 3.262</math>, <math>P = 0.016</math></i>							
5	Intercept	1.69	0.28		5.95	0.00	1.12	2.26
	General Inputs	-0.01	0.02	-0.06	-0.43	0.67	-0.05	0.03

Model	Independent variables/Predictors	Unstandardized Coefficients		Standardized Coefficients	t-value	P-Value	95% Confidence Interval	
		Beta	Std. Error	Beta			Lower Bound	Upper Bound
	Laboratory Capacity	0.00	0.03	-0.01	-0.04	0.97	-0.06	0.06
	Anti-Malaria Medicines Availability	0.26	0.11	2.23	2.46	0.02	0.05	0.47
	Supportive Medicines Availability	0.22	0.07	1.28	3.15	<0.001	0.08	0.36
	Interaction Term: Anti-Malaria and Supportive Medicines Availability	0.06	0.02	2.57	2.43	0.02	0.01	0.10
	<i>Model 5 Summary: <math>R^2 = 0.226</math> <math>F_{(5,73)} = 3.977</math>, <math>P = 0.003^*</math></i>							

Dependent Variable: Overall Compliance with Protocols for Malaria Case Management; \*P-Value < 0.05

#### 4.6 Patient and Caretakers Demographic Characteristics (Patient Survey)

The age bracket of the parents/caretakers was 31-39 years representing 40.9% (n= 123) majority while the mean age of the children under-five was 2.58 years (SD=1.28 years). Majority of the patients were females (92.7%, n=297) with 72.4% (n=218) of them married and living with their partners while the rest were single (24.3%, n = 73), divorced (1.7%, n=5) or widowed (1.7%, n = 5). About 68.4% (n = 206) of the patients were treated as OPD cases while the rest were admitted. For those that were admitted, the length of stay ranged from 1 to 6 days (mean =2.9, SD=1.49). Details of the patients and parents/caretaker's demographics characteristics are presented in Table 6.

**Table 6: Demographic Characteristics of Parents/caretakers**

<b>Demographic Variables</b>	<b>Frequency (N)</b>	<b>Percent (%)</b>	
<b>Age bracket</b>	Below 30 years	111	36.9
	<b>31-39 years</b>	<b>123</b>	<b>40.9</b>
	40-49 years	63	20.9
	Over 50 years	4	1.3
	<b>Total</b>	<b>301</b>	<b>100.0</b>
<b>Gender</b>	Male	22	7.3
	Female	279	92.7
	<b>Total</b>	<b>301</b>	<b>100.0</b>
<b>Marital Status</b>	Married	218	72.4
	Single	73	24.3
	Divorced	5	1.7
	Widow	5	1.7
	<b>Total</b>	<b>301</b>	<b>100.0</b>
<b>Was your child admitted?</b>	Yes	95	31.6
	No	206	68.4
	<b>Total</b>	<b>301</b>	<b>100.0</b>
<b>If admitted, how long?</b>	1-2 days	13	13.6
	2-3 days	30	31.6
	3-4 days	31	32.6
	5 days and above	21	22.2
	<b>Total</b>	<b>95</b>	<b>100.0</b>

#### **4.7 Patient Satisfaction with Malaria Care Quality at PML Hospital**

Besides technical quality, subjective patient satisfaction with malaria care at PML hospital was examined from the perspective of parents/caretakers of the under-five year old children using a standardised five-point patient satisfaction scale.

The analysis showed that the overall mean score for patient satisfaction with the quality of malaria management and care at the hospital was moderate (mean = 3.09 on the 5-point scale, SD = 0.40) which translates into 61.8%. A breakdown of the dimensions of patient satisfaction included in the study showed that parental/caretaker satisfaction with Out Patient Department (OPD) appointment process at the hospital was high (Mean = 3.77, SD = 0.74). On the 5-point scale, this translates into a 75.4% satisfaction with the OPD processes. Also, parental/caretaker satisfaction with staff attitude was about 77.6% (Mean = 3.88, SD = 0.43) but satisfaction with the staff communication with patients was lower (65.6%) (Mean = 3.28, SD = 0.59). In terms of patient satisfaction with the facilities at the hospital, the analysis revealed a high mean score of patient satisfaction (Mean=3.74, SD = 0.69) which translates into 74.8%. Details of the patient's satisfaction of care quality of malaria under-five management are presented in Table 7.

**Table 7: Patient Satisfaction with Malaria Care**

PATIENT SATISFACTION DIMENSIONS	Mean	Std. Error	Std. Deviation	95% CI of Mean	
				Lower	Upper
<b>PATIENT APPOINTMENT</b>	<b>3.77</b>	<b>0.04</b>	<b>0.74</b>	<b>3.68</b>	<b>3.85</b>
<i>Making you feel at ease</i>	4.09	0.10	1.81	3.89	4.29
<i>Service available 24 hours to clients</i>	4.29	0.04	0.75	4.21	4.37
<i>Getting care as soon as you needed</i>	3.83	0.04	0.70	3.75	3.91
<i>Getting after-hours care when needed</i>	3.76	0.04	0.71	3.68	3.84
<i>Efficiency of check-in process</i>	3.53	0.04	0.77	3.44	3.62
<i>Waiting time in the doctor's room</i>	3.27	0.05	0.82	3.18	3.36
<i>Informing if appointment time was delayed</i>	3.26	0.05	0.80	3.17	3.35
<i>Ease of getting a referral when you needed</i>	3.14	0.05	0.86	3.04	3.24
<b>STAFF ATTITUDE</b>	<b>3.88</b>	<b>0.02</b>	<b>0.43</b>	<b>3.83</b>	<b>3.93</b>
<i>Courtesy of staff</i>	3.05	0.02	0.41	3.00	3.10
<i>Friendliness and courtesy of receptionist</i>	3.72	0.04	0.64	3.65	3.79
<i>Care and concern of nurses and doctors</i>	3.72	0.04	0.61	3.65	3.79
<i>Helpfulness of staff with billing or insurance</i>	3.71	0.04	0.64	3.64	3.78
<i>Professionalism of our laboratory other staff</i>	3.69	0.03	0.59	3.62	3.76
<b>STAFF COMMUNICATION WITH PATIENT</b>	<b>3.28</b>	<b>0.03</b>	<b>0.59</b>	<b>3.21</b>	<b>3.34</b>
<i>Prompt attention &amp; answered all questions</i>	3.86	0.05	0.94	3.75	3.97
<i>Getting advice or help when needed during</i>	3.58	0.04	0.72	3.50	3.66
<i>Staff explained treatment understandably</i>	3.54	0.04	0.65	3.47	3.61
<i>Test results reported in a reasonable time</i>	3.66	0.14	2.38	3.39	3.93
<i>Effectiveness of providing information</i>	3.42	0.04	0.70	3.34	3.50
<i>Staff ability to answer patient questions timely</i>	3.38	0.11	1.90	3.17	3.59
<i>Patients able to contact staff for attention</i>	3.22	0.04	0.66	3.15	3.29
<i>Patient obtains prescription refills by staff</i>	2.98	0.05	0.82	2.89	3.07
<b>PATIENT VISIT WITH THE PROVIDER</b>	<b>3.82</b>	<b>0.03</b>	<b>0.54</b>	<b>3.76</b>	<b>3.88</b>
<i>Willingness to listen carefully to you</i>	3.33	0.04	0.66	3.26	3.40
<i>Taking time to answer your questions</i>	3.70	0.04	0.63	3.63	3.77
<i>Amount of time spent with you to attend to you</i>	3.68	0.04	0.65	3.61	3.75
<i>Explaining things without using medical terms</i>	3.65	0.04	0.66	3.58	3.72
<i>Instructions regarding medication/follow-up</i>	3.69	0.04	0.65	3.62	3.76
<i>The thoroughness of the examination</i>	3.73	0.04	0.73	3.65	3.81
<i>Referral to laboratory for malaria test</i>	3.75	0.04	0.75	3.67	3.83
<i>Advice given on home care</i>	3.63	0.05	0.79	3.54	3.72
<b>PML FACILITY</b>	<b>3.74</b>	<b>0.04</b>	<b>0.69</b>	<b>3.66</b>	<b>3.82</b>
<i>Hours of operation convenient</i>	3.45	0.04	0.77	3.36	3.54

<i>Overall comfort</i>	3.65	0.04	0.67	3.57	3.73
<i>Ade-quate sitting and chairs at waiting room</i>	3.76	0.04	0.70	3.68	3.84
<i>Signpost/directional sign easy to follow</i>	3.60	0.05	0.90	3.50	3.70
<b>COMPOSITE SATISFACTION WITH MALARIA CARE QUALITY</b>	<b>3.70</b>	<b>0.02</b>	<b>0.40</b>	3.65	3.74

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*Patient Satisfaction with Malaria Care was measured on a 5-point where higher mean scores reflects higher patient satisfaction with malaria case management and care*

#### **4.8 Influence of Technical Quality Indicators on Patient Satisfaction with Malaria Care**

To examine the influence of technical quality indicators such as the availability of inputs and compliance with standard protocols on patient satisfaction with malaria case management, an Ordinary Least Squares (OLS) regression was performed. The results, however, showed that, all the technical quality indicators (General inputs, laboratory capacity, anti-malaria medicines availability, supportive medicines availability, overall compliance with protocols for malaria case management, interaction effect of anti-malaria and supportive medicines and interactive effect of medicines availability and laboratory capacity) altogether yielded a weak and statistically insignificant model ( $R^2 = 0.08$ ,  $F_{(7,300)} = 0.291$ ,  $P = 0.957$ ). Thus, the independent variables were not significant predictors of patient satisfaction of malaria care in the hospital. Even when a hierarchical approach was used and each of the predictor variables entered one after the other, none yielded a model with predictive power of statistical significance. Details of technical quality indicators on patient's satisfaction with malaria care are presented in Table 8.

**Table 8: Influence of Technical Quality Indicators on Patient Satisfaction with Malaria Care**

Independent variables/Predictors	Unstandardized Coefficients		Standardized Coefficients	t-value	P-Value
	B	Std. Error	Beta		
Intercept	2.85	1.66		1.72	0.09
General Inputs	0.01	0.10	0.01	0.08	0.94
Laboratory Capacity	-0.23	0.41	-0.26	-0.55	0.58
Anti-Malaria Medicines Availability	0.30	0.63	0.62	0.48	0.63
Supportive Medicines Availability	0.03	0.45	0.05	0.08	0.94
Overall Compliance with Protocols for Malaria Case Management	0.30	0.58	0.07	0.52	0.61
Interaction Term: Anti-Malaria and Supportive Medicines Availability	-0.12	0.22	-1.31	-0.54	0.59
Interaction Term: Medicines Availability and Laboratory Capacity	0.02	0.03	0.81	0.58	0.57

*Model Summary: ( $R^2=0.08$ ,  $F_{(7,300)} = 0.291$ ,  $P=0.957$ )*

**Dependent Variable: Composite Satisfaction with Malaria Care Quality**

## **CHAPTER FIVE**

### **DISCUSSION OF FINDINGS**

This chapter discusses the findings of the study and it is organised according to the objectives of the study. This focuses on demographic characteristics of respondents, inputs for malaria case management, compliance with standard malaria case management and is presented as follows:

#### **5.1 Demographic Characteristics**

The study finds that majority of the staff sampled are in the age bracket of 31-39 years (43.2%, n=32) with 55.4% (n=41) of them being females. These findings are consistent with previous studies and reports which suggest that health workforce in Ghana is generally youthful (AHWO, 2010) and dominated by females (GHS, 2016). A recent study also corroborated this demographic information that the health

Professions in Ghana are widely dominated by females especially in nursing and midwifery (ASAMANI, 2015). The current study found nurses and midwives professional group to be the majority (52.7%, n=39) at PML hospital whilst doctors were the number (6.8%, n=5). This implies that nurses and midwives was the healthcare professional group rendering most of the care delivery service to the children under five with malaria. Thus, the conduct of nurses and midwives in the hospital is likely to have immense impact on the quality of service delivery and patient satisfaction with care.

In the parental/caretaker survey, study also found that most of the parents or caretakers were aged between 31 and 39 years which represented 40.9% (n= 123) of the sample. Meanwhile, the mean age of the children under-five was 2.58 years (SD=1.28 years). These findings are in consonance with Ghana Statistical Service survey, (2014) which indicated that the average age range for Ghanaians is 25 to 40 years who are also the most productive age group. This also revealed that about 68.4% (n = 206) of the patients were treated as OPD cases, leaving 31.6% who were admitted for more rigorous treatment. However, the average admission rate for PML hospital over the last five years has consistently been 7% (MOH, 2016a) which is consistent with the national average rate of admissions of 9.5% (range: 5-11%) (MOH, 2015). Whereas the large difference could be attributed to the sampling method adopted, it may be worth exploring if there is a significant difference between admission rates for malaria in children as compared with other diseases.

Also, in the current study, patients who were admitted had an average length of stay of about 2.9 days (range: 1-6 days) in the hospital which is consistent with the national average length of stay of 3.2 days (MOH, 2016b).

## **5.2 Availability of Inputs for Quality Malaria Case Management in Under-Five Children**

Ensuring technical quality in healthcare delivery has been one of the objectives of the Ministry of Health and Ghana Health Service (MOH, 2014). Consistent with this desire, the current study assessed the availability of inputs for malaria case management and the extent to which standard malaria case management protocols were adhered to by the staff of PML Hospital in managing children under-five years with malaria. The study finds that the overall inputs availability at the hospital was 81.1% but could lie between 79.2% and 83.0% when the 95% confidence interval is taken into account. In particular, the highest input availability score is recorded in the area general inputs such as staff, triaging and basic equipment including weighing scales and thermometers among others (88.8%). These findings suggest that the hospital may be relatively well equipped compared with others in the country. This contrast with previous studies that suggest that many health facilities are characterised by frequent shortages of drugs and equipment supplies (Annan and others, 2013; Khuluza, Kadammanja, Simango, & Mukhuna, 2016; Nyberg & Nilsson, 2013). However, some studies have often linked unavailability of hospital inputs and logistics to lack of funding arising from delayed and erratic reimbursement from the National Health Insurance Authority (NHIA) (Abuosi & Atinga, 2013; Ayimbillah Atinga, Abekah-Nkrumah, et al., 2011; Sika Avortri et al., 2011).

In contrast, availability of the core anti-malaria medication is the lowest of all the inputs parameters assessed (66.6%), a finding that corroborates the works of Ghouth, (2013) and Khuluza et al., (2016) who found in Yemen and Malawi that availability of medication in line with national guidelines for anti-malaria drugs was only 38% even after interventions towards improvement of supplies from national medical stores. However, the Ghana Health Service estimated that essential medicines availability in the Greater Accra region where PML Hospital is located is about 98% (MOH, 2016a).

This suggests that, shortage of essential medicines especially anti-malaria drugs in hospitals could be worse than documented or anticipated.

### **5.3 Compliance with Standard Malaria Case Management Protocols at PML Hospital**

Compliance with standard protocols and guidelines is considered one of the benchmarks of technical and process quality in healthcare delivery (Donabedian, 2002). The study finds that staff compliance with the Ghana Health Service standard protocols for malaria case management was 89.4% (SD = 0.10). Specifically, there is 93% compliance with mandatory testing for malaria and treatment with only the recommended Artemisinin-based Combination Therapies (ACT) at the hospital. This finding appear to support one previous Ghanaian study where it was found that curative regimens containing an artemisinin derivative were given to 90.8% of patients (Dodoo et al., 2009). Dodoo and colleagues further asserted that the use of recommended anti-malaria therapy was influenced by laboratory confirmation for children less than 5 years and attending a government facility.

Linked to the forgoing, the current study found that compliance rate for standard laboratory investigations to be conducted for children with severe or complicated malaria was about 87.2% (SD = 0.27). This is also in line with WHO recommendations and other research findings supporting laboratory testing as the standard at health facilities such as PML hospital (Achan et al., 2011b; Fenny, Hansen, Enemark, & Asante, 2014; Rezai et al., 2013; WHO, 2010). While the 89.4% adherence to standard guidelines appear to be high, there appear to be no benchmark in Ghana as to what level of adherence is acceptable or otherwise. Nonetheless, the literature is unanimous that treatment of malaria in children under the age of five years must follow established treatment guidelines/protocols (Dodoo et al., 2009; Ghouth, 2013; Mbacham et al., 2014). Thus, there is no room for errors and so PML hospital must endeavour to ensure universal compliance with established protocols for malaria case management especially for children below five years.

#### **5.4 Influence of Inputs Availability on Compliance with Standard Malaria Care**

The study finds that the availability of various inputs does not necessarily predict staff compliance with standard protocols for malaria case management except where there are sufficient supportive medications and anti-malaria drugs. The interaction effect of anti-malaria and supportive medicines improves compliance with protocols by 6% ( $\beta = 0.06$ ,  $p = 0.02$ ). It is worth noting also, that the mere availability of anti-malaria medicines is an insignificant predictor of compliance with standard protocols unless supportive medicines are available. Clearly, the bulk of the national malaria case management standards used to guide this study provides directions in dealing with complicated malaria within hospital settings (GHS, 2004). In this context, the availability of supportive medicines such as 5% dextrose, 50% dextrose, blood for transfusion, blood transfusion sets, intravenous (IV) giving sets, oxygen, syringes and needles among others are essential to augment the use of core anti-malarial drugs. Again, the work of (Dodoo et al., 2009) also supports this assertion when they concluded a median of two co-prescriptions per patient (range 1–9) was often used by Ghanaian clinicians in managing malaria. The current study, however, did not assess the actual type of prescriptions used as supportive medicines for the case management of malaria in under-five children and if these prescriptions were based on approved national guidelines.

#### **5.5 Patient Satisfaction with Malaria Care Quality at PML Hospital**

Subjective quality was assessed from individual patients (parents/caretakers) point of view in the form of patient satisfaction with malaria care at PML hospital. It was found that the overall parental/caretaker satisfaction with the quality of malaria management and care at the hospital is moderate (61.8%,  $SD = 0.40$ ). This appears to contrast with the findings of Turkson, (2009); Wong, Butt, Symington, & Pinelli, (2011) who reported 70-90% patient satisfaction with the treatment and care received from health facilities. However, it is worth noting that these earlier studies examined

satisfaction with care in general rather than care for persons suffering malaria or special age group as in the case of the current study. This notwithstanding, there is a wealth of Ghanaian studies suggesting that patients tend to be generally satisfied with malaria service delivery albeit having concerns with technical quality in some health facility in Ghana (Aaron. Abuosi et al., 2015; Aaron Abuosi&Atinga, 2013; Aaron AsibiAbuosi, 2015; AyimbillahAtinga, Abekah-Nkrumah, et al., 2011; Dzomeku, 2011; Essiam, 2013; Nketiah-Amponsah&Hiemenz, 2009). Thus, the relatively lower rate of patient satisfaction found in this study require further exploration to unravel the associated factors given that the technical quality has been found to be high.

#### **5.6 Influence of Technical Quality Indicators on Patient Satisfaction with Malaria Care**

The study finds that all the technical quality indicators (General inputs, laboratory capacity, anti-malaria medicines availability, supportive medicines availability, overall compliance with protocols for malaria case management, interaction effect of anti-malaria and supportive medicines and interactive effect of medicines availability and laboratory capacity) are not significant predictors of patient satisfaction with care quality. Thus, what constitute technical quality may not necessarily be the elements that would satisfy patients in the hospital setting. Indeed, there is information asymmetry between technical health staff and patients (Morris, Devlin, Parkin, & Spencer, 2012) which often leads to a disconnect between what patients expect from health providers and what health providers also considers relevant for patients.

Also, some authors postulate that in addition to technical quality, measures such as improving patient waiting time, staff communication techniques, response to emergency cases, prompt treatment, staff attitude towards patients, and reporting time to work by staff are the hallmark in promoting patient satisfaction (“1 GHANA MINISTRY OF HEALTH 2013.pdf,” n.d.; Eugene-Ezebilo&Ezebilo, 2015; Oforu-Kwarteng, 2012; TagbelWaki, 2013). As has been shown in the current study, relying on

technical quality indicators alone can be a mirage if improving patient satisfaction is the main aim. Thus, management of PML hospital need to improve upon technical quality indicators effective and efficient health care delivery, but from the patient's point of view, address the subjective aspects of service delivery through customer orientated innovations.

## CHAPTER SIX

### CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 Conclusions

Based on the finding of this study and within the context of the study setting and relevant literature, the following conclusions are drawn.

1. From the data analysed PML appears to have adequate inputs for provision of quality health care to children under five with malaria though availability of anti-malaria ranked as the lowest available input in the hospital. Overall inputs availability at the hospital for standard malaria case management however, scored as high as 81.1%.
2. Staff compliance with the Ghana Health Service standard protocols for malaria case management was quite high (89.4%) but less than previously reported rate of 90.8% (Dodoo et al., 2009) which suggest a slide decline adherence to standards. However, a review of the literature reveals no benchmark for comparison.
3. The availability of various inputs does not necessarily influence staff compliance with standard protocols for malaria case management unless there are sufficient supportive medications alongside anti-malaria drugs.
4. Parental/caretaker of children who received treatment and care for malaria at the hospital were moderately satisfied with the quality of service (61.8%). This is, however, below the average of 70-90% reported in other Ghanaian studies and operational surveys.
5. Technical quality indicators (inputs and process) are not significant predictors of patient satisfaction with health service. Thus, what may constitute technical quality may not necessarily be the elements that would satisfy patients in the hospital setting and so context-appropriate and customer oriented innovations must be explored.

## 6.2 Recommendations

Based on the findings of the study, the following recommendations are made.

1. National Malaria Control Program and the hospital management should ensure adequate provision of inputs such as anti-malaria and supportive medicines as these were inadequate at the facility.
2. Compared with previous studies, compliance with standard protocols appear to be declining. Therefore, National Malaria Control Program and the hospital management should ensure periodic in-service training for service providers and periodic supervision to ensure 100% adherence to standard treatment guidelines.
3. Hospital management should consider an in-depth exploration of the factors that would make patients satisfied with health service at PML since technical quality indicators does not have influence on patient satisfaction.
4. Further studies are needed to examine the influence of protocol adherence on under-five malaria patient outcomes.

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## APPENDICES

### Appendix 1: Consent Form

#### **Assessment of Quality of Care Rendered To Children under Five With Malaria at Princess Marie Louis Hospital.**

**Principal Investigator:** Haphsheitu Yahaya

**Phone:** 0244 523339

#### **Introduction to Study**

I am conducting a study on the quality of care rendered to children under five with malaria at PML hospital. The study is aimed at assessing the quality of care in malaria case management taking into consideration availability of logistics, nurse patient ratio, drugs availability and adherence to national protocol on malaria case management as well as operational challenges and patient satisfaction with care given.

#### **What should you expect during this study?**

If you volunteer to be part of the study, you will take part in answering questions on a structured questionnaire which will take about 20 minutes. Please give us as much detail as you are willing and able to provide. Please feel free to ask any questions or tell us if you do not understand a question being asked. You can refuse to answer any question.

#### **Potential Risks**

Some of the questions may make you feel uncomfortable or upset. You can refuse to answer any question and you can ask to stop the interview at any time.

#### **Benefits**

There is no direct benefit to you for participating in this study. It is hoped that the research will help improve upon quality of care given.

### **Compensation/Payment**

There will be no cost to you for being in the study.

### **Confidentiality**

What you tell us is confidential. Nothing you share in the questionnaire will be linked to your personal information. No one except the Principal Investigator, research assistants and supervisor will have access to your comments.

### **Rights**

#### **Voluntary participation/withdrawal**

*Participation in research is completely voluntary.* You are free not to take part in the study. You can decline to answer any questions and are free to stop taking part in the research study at any time. There will be no penalty to you or loss of benefits to which you are otherwise entitled if you decide not to answer any questions or decide to stop being in the study.

### **Questions**

If you have any future questions about this research, please feel free to contact Haphsheitu Yahaya, the Principal Investigator of the study. She can be reached phone at +233 244523339 or by email at [yhaphsheitu@yahoo.com](mailto:yhaphsheitu@yahoo.com) in case you have any problem with participation in the research.

### **Agreement and Consent**

You have read document or it has been read and explained to you. Do you have any questions?

Do you agree to take part?

1. I have been informed by the interviewer about the nature, conduct, benefits and risks of this study
2. I have also received, read and understood the above written information regarding the study
3. I am aware that the results of the study, including any personal information I choose to share, will be anonymously processed into a study report
4. I may, at any stage during the discussions, without prejudice, withdraw my consent and participation in the study
5. I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study

Date: \_\_\_\_\_ Signature of Participant: \_\_\_\_\_

I have fully explained to the participant the nature and purpose of the procedures described above and the risks involved in its performance. I have asked if any questions have arisen regarding the procedures and have answered these questions to the best of my ability.

Date: \_\_\_\_\_ Signature of Interviewer: \_\_\_\_\_

Signed copies of this consent form must be 1) retained on file by the principal investigator and 2) given to the subject.

## **Appendix 2: Informed Consent for Staff at Princess Marie Louis Hospital**

### **Assessment of the Quality of Care Rendered To Children under Five With Malaria at Princess Marie Louis Hospital.**

**Principal Investigator:** Haphsheitu Yahaya

**Phone:** 0244523339

#### **Introduction to Study**

I am conducting a study on the quality of care rendered to children under five with malaria at PML hospital. The study is aimed at assessing the quality of care in malaria case management taking into consideration availability of logistics, nurse patient ratio, drugs availability and adherence to national protocol on malaria case management as well as operational challenges and patient satisfaction with care given.

#### **What should you expect during this study**

If you volunteer to be part of the study, you will be asked to take part in a one-on-one interview with a trained interviewer at a time of your choice at the health care facility where you work. The interview will last between 25-30 minutes.

Everything you share in the interview will be confidential and private and cannot be used against you.

#### **Potential Risks**

Some of the questions may make you uncomfortable or upset. You can refuse to answer any question.

#### **Benefits**

There is no direct benefit to you from taking part in this study. It is hoped that the research will help improve upon health care quality.

### **Compensation**

There will be no cost to you for being in in the study.

### **Confidentiality**

What you tell us is confidential. Nothing you share in questionnaire will be linked to your personal information. No one except the Principal Investigator, research assistants and supervisor will have access to your comments.

### **Rights**

#### **Voluntary participation/withdrawal**

*Participation in research is completely voluntary.* You are free to not take part in the study. You can decline to answer any questions and are free to stop taking part in the research study at any time. There will be no penalty to you or loss of benefits to which you are otherwise entitled if you do decide not to answer any questions or decide to stop being in the study.

### **Questions**

If you have any future questions about this research, please feel free to contact Haphsheitu Yahaya, the Principal Investigator of the study. She can be reached phone at +233 244523339 or by email at [yhaphsheitu@yahoo.com](mailto:yhaphsheitu@yahoo.com) and in case you have any problem with participation in the research

### **Agreement and Consent**

You have read this document. Do you have any questions?

Do you agree to take part?

1. I have been informed by the interviewer about the nature, conduct, benefits and risks of this study
2. I have also received, read and understood the above written information regarding the study
3. I am aware that the results of the study, including any personal information I choose to share, will be anonymously processed into a study report
4. I may, at any stage during the discussions, without prejudice, withdraw my consent and participation in the study
5. I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study

Date: \_\_\_\_\_ Signature of Participant: \_\_\_\_\_

I have fully explained to the participant the nature and purpose of the procedures described above and the risks involved in its performance. I have asked if any questions have arisen regarding the procedures and have answered these questions to the best of my ability.

Date: \_\_\_\_\_ Signature of Interviewer: \_\_\_\_\_

Signed copies of this consent form will be 1) retained on file by the principal investigator and 2) given to the subject.

**APPENDIX 3: Patient Satisfaction Questionnaire on the Quality of Health Rendered To Children Under-Five with Malaria at Princess Marie Louis Hospital**

Dear Patient,

This is an academic research questionnaire carried out on “**Assessment of the Quality of Health Care Rendered to Children under- Five with Malaria at the Princess Marie Louis Hospital**”. It is purely for academic purpose and your objective response shall be kept in strict confidence and will not be discussed with anyone. You reserve the right to withdraw from the study at any time but your participation would be much valued and appreciated.

Kindly take some off your busy schedule and answer this questionnaire honestly.

Thank you.



4. What is your highest educational level?
- a) No formal education [ ]
  - b) Middle school level [ ]
  - c) Basic school level [ ]
  - d) Secondary school level [ ]
  - e) Tertiary level [ ]
  - f) Others, please specify .....

5. What is your employment status?
- a) Unemployed [ ]
  - b) Full time employment [ ]
  - c) Part time job [ ]
  - d) Retirement [ ]
  - e) Others, please specify .....

6. How old is your child? .....Years .....Months

7. How many days was child admitted at the hospital? .....

#### SECTION B: SATISFACTION WITH MALARIA CARE

Having visited PML Hospital to seek healthcare for your child suffering from malaria, please tell us your opinion about the service your child received. Please tick (✓) the answer that best describes the extent of your satisfaction with the services rendered to your child.

Key:

1 - Poor

2 - Fair

3 - Good

4 - Very Good

5 - Excellent

PML Hospital Characteristics		Level of Satisfactions [Please, tick (✓) in the boxes]				
		Poor	Fair	Good	Very Good	Excellent
		1	2	3	4	5
<b>PATIENT APPOINTMENT FOR TREATMENT AT PMLH</b>						
1	Making you feel at ease at PMLH (being friendly and warm towards you, treating you with respect; not cold or abrupt)					
2	Appointment available at any time (24hours) services to clients					
3	Getting care for illness/injury as soon as you wanted it					
4	Getting after-hours care when you needed it					
5	The efficiency of the checkin process in timely manner					

6	Waiting time in the OPD area					
7	Waiting time in the doctor's examination. Consulting room					
8	Keeping patient informed if their appointment time was delayed					
9	Ease of getting a referral when you needed one to choice tertiary hospital					
<b>PML H STAFF</b>						
10	The courtesy of the person who attended to you and your child					
11	The friendliness and courtesy of the receptionist					
12	The caring concern of our nurses and medical doctors					
13	The helpfulness of the account officers who assisted you with billing or insurance					
14	The professionalism of our lab other staff who attended to you					
<b>STAFF COMMUNICATION WITH PATIENT</b>						
15	Patient was given prompt attention by staff answering all questions asked from the patient					
17	Getting advice or help when needed during care					
18	Staff explained the treatment / health advice in a way that I could understand					
19	Your test results reported in a reasonable amount of time					

20	Effectiveness of providing health information to client during OPD and on admission					
21	Staff ability to answer patient questions about their child condition in a timely manner					
22	Patients ability to contact staff after working hours for further attention					
23	Patient ability to obtain prescription refills by staff at time					
<b>PATIENT VISIT WITH THE PROVIDER (Doctor, Physician Assistant, Nurse, Laboratory)</b>						
24	Willingness to listen carefully to you					
25	Taking time to answer your questions					
26	Amount of time spent with you to attend to you					
27	Explaining things in a way you could understand without using medical terms					
28	Instructions regarding medication/follow-up care					
29	The thoroughness of the examination (From head to toe)					
30	Referring you to the laboratory for malaria and other blood test					
31	Advice given to you on ways to stay healthy with your child at home					
<b>PML FACILITY</b>						
32	Hours of operation convenient for you					
33	Overall comfort					

34	Adequate sitting and proper chairs at waiting room					
35	Signpost and directional sign easy to follow to the hospital					
<b>PATIENT OVERALL SATISFACTION</b>						
36	Our general practice and delivery of care to patients					
37	The quality of medical care received					
38	Overall rating of care from your providers or nurses					

39. Would you recommend the provider to others? Yes [ ] No [ ] If no, please tell us why:

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40. If there is any way we can improve our services, please tell us.

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**APPENDIX 4: Staff Questionnaire on Quality of Care Rendered to Children Under-five with  
Malaria at Princess Marie Louis Hospital**

**UNIVERSITY OF GHANA SCHOOL OF PUBLIC  
COLLEGE OF HEALTH SCIENCES**

**This is an academic research questionnaire carried out on “Assessment of the Quality of Health Care Rendered to Children under- Five with Malaria at the Princess Marie Louis Hospital”. It is purely for academic purpose and your objective response shall be kept in strict confidence and will not be discussed with anyone. You reserve the right to withdraw from the study at any time but your participation would be much valued and appreciated.**

Kindly take some off your busy schedule and answer this questionnaire honestly

Thank you.

**SECTION A: SOCIO-DEMOGRAPHIC DATA**

Put a tick (✓) in the spaces provided.

1. What is your age bracket?

- a) Below 30 years            [    ]
- b) 31-39 years                [    ]
- c) 40-49 years                [    ]
- d) Over 50 years              [    ]

2. What is your gender?

- a) Male                        [    ]
- b) Female                     [    ]

**3. Marital Status**

- a) **Married** [ ]
- b) **Single** [ ]
- c) **Divorced** [ ]
- d) **Widow** [ ]
- e) **Others specify** .....

**4. What is your highest educational background?**

- a) **Secondary school level** [ ]
- b) **Tertiary level** [ ]
- c) **Others specify** .....

**5. What is your profession?**

- a) **Doctor** [ ]
- b) **Physician Assistant** [ ]
- c) **Nurse/Midwife** [ ]
- d) **Pharmacist** [ ]
- e) **Biomedical Scientist/Laboratory Technician** [ ]
- f) **Others, please specify**.....

**SECTION B: AVAILABILITY OF INPUTS FOR MANAGE MALARIA AT PML****HOSPITAL**

Having been working at PML Hospital as a health professional, kindly share your opinion about the facilities/ resources availability for quality malaria care. Please state by ticking the appropriate box (✓), the extent to which you agree or disagree with the statements.

**Key:**

1 - Poor

2 - Fair

3 - Good

4 - Very Good

5 - Excellent

Characteristics	RESPONSE				
	1	2	3	4	5
1. PLM hospital triage system					
2. Practice of Triageing					
3. Presence of separate consulting rooms for severely ill children at the OPD					
4. Thermometers available					
5. Functional scale for weighing					
6. Cold box/fridge					
<b>Laboratory capacity</b>					
7. Medical laboratory at PML availability					

8.	Medical laboratory at PML availability						
9.	Functional microscope, according to the laboratory technician						
10.	RDTs availability at PML Hospital						
11.	Staff trained to perform RDTs						
12.	Malaria testing, by Functional microscopy						
13.	Malaria testing, by both microscopy and RDT						
<b>Medicines in stock/ Availability</b>							
14.	Artemisinin-based Combination Therapies – ACTs (oral)						
15.	IV artesunate						
16.	Artemisinin-based suppository						
17.	Artemether Injection						
18.	Injection Quinine						
<b>SUPPORTIVE MEDICINES</b>							
19.	5% dextrose						
20.	50% dextrose						
21.	Blood for transfusion						

22.	Blood transfusion sets					
23.	IV giving sets					
24.	Oxygen availability					
25.	Syringes and needles availability					
26.	Gloves availability					
27.	Thermometers availability					
28.	Suction machine availability and functioning					

### SECTION C: CASE MANAGEMENT PRACTISES FOR US CHILDREN WITH

#### MALARIA AT PMLH

The following table presents some recommendations for managing complicated malaria (GHS, 2015). In your candid view, please indicate how frequents these recommendations are complied with in this hospital.

Key:

1. – Not done at all
2. – sometimes done
3. – Always done

ASPECTS OF MALARIA CARE PROTOCOL (GHS, 2015)	Not done at all	Sometimes	Always done
	1	2	3
<b>1. General care of a child with malaria</b>			
i. All children under the age of five years are tested for malaria using RDT or microscopy before malaria treatment			

<p>ii. Use of only the following Artemisinin based Combination Therapies (ACT): Artesunate-Amodiaquine (AS-AQ); Artemether-Lumefantrine (A-L) and Dihydroartemisinin-Piperaquine (DHAP)</p>			
<p><b>Management of a child admitted with with complicated malaria conducted in the malaria in the Hospital</b></p>			
<p><b>2. Initial Evaluation of patient admitted following areas:</b></p>			
<p>a) Airway, Breathing and Circulation.</p>			
<p>b) The child is assessed for the following (documentary evidence available):</p>			
<p>i. Dehydration</p>			
<p>ii. Repeated Convulsions</p>			
<p>iii. Signs of shock and collapse</p>			
<p>iv. Anaemia</p>			
<p>v. Pulmonary Oedema</p>			
<p>vi. Level of Consciousness using Glasgow or Blantyre Coma scales</p>			
<p>vii. Hyperpyrexia</p>			
<p>viii. Urine Output</p>			
<p><b>3. Laboratory tests conducted immediately:</b></p>			
<p>i. Microscopy for malaria parasites- thick and thin blood films</p>			

ii. Haemoglobin (Hb) and/or Haematocrit (Hct).			
iii. Grouping and cross-matching for possible transfusion where Hb<5gm/dl and Hct<15 - 20%,.			
iv. Lumbar Puncture (LP) for cerebrospinal fluid following convulsions or comatose patient in order to exclude other causes of convulsions and coma			
v. Funduscopy to rule out raised Intracranial Pressure before LP is conducted			
vi. Urea /creatinine, and electrolytes			
vii. Blood glucose			
viii. Full blood cell count, platelet count, clotting studies, blood culture, plasma bicarbonate, plasma lactate.			
<b>4. Initiating and maintaining treatment</b>			
i. Start treatment whilst waiting for results of laboratory investigations			
ii. Secure the airway in an unconscious Patient.			
iii. Intubate patient where appropriate			
iv. Insert an IV cannula.			
v. Weigh the patient, or estimate the body			

	Weight (for calculation of medication and fluid regimens).			
vi.	Administer parenteral anti-malarial medications			
vii.	Provide additional supportive therapy			
viii.	Full parenteral doses of an appropriate anti-malarial following rapid clinical assessment and parasitological confirmation of the diagnosis			
ix.	Choice of paraentral anti-malaria based on the following order of preference: IV/IM Artesunate; IM Artemether; and IV-IM Quinine.			
x.	Parenteral treatment continued until patient is well enough to swallow,			
xi.	Parenteral treatment given for at least 24 Hours even if the patient is well enough to swallow before 24hours.			
xii.	Treatment completed by giving a full 3-day course of an oral ACT (Artesunate-Amodiaquine, Artemether-Lumefantrine, Dihydroartemisinin-Piperaquine).			
<b>5. Monitoring while on admission</b>				

i.	Monitor the following on routine basis:			
ii.	Level of consciousness using Blantyre or Glasgow coma scale			
iii.	Vital Signs: blood pressure, body temperature, pulse, respiratory rate four (4) hourly.			
iv.	Fluid intake/output, including the rate of infusion of fluids.			
v.	Urine volume monitored hourly noting colour and specific gravity.			
vi.	Blood glucose check 4-hourly while patient is unconscious.			
vii.	Parasitaemia: obtain on admission (mandatory).			
viii.	Parasitemia while patient is hospitalised - repeated at least six (6) hourly.			
<b>6. Assessment of Recovery</b>				
i.	Check for neurological sequelae (deficit)			
ii.	Assess vision and hearing. If deficits found, refer for further evaluation and management.			
iii.	Assess neuro-motor functioning.			
iv.	Perform follow-up laboratory tests on the 7th and 14th days using thick and thin blood films Haematocrit Haemoglobin			

**GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE**

*In case of reply the number and date of this letter should be stated.*

*Reference: GHS RDD/ERC/Amend App 17/460  
Your Ref. No.*



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**Haphsheitu Yahaya**  
School of Public Health  
University of Ghana  
Legon

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

<b>GHS-ERC Number</b>	<b>GHS-ERC: 102/02/ 2017</b>
<b>Project Title</b>	<b>Assessment of the Quality of Health Care Rendered to Children Under-Five with Malaria at the Princess Marie Louis Hospital</b>
<b>Approval Date</b>	<b>3<sup>rd</sup> April, 2017</b>
<b>Expiry Date</b>	<b>2<sup>nd</sup> April, 2018</b>
<b>GHS-ERC Decision</b>	<b>Approved</b>

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

