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AN EVALUATION OF THE MALARIA TEST, TREAT AND TRACK (3T) POLICY IN TWO HEALTH FACILITIES WITHIN THE GREATER ACCRA REGION

BY

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THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF SCIENCE IN PUBLIC HEALTH MONITORING AND EVALUATION DEGREE.

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DECLARATION

I, DORIS OSEI-BONSU, declare that this dissertation titled 'An Evaluation of the Malaria Test, Treat and Track (3T) Policy in two Health Facilities within the Greater Accra region' is my own research which I was supervised to conduct, and contains references and quotations from other works which have been duly acknowledged. I also affirm that whether in part or whole no part of this work has been submitted for the award of a degree in any institution of learning.

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DATE: 03-10-2019

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DR PAULINA TENDANA

(SUPERVISOR)

DATE: 03/10/2019

DEDICATION

I dedicate this dissertation to the Almighty God, His grace and mercies have brought me this far. I further dedicate it to my wonderful husband, caring mother and my lovely children, Pearl, Peniel and Perry.

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LIST OF ABBREVIATIONS

3T	Test, Treat and Track
AA	Artesunate Amodiaquine
ACT	Artemisinin Combination Therapy
AL	Artemether Lumefantrine
DHIMS	District Health Information Management System
EIR	Entomological Innoculation Rate
ERC	Ethical Review Committee
GHS	Ghana Health Service
HIO	Health Information Officer
IPT	Intermittent Preventive Treatment
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Nets
NMCP	National Malaria Control Programme
OPD	Out patient Department
PHC	Population and Housing Census
RDT	Rapid Diagnostic Test
SMC	Seasonal Malaria Chemoprophylaxis
TTM	Transfusion Transmitted Malaria
WHO	World Health Organization

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ABSTRACT

Background: Universally, the policy for malaria case management has changed from a system of widespread presumptive treatment based on clinical diagnosis of fever to targeted treatment following a positive parasitological diagnosis. This is known as the Test, Treat and Track (3T) policy. The Ghana National Malaria Control Program in accordance with WHO has instituted the 3T policy which recommends that all suspected cases of malaria are put on quality assured antimalarials (ACTs) only after diagnosis has been confirmed by means of an RDT and or microscopy. Ghana has however not reached the level proposed for the elimination of malaria. Compliance with the 3T policy is also low as most facilities are seemingly not complying.

Objective: To evaluate health care providers' compliance with the Malaria Test, Treat and Track policy.

Method: A descriptive cross-sectional design involving both quantitative and qualitative methods was used in this study. The study was conducted in two health facilities, the Greater Accra Regional Hospital, and the La General Hospital. The quantitative approach involved a retrospective review of the records of suspected malaria cases in the electronic database of both facilities in the first quarter of 2019. The qualitative approach involved in-depth interviews with key health workers. Compliance with the policy was the dependent variable while independent variables included patients and health worker characteristics. The quantitative data were entered into Microsoft Excel and imported into Stata version.15 for statistical analysis. The qualitative interviews were audio-recorded, transcribed and analyzed manually using the thematic analysis.

Results: A total of 876 records were extracted from the OPD database of the selected facilities. Fever was a common symptom reported by the patients. A laboratory test was requested for the majority of patients (GARH-412(80.2%), La General-316 (83.1%)). The test results showed that 216 (29.7%) were positive, 252 (34.6%) were negative and 260 (35.7%) test results were not documented. The compliance rate at the GARH was 54.5% and that of La General Hospital was 63.6%. Less than half, 270/604 (44.7%) of patients who were put on ACTs were given follow up appointments. A total of 13 health personnel were interviewed in the two facilities. The main challenges reported were stock out of ACTs, RDTs, lack of training and supervision, limited public awareness on the policy and the activities of private pharmacists.

Conclusion: The overall compliance with the 3T policy was just above average (58%). There was an outstanding performance with the treatment of confirmed cases with ACTs, however, a sizeable number of patients were treated against the guideline. More than half of the patients were not given follow up appointments. These findings clearly indicate that full compliance with the policy is still a challenge. More needs to be done to increase compliance levels in the health facilities in Ghana.

CHAPTER ONE

INTRODUCTION

1.1 Background

Malaria is a deadly disease that has high morbidity and mortality rates, mostly among children under five years (WHO, 2014). It is an acute febrile and life-threatening illness caused by a protozoon parasite of the Plasmodium family. Humans get infected when they are bitten by a plasmodium infected female Anopheles mosquito. The main Anopheles species in Africa are *Anopheles gambiae* and *Anopheles funestus* (Mouatcho & Dean Goldring, 2018; World Health Organization, 2018). Ghana has a prevalence rate of 52% and 48% for *Anopheles Gambiae* and *Anopheles Funestus* respectively with varied monthly Entomological Inoculation Rate (EIR) between zero and 388 infective bites (Owusu-Agyei et al., 2013). There are five species of parasites that infect humans these are *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae*, *Plasmodium ovale* and *Plasmodium knowlesi*. The predominant parasite species is *Plasmodium falciparum*, and it usually causes the severest form of malaria. It has a high prevalence in Africa, Southern Asia, Central America, and South America and causes fever and chills (Mouatcho & Dean Goldring, 2013).

The World Health Organization (WHO) has identified malaria as a priority health issue in the world, the majority (92%) of the burden of the disease is in Sub-Saharan Africa (World Health Organization, 2018).

Globally, 219 million malaria cases were reported in 2017, thus 2million additional cases from the previous year (WHO,2018).

About 50% of the world's population was at risk of contracting the disease in 2017 with transmission still occurring in 87 countries (WHO, 2018). Majority of the deaths were recorded in Sub-saharan Africa, and most occurred in children under five. Malaria was also responsible for the admission of about 1800 patients and approximately 10 deaths per 100,000 population (World Health Organisation, 2016). To effectively control malaria transmission, make evidence-based decisions and reduce the burden of the disease, accurate and timely detection of cases and prompt administration of Artemisinin based Combination Therapy (ACT) for treatment is crucial (Berzosa et al., 2018).

The economic burden of malaria cannot be overlooked. In 2013, global expenditure on malaria was US $ 2.7 billion representing approximately 53% of the amount required to achieve global malaria control and elimination targets. This was from available international and domestic funds(World Health Organization, Global Malaria Programme, and World Health Organization 2014).

Malaria case management procedures have changed universally from the previous presumptive treatment practice which was based on clinical diagnosis of fever to one in which antimalaria treatment only follows a positive parasitological test. In accordance with this, the 3T initiative was launched to ensure that policy-makers and donors adopt this most current and proven recommendation of diagnostic testing, treatment, and surveillance, and improving country-specific operational plans as well as existing malaria control and elimination strategies (WHO, 2012). The 3T initiative is expected to help scale up malaria diagnosis, treatment, and surveillance in endemic areas (WHO 2012). It was launched on the 2012 World malaria Day by WHO. By the policy, in all malaria endemic countries, clinicians are to ensure that:

i. All suspected malaria cases are tested

ii. Every confirmed malaria case is treated with ACTS, the recommended anti-malaria drug.

iii. All malaria cases are treated and tracked in a surveillance system.

According to Agandaa et al, (2016), series of researches have revealed that diagnostic facilities were not available in a large number of public primary health care facilities, and even in cases where these facilities were available, there weren't enough skilled workers to cope with the high workloads. As a result, many malaria endemic countries in the past equated fever to malaria and treated presumptively

1.2 Problem Statement

Malaria is a disease of high public health concern as it is ranked high with regards to cases and deaths. According to WHO (2018), in the year 2017, African nations accounted for more than 90% of the worldwide malaria burden. Malaria is mostly the reason why a child in sub-Saharan African, will be absent from school (Macnab, Mukisa, Mutabazi, & Steed, 2016). The disease is endemic in all regions in Ghana (Awine, Malm, Bart-Plange, & Silal, 2017) and has been first on the list for the top twenty causes of OPD attendance since 2002 (Ghana Health Service, 2015). In the last quarter of 2017, 2.3 million suspected malaria cases, were recorded at OPDs, an increase of 1.18% over the same period in 2016 (GHS, 2017). According to Ghana Health Service,(2018), malaria accounted for more than 34% of OPD attendance and in Accra, almost a third of OPD attendance was due to malaria.

Regardless of the fact that in WHO African Region, 37 out of the 43 malaria countries with high malaria endemicity had embraced the 3T policy, the sum of ACTs procured and

distributed was almost twice the number of diagnostic tests that were carried out. Ghana was mentioned as one of such countries, (UNICEF/WHO/World Bank.,2017).

Prescribing ACTs for patients in whom the diagnosis of malaria has not been confirmed results in overtreatment of malaria and wastage of the drug which is relatively expensive (Gallay et al., 2018). Patients may experience the adverse side effects of drugs unnecessarily and incur needless costs. Moreover, other febrile conditions will be undertreated since the cause of fever is perceived to be malaria (Mbuli, Waqo, Owiti, Tweya, Kizito, Edwards, and Omondi-Ogutu, 2016).

Unavailability of RDT kits, shortage of medication and staff, and lack of trust by health workers in RDT test results may lead to noncompliance with the 3T policy. When suspected malaria cases have quality diagnostic testing and effective malaria treatment, malaria transmission will reduce and antimalarial drugs be used rationally and correctly (Kabaghe et al., 2016).

The Greater Accra Region, as reported in the first quarter bulletin of GHS for the year 2017, was ranked 8th out of the then ten regions with regards to malaria testing rate at the health facilities. The testing rate was 82.9% which was below the national testing rate of 83.9% (GHS, 2017). The region is the most densely populated in the country as such it must be ensured that standards are always met.

As stated by Adebimpe, (2018b) when the diagnosis and treatment of malaria is improved, not only will treatment outcomes improve, it would also assist in rationalizing health care costs by reducing the consumption of anti-malarial drugs. Compliance with this policy

guidelines will enhance accurate profiling of malaria burden and eliminate pressure on ACTs while looking for other causes of fever in the test-negative cases.

According to (Tesfay et al., 2014), in Sub-Saharan Africa, the rate at which clinicians ignored negative test results and prescribed antimalaria medications is high. This is one of the interesting areas that urgently need the attention and focus of researchers. This study will, therefore, provide useful information about how the test, treat and track policy is being complied with by health workers in the Greater Accra Region.

1.3 Conceptual Framework

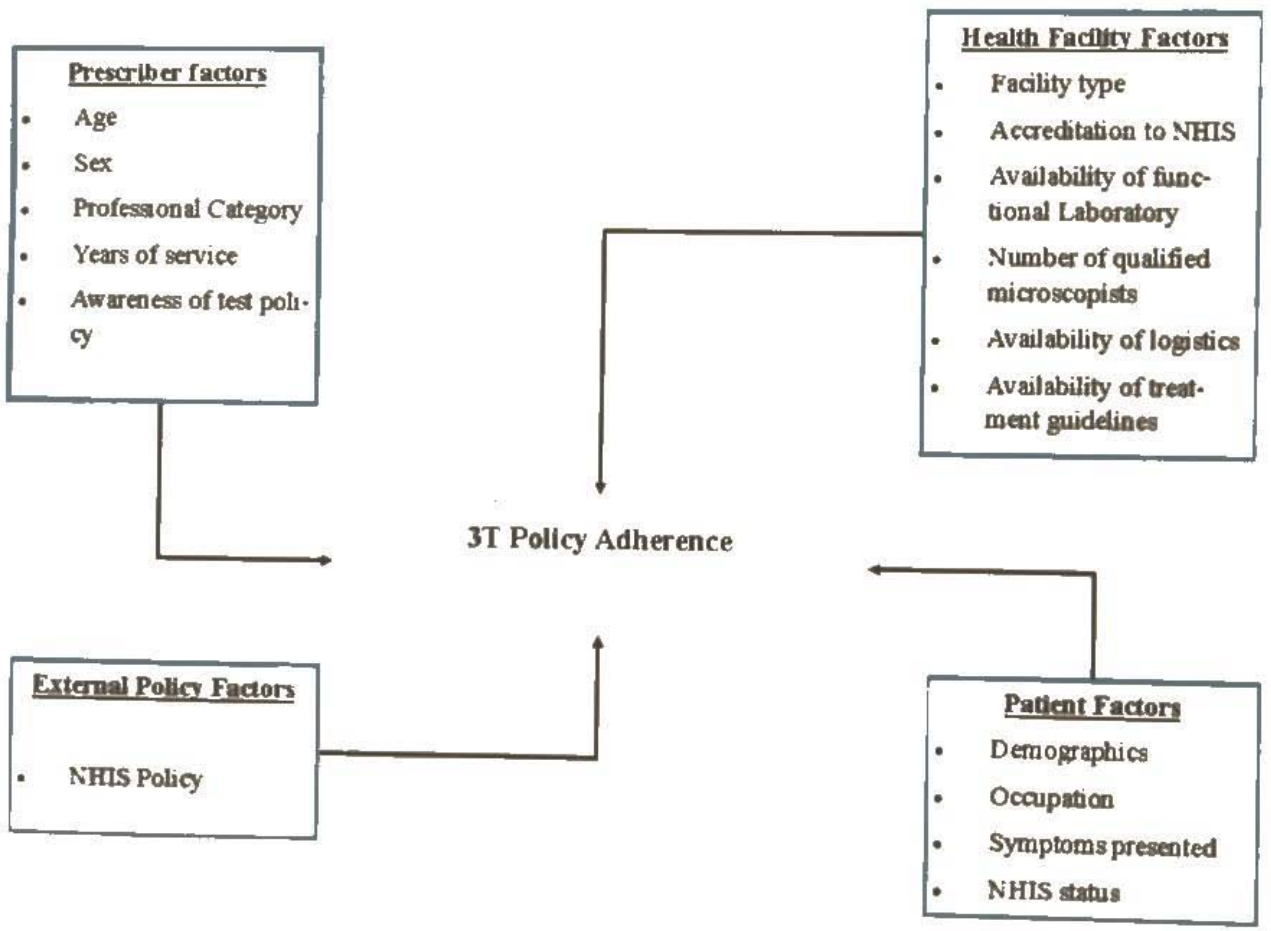

Figure 1.1 Conceptual Framework

Narrative on Conceptual Framework

Several factors including Prescriber-related factors, health facility factors, and patient factors have been noted to have a direct influence on health worker compliance with the Test, Treat and Track policy. A prescriber's professional category, years of service, awareness, and level of training on the 3T Policy will directly affect how he or she complies. The type of facility, as well as availability of a functional laboratory where tests could be done equally, have a direct bearing on compliance with the policy. Even in lower-level health facilities that lack functional laboratories, the availability of malaria Rapid Diagnostic Test (RDT) Kits influences compliance with the 3T policy.

External factors such as the state of health insurance policies in the country have a direct influence on compliance with the policy. Patient-related factors that have been noted from literature to have an influence on health worker compliance to the 3T policy, these factors include demographic characteristics such as age and sex. Other patient-related factors such as the symptoms presented by the patient and health insurance status have equally been noted to have an influence on compliance with the policy.

1.4 General Objective

The general objective of the study was to evaluate health care providers' compliance with the Malaria Test, Treat and Track policy.

1.5 Specific Objectives

The specific objectives of the study were to:

1. Determine the proportion of suspected malaria cases who were tested.
2. Measure the proportion of patients with positive test results who were put on ACTs.

3. Evaluate the proportion of patients with negative test results who were put on ACTs.
4. Ascertain the proportion of confirmed malaria cases on ACTs who are given follow up appointments.
5. Identify the challenges faced by health workers in complying with the policy.

1.6 Justification

The second objective of the Ghana NMCP is to provide a parasitological test to diagnose all suspected malaria cases and provide prompt and effective treatment to all confirmed cases by the year 2020 (GHS, 2018)

Achieving the global and national targets for malaria control hinges to a large extent on the ability to diagnose, treat and monitor all cases of malaria. As such, there is the need to conform to the standards set by the WHO and the NMCP, particularly on the 3T policy implementation.

This research sought to assess the extent to which this policy is being complied with by health workers in the Greater Accra Region. This was done by determining the proportion of suspected cases that were tested, the proportion of patients with positive test results who were put on ACTs, the proportion of patients with negative test results who were put on ACTs, and the proportion of patients with positive test results who were put on ACTs and were given follow up appointments. Information on the challenges associated with compliance with the policy were also explored. Findings from this study will guide policy interventions with regard to malaria case management.

CHAPTER TWO

LITERATURE REVIEW

2.1 History of malaria

Malaria was initially known as Roman fever because it was prominent in the Roman Campagna region. The name malaria originated from the Medieval Italian "mala aria" meaning bad air, this is because the disease was perceived to be caused by the bad air from swamps and mash land. Symptoms and characteristics of malaria have been documented in historical writings and ancient times, from 1570BC (Power, 2006).

2.2 Epidemiology of Malaria

Malaria is a dreadful febrile illness that comes about when Plasmodium parasites invade the body. The disease is passed on from person to person through the bite of a female anopheles mosquito which is infected with the plasmodium parasite. These mosquitoes are known as malaria vectors. Malaria parasites can also be passed on from a woman who is gestating to her baby prior to or during delivery. Occasionally, Plasmodium parasites are spread through blood transfusion, this is known as transfusion- transmitted malaria (TTM). TTM has occurred in a lot of countries worldwide with Ghana inclusive (O'Brien et al., 2015, Owusu-Ofori, Betson, Parry, Stothard, & Bates, 2013). According to States (2014), transmission could also be through an organ transplant.

Malaria is deadly, however, it can be cured and its occurrence averted. Estimates from the World malaria report issued in November 2018, showed that in the previous year thus 2017, 219 million malaria cases were reported, up by 2million the number of reported cases in 2016 which was 217 million. Four hundred and thirty-five thousand reported deaths were

due to malaria. This number is however not very different from that of the previous year which was 445 000.

Everybody is at risk of developing malaria, however, children under five, expectant mothers, people living with HIV/AIDS and travelers from areas where the disease is absent are at a greater risk. Almost 50% of the total population in the world was at risk of contracting the disease in 2017 with the transmission still occurring in 87 countries (World Health Organization, 2018)

Malaria accounts for 10% of child deaths in sub-Saharan Africa, killing a child every 2 minutes and therefore making it the fourth cause of child mortality (WHO et al 2015). Of the total number of malaria cases recorded, African countries accounted for almost 92% of the global burden of the disease (World Health Organization, 2018). It has been reported in several studies that in developing countries, malaria accounts for a sufficiently great economic burden. Nonvignon et al.,(2016) reported in their study on the Economic burden of malaria on businesses in Ghana that between 2012 and 2014, a total of 3913 working days were lost due to malaria in 62 businesses involved in the study. The study further revealed that within the same period, almost 0.5% of annual corporate returns were spent on treating employees with malaria.

In Ghana. Malaria is hyperendemic; everybody in the country is at risk of being infected with the disease (Fenny, Hansen, Enemark, & Asante, 2014) According to the Global Malaria Program, Ghana is classified to be in the control phase (Awine et al., 2017). It was reported in the current world malaria report that between the years 2016 and 2017, Ghana

accounted for an estimated 4% of the total malaria cases in the world, (World Health Organization, 2018).

2.3 Overview of the 3T Policy

Several efforts have been made to avert malaria transmission and reduce the global burden of malaria. This has resulted in the development of various tools and strategies such as the use of Insecticide Treated Nets (ITNs) and Seasonal Malaria Chemoprophylaxis (SMC), Indoor Residual Spraying (IRS), Intermittent Preventive Treatment for pregnant women (IPTp), ACTs and RDTs. All these have been useful and have helped to reduce the burden of the disease over the years. According to WHO (2018), in the year 2010, 29% of people in Africa at risk of the disease were protected by ITNs, however, this number increased to 50% in 2017.

In accordance to this, the 3T initiative was launched by WHO in 2012 on World Malaria Day, to ensure that policy-makers and donors adopt this most current and proven recommendation of diagnostic testing, treatment, and surveillance, and improving country-specific operational plans as well as existing malaria control and elimination strategies (WHO, 2012). This initiative is suspected to help scale up malaria diagnosis, treatment, and surveillance in endemic areas (WHO, 2012).

Faust et al.,(2015) in their study on Assessing Drivers of Full Adoption of Test and Treat policy for Malaria in Senegal indicated that diagnostic testing and treatment would be possible only when policies are implemented efficiently.

The policy for managing malaria cases has therefore taken a new turn globally. According to current WHO recommendations, in malaria endemic areas, clinicians are encouraged to refrain from the presumptive treatment practice in which fever was equated to malaria and treated as such, to a test, treat and track approach. With this approach, quality assured antimalarial medications are prescribed for patients only after the presence of malaria parasites has been confirmed either by means of an RDT or microscopy.

Globally, several research projects have been conducted to assess the degree to which health workers comply with the new policy by WHO, using different methods. For example, in 2011, Sarrassat, et al. conducted a study on malaria case management in children and found that there were inconsistencies between what was being practiced and what was stated in the guideline Another study by Kwarteng et al., (2015) involved reviewing patients' records, the study concluded that there was low compliance with the guideline for ACT usage. Kabaghe et al., (2016) reviewed published literature and revealed that in sub-Saharan Africa, over treatment of malaria is still a big problem. In other studies, direct observation was used to assess health worker compliance with the malaria case management protocol in Papua New Guinea, it was shown that even though compliance was higher, compared to other countries, it was far from perfect (Pulford, Smith, Mueller, Siba, & Hetzel, 2016). Health workers' compliance with the new policy has been recognized as a key component in effective malaria case management, however, most studies have revealed poor compliance of health workers with this new treatment guideline.

An improvement in malaria diagnosis and treatment will not only result in better treatment outcomes, but it would also assist in rationalizing health care costs by reducing the consumption of anti-malarial drugs, (Adebimpe, 2018).

Mbuli et al (2016) described how malaria treatment was previously based mostly on presumptions which resulted in overuse of anti-malaria medications, inability to account for resources and exacerbation of cases especially in situations where the fever was associated with other infections. However, the introduction of the 3T policy will ensure that in countries where malaria is endemic, all patients suspected of having malaria are tested and all confirmed cases are treated with quality-assured antimalarial medications, it must also be ensured that an accurate and efficient malaria surveillance system is in place to provide guidance for policy formulation and practice. In 2013, Ghana embraced the 3T policy, however, according to the Ghana NMCP report (2014), a number of suspected cases were not confirmed before the administration of antimalarial medications.

In July 2014, the third edition of malaria case management was developed to improve upon malaria case management and reduce the burden of the disease in the country as per WHO recommendation.

2.3.1 Test

The first 'T' in the 3T policy from WHO refers to Testing, This is a means of detecting the plasmodium parasites or their antigens in blood samples. WHO advocates the adoption of this policy across all levels of the healthcare delivery system, meaning every patient suspected of having malaria must undergo a parasitological test (which can be either by microscopy or RDT) with quality assured diagnostic tools before the commencement of treatment (WHO, 2014). Parasitological testing to confirm the presence of malaria parasites is critical not for case management only but also for measuring the burden of malaria accurately (World Health Organization. Global Malaria Programme, 2012).

Routinely in areas with endemic malaria, the presence of malaria parasites is confirmed using two main techniques, either RDTs or microscopy (Berzosa et al., 2018). The latter is the gold standard for confirming malaria diagnosis and it involves using a microscope to directly visualize the parasite (Acheampong, Appiah, Boamponsem, Boampong, & Afoakwaah, 2011; Li et al., 2013). In doing this, peripheral blood is taken by skilled personnel, smeared on a slide and observed under the microscope. Using microscopy to diagnose malaria however has some disadvantages, it takes time to get the results and requires the use of both electricity and skilled personnel. Taking blood samples can also be tedious (Mace, Arguin, Lucchi, & Tan, 2019).

RDTs are immune chromatographic tests that diagnose malaria by identifying antigens that are produced by the plasmodium parasites in the blood (Mouatcho & Dean Goldring, 2013).

Unlike microscopy, RDTs produce test results fast and are cheap compared to microscopy. It also does not require skilled personnel to conduct a test, however regularly used RDTs only detect *Plasmodium falciparum*, (Mouatcho & Dean Goldring, 2013). Boadu et al.,(2016) stated in their study that using RDTs to diagnose malaria does not require much infrastructure or technical expertise, in areas where microscopy is not available presumptive treatment is therefore questionable.

Currently, at the various levels of the healthcare delivery system, excellent and economical RDTs are accessible and have made it possible to improve and expand diagnostic testing significantly. Malaria testing rate has, therefore, increased in all malaria-endemic regions worldwide. The introduction of RDTs has led to an increase in the number of patients who

are tested for malaria with a similar proportion among both adults and children (Bruxvoort et al., 2017).

In a study on the quality of uncomplicated malaria case management in Ghana, Fenny et al., (2014) concluded that, with respect to testing to confirm malaria diagnosis before treatment, there was low adherence. On the average 16% of patients who were diagnosed with uncomplicated malaria had a parasitological test done.

Adebimpe (2018) stated in his study that the use of microscopy is very limited in most hospitals in sub-Saharan Africa with poor electricity supply and poorly trained malaria microscopists worsening the situation. Rapid diagnostic tests (RDTs) for malaria are the suggested methods through which the confirmation of malaria diagnosis can be easily achieved. The accuracy, reliability, and outcome of treatment based on results of approved RDT kits will, therefore, move countries in sub-Saharan Africa beyond the general belief that fever is malaria until proven otherwise.

2.3.2 Treat

It is expected that every confirmed case of malaria is treated with quality-assured antimalarial medications, this is the second tenet of the 3T policy. Malaria is a disease that can be cured and prevented as well.

Prompt administration of high-quality antimalarial medications to patients leads to a speedy recovery and prevention of complications which might result in death. Currently, ACTs are the best antimalarial medications available and are recommended by WHO as the first line of treatment globally for malaria resulting from Plasmodium falciparum infection,(Macnab

et al., 2016). Three ACT products that have been recommended in the national treatment guideline for treating uncomplicated malaria in Ghana are :

- Artesunate-Amodiaquine (AS-AQ)
- Artemether-Lumefantrine (A-L)
- Dihydroartemisinin-Piperaquine (DHAP) (National Malaria Control Programme, 2014)

Second-line medications are those that are used for treating treatment failures, thus when first-line medications have been used and are not effective (World Health Organization. Global Malaria Programme, 2012).

With the availability of effective, high-quality antimalarial medications in endemic countries, it has been found that millions of people still lack ready access to appropriate treatment. In order to prevent progression of the disease to its severest form which comes with a lot of complications it is of utmost importance that after the disease is confirmed, appropriate treatment follows. It has been established that for malaria treatment, routine monitoring of medicine combinations to determine their therapeutic efficacy is very important before such drugs are used. Administration of rectal Artesunate is recommended for children with severe malaria before transferring to an appropriate health facility for further management (World Health Organization. Global Malaria Programme, 2012). In all geographical settings, Injection Artesunate is the preferred choice of treatment for both children and adults with severe malaria resulting from plasmodium falciparum. Intravenous (IV) or intramuscular (IM) Quinine is, however, the preferred choice in situations where Artesunate is not available (World Health Organization. Global Malaria Programme, 2012).

In parts of Latin America and South Asia, the main parasite species which causes malaria is *Plasmodium vivax*, in such places, chloroquine is the choice of antimalarial. However, in situations where the parasite has developed resistance to chloroquine, an appropriate ACT is recommended (World Health Organization. Global Malaria Programme, 2012).

According to Faust et al., (2015), Non-ACTs were still prescribed for patients even after health workers fully relied on results from the parasitological test.

When antimalarial medications are inappropriately prescribed, there is wastage of the medication and obtaining effective treatment for the actual cause of the illness is delayed (Maloney et al., 2017).

In another study, the capacity and quality of malaria diagnosis in Ghana and the Republic of Benin was assessed using a cross-sectional study. Keating et al., (2014) reported that in both countries, diagnosis of malaria was often sufficient and precise. Eighty-five point four percent (95% CI; 72.2-98.7) and 83.6% (95%CI; 68.7-98.4) of patients whose test result was positive for malaria in Ghana and Benin respectively were put on the recommended medications. However, 30% (95% CI; 11.1-49.0) in Ghana and 37.8% (22.6-53.0) in the Republic of Benin of patients with negative test results were also put on ACTs.

2.3.3 Track

Tracking of all malaria cases in a surveillance system to promote evidence-based decision making by stakeholders is the third T. To enable health ministries to accurately discover priority areas of public health importance and implement fruitful' health interventions, WHO urges strengthening disease surveillance, vital registration systems and, health

information. Upgrading malaria morbidity and mortality surveillance will also help ministries of health to identify areas or groups in the population that need urgent help and thus allocate resources appropriately (WHO, 2012).

According to WHO, the malaria trends in 38 of 99 countries could not be determined with certainty because their surveillance systems were weak (World Health Organization. Global Malaria Programme, 2012).

Health information is among the six building blocks of a health system, and surveillance is a major component of a national Health Management Information System (HMIS). A malaria surveillance system consists of tools, both human and material resources and structures that are needed to produce information on malaria morbidity and mortality which will in turn influence decision making. (WHO, 2012)

Appropriate surveillance of malaria will also alert ministries of any epidemics in order to intensify control measures. Also, to determine whether interventions are successful or not, information on changing trends in malaria is essential.

The level of malaria transmission in a country and the availability of resources used in conducting surveillance are two fundamental factors that determine the malaria surveillance design to implement. In moderate to high transmission areas, aggregate numbers of cases are analyzed to make informed decisions (World Health Organization. Global Malaria Programme, 2012).

Registration of each individual case should be done in all health facilities to enable accurate documentation of the number of suspected cases, the outcome of diagnostic tests, and the type of medication administered. Presumed, suspected and confirmed cases are to be reported differently, and aggregate morbidity and mortality data summarized periodically for countries with medium to high transmission. In low transmission areas, it is required that each malaria case is fully investigated. (WHO, 2012).

In order to improve surveillance data and make the right decisions, it is of utmost importance that patients with fever are tested and treated with quality assured antimalarial medications if their test result is positive, this is because it has been established that a greater proportion of fever cases are not due to malaria (WHO, 2012)

The District Health Information Management System of Ghana (DHIMS2) is an electronic routine health information system that was rolled out in early 2012 by the Ghana Health Service. Currently at least 90% of districts report malaria cases and deaths through this system(PMI-Ghana, 2014)

The main component of the third T is accurate malaria surveillance to provide reliable data that will inform decision making at the various Ministries of Health to promote effective decision making and hence reduce the burden of the disease. At the various health facilities, Health information officers are responsible for collecting and reporting this information. At the facility level, they are also supposed to analyze their data and use results for decision making (GHS, 2017)

The finding of Sergio et al.,(2017) in a retrospective cross-sectional study to assess the implementation of the malaria 3T policy in Angola was that in 2016 malaria reporting data was 3.7(95%CI: 3.2-4.4) times more likely to be accurate compared to 2013, ($p<0.01$). However, with respect to other indicators which were measured, reporting malaria data accurately did not improve much.

2.4 Compliance with the 3T policy

Bawate, Callender-Carter, Nsajju, & Bwayo (2016) in their research on the factors affecting adherence to national malaria treatment guidelines in the management of malaria in Uganda indicated that even though fever is a major symptom for other illnesses, mostly, health workers of different cadres rely on the presence of fever as the basis for clinical diagnosis of malaria.

Kankpetinge et al., (2016) recounted in their study which was conducted in 10 health facilities in the Ho Municipality of Ghana among 300 children under-five years, that, less than 60% (58.5%) of the total fever cases reported did a parasitological test of which 52.8% tested positive and were therefore confirmed as malaria cases, malaria parasites were absent in 43.8 % of the patients, their test result was thus negative. However, ACTs were prescribed for all patients who tested positive as well as for those who tested negative. They stated in their research that 100% adherence to the treatment of test positive malaria cases with ACT by clinicians was praiseworthy. Nevertheless, the poor adherence to negative test result was undesirable and not commendable. Moreover, over a third of patients were not given follow up appointments.

Clinicians or health workers do not always meet WHO's recommendations. In a study conducted by Chanda-Kapata et al., (2014) in Zambia on evaluating the quality of malaria case management, it was discovered that, contrary to WHO recommendations, antimalarial medications were prescribed for about 30% of patients whose parasitological test result was negative. Similarly, a study involving 1,362 children in two rural areas (Kisii and Homa Bay) in western Kenya also reported that, 7% (46) out of 685 and 45.8% (310) out of 677 in Kisii and Homa Bay respectively who reported with fever had their diagnosis confirmed by means of a parasitological test. The study further indicated that ACTs were administered to 210 (57.2%) and 45 (7.0%) of malaria-negative children in Homa Bay and Kisii respectively (Onchiri et al., 2015).

Also, the findings of Juma & Zurovac (2011) revealed that as high as 58% of test-negative young children and 50% of older children and adults are treated for malaria. Their study further stated that in both age groups, the dominant treatment for test-negative patients was a specific ACT - Artemether-Lumefantrine (AL).

In another study, a three-arm cluster randomized trial involving 46 health facilities was conducted in Cameroun by Mbacham et al (2014) comparing three approaches to malaria diagnosis. It was disclosed that of all patients tested during consultation, 78% of those who tested positive were put on an antimalarial medication of which 52% were ACTs, however the same was done for 82% of those whose test result came out negative, with Artemisinin-based combination therapy forming about 56% of the medications prescribed for them.

Mangham-Jefferies, Hanson, Mbacham, Onwujekwe, & Wiseman, (2014) stated in their study on what determines providers preference for uncomplicated malaria treatment, that

having access to the treatment guideline for malaria does not determine the type of treatment a health care provider prescribes for patients. They added that colleagues in the same facility are more likely to have a preference for the same drug which is ACTs in this case.

To assess the impact and effect of RDT on malaria case management, Bruxuoort et al., (2017) conducted a ten linked study, 8 studies were from sub-Saharan Africa and the other 2 from Afghanistan. The results of the study showed that prescribers' adherence to RDT results was not satisfactory. Over 30% of patients with negative test results were put on ACTS and even for those with positive test results, ACTS were prescribed for less than 80%.

One determinant of completing T3 is asking clients who have been put on ACTs to return for a review (Akanteele Agandaa et al.,2016). In the Bongo District of Ghana, Akanteele Agandaa et al.,(2016) in their study on implementation and challenges of test, treat and track (T3) strategy for malaria case management reported that 91.2% of fever cases put on anti-malaria treatment were not given review appointments, therefore, less than 50% of the children completed the 3T.

2.5 Factors That Inhibit Compliance with the 3T Policy

Mbacham et al., (2014) reported that several studies have confirmed that in public health facilities, diagnostic test results are ignored therefore malaria diagnosis is based mainly on clinical judgment by clinicians. They further indicated that inadequate training of health workers in malaria case management, lack of trust or confidence in test results that come out negative, inadequate resources to investigate other causes of fever and demand made by

the patient for antimalarial medication are some of the challenges that inhibit health workers compliance to the policy.

Clinicians' adherence to the 3T strategy with respect to malaria cases varies in different African countries (Kankpetinge et al., 2016). Kankpetinge et al., (2016) further highlighted that the level of adherence to the test of fever cases, negative test results, and tracking of malaria cases were major problems that need attention. On the tracking of malaria cases by clinicians, their study revealed that, apart from the recording of individual cases, diagnostic test results and treatments given at health facilities, a significant proportion (61.5%) of all the cases treated as malaria were not followed or tracked. This is because patients treated for malaria were not informed by the clinicians to return to the respective facilities for review or follow-up to determine their treatment outcomes. In a qualitative study in western Uganda on why health workers give anti-malarials to patients with negative test results, Altaras et al.,(2016) found out that health providers encountered a major challenge of patients refusing to do requested test or even denying negative test results and requesting for AL.

According to Baiden *et al.*, (2014), in the absence of appropriate diagnostic tools for non-malarial fevers, clinicians are likely to overlook negative malaria test results and still prescribe anti-malarial drugs to all cases of non-malarial febrile illnesses. In a similar study conducted by Bawate et al., (2016), healthcare workers said non-reliability of laboratories (25.27 %), delay in producing laboratory results (12.37 %), presence of cardinal malaria signs (26.34 %), presence of a "typical" clinical picture of malaria (8.06 %), and presence of signs and symptoms of malaria with no suspicion of any other differential diagnosis (27.96 %) being the drivers for not basing malaria management according to the policies.

In a cluster randomized control trial conducted by Mbonye et al., (2014) in Uganda, it was discovered that adherence to malaria case management guidelines improves significantly when health professionals are adequately trained on malaria case management. The results of the study showed that the proportion of patients with negative test results who were put on ACTs reduced significantly by about 33% in the intervention group who received adequate training than in the control group in which the reduction was only 4%.

Adebimpe, (2018) in assessing the compliance of the 3T policy by health workers in Abuja, discovered that more than two-thirds of health workers in the public sector had adequate knowledge about the 3T policy even though 33% ever had a training on the policy. However, in a similar study conducted at Ogun state in Nigeria, it was found out that almost all the respondents who were health care workers were very much aware of the policy (Bamiselu et al., 2016).

CHAPTER THREE

METHODOLOGY

3.1 Study Design

A descriptive cross-sectional design involving both quantitative and qualitative methods was used in this study. This design was selected because it is the most appropriate to elicit the required information to achieve the research objectives.

The quantitative approach involved a retrospective review of suspected malaria cases recorded in the electronic database within the first quarter of 2019 at the selected health facilities.

The qualitative approach involved in-depth interviews with key health workers to explore their knowledge of and challenges with the implementation of the Malaria Test, Treat and Track (3T) policy. This involved a purposive sampling of prescribers (Medical doctors and Physician assistants) and the Health Information Officers.

3.2 Study Area

The study was conducted in the Greater Accra region and two major hospitals were involved; the Greater Accra Regional Hospital a tertiary health facility, and the La General Hospital, a secondary health facility.

The Greater Accra Region is located in the south-central part of the country and shares borders with the Central Region to the west, Volta Region to the east, Eastern Region to the north, and the Gulf of Guinea to the south. It is the smallest of the 16 regions in the country.

According to the 2010 Population and Housing Census (PHC), the region has a population of 4,010,054 making it the second-most populous after the Ashanti Region

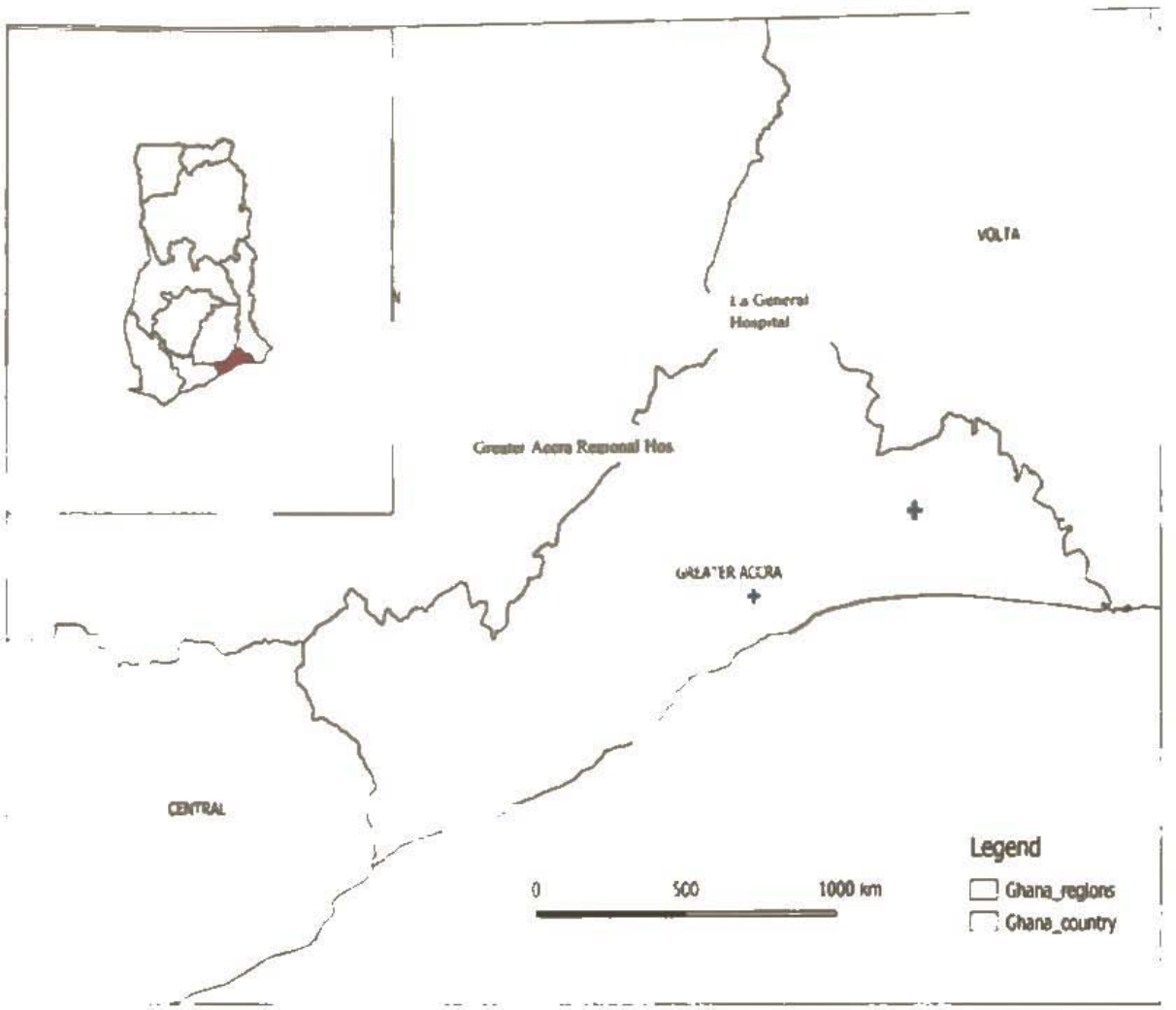

Figure 3.1: Map of Greater Accra Region showing the two hospitals

The Greater Accra Regional Hospital is located within the Osu Klottey sub metro of the Accra Metropolitan Assembly. It is one of the major referral hospitals in the Accra. It serves the whole region, however, suburbs such as Nima, Osu, La, Adabraka, Airport Residential Area, Legon, Accra Central are within the immediate catchment area of the hospital.

La General Hospital is a health facility located in the La Dadekotopon municipality of the Greater Accra Region of Ghana and is a district hospital. The hospital was built in 1963 as a polyclinic and was upgraded to a hospital status in 2004. It is a 161 patient bed-capacity hospital, with staff strength of 421 and has 39 units departments. Healthcare workers in La General Hospital (LGH) consist of anesthetists, Midwives, Surgeons, Pharmacists, Physician Assistants, Recorders, etc. La General Hospital runs specialist clinics including, Neonatal Intensive Care Unit (NICU), diabetic clinics, physiotherapy, child welfare clinics, obstetric and gynecological clinics, etc.

3.3 Study variables

3.3.1 Dependent variable

The dependent variable is compliance with the 3T policy. Compliance with the 3T policy is when a parasitological test (Microscopy or RDT) is requested for a suspected malaria patient, the patient is put on an ACT only when the test result is positive, and the patient is a given follow up appointment or asked to return for review. A patient whose test result is negative and is not put on an ACT is also termed compliance.

3.3.2 Independent variables

The independent variables in the study are listed below stating their definitions and how they were measured.

Variables	Definition	Measurement scale
Patient characteristics		
Age	Age of the patient	Continuous
Sex	Sex of the patient	Binary:Male/Female
Symptoms	Symptoms presented by the patient	Categorical
NHIS status	The insurance status of the patient	Binary: Insured/Non-insured
Health worker		
Age of prescriber	Age of the health worker	Continuous
Sex of prescriber	Sex of the health worker	Binary: Male/Female
Professional Category/ Cadre of health worker	Professional Category/ Cadre of health worker	Categorical
Rank	Rank of the health worker	Categorical
Years of service	Years of service of the health worker	Continuous
Awareness of test policy	Health worker Awareness of test policy	Categorical
Training on policy	Health worker training on the policy	Categorical
Health facility		
Type of facility	Type of facility	Binary: Secondary/Tertiary
Test requested	Malaria test requested	Binary: Yes / No
Type of test requested	Type of malaria test requested	Binary: RDT/Microscopy
Result	Test result	Categorical: Positive, Negative, Not documented
Medicine prescribed	Type of antimalarial prescribed	Binary: ACT, Other antimalarials
Tracking	Patient asked to come back for review	Binary: Yes / No

3.4 Indicators

INDICATORS	CALCULATION	SOURCE OF INFORMATION
Proportion of all suspected malaria cases that were tested (microscopy or RDT) .	Numerator: Number of all suspected malaria cases that received a parasitological test Denominator: Number of all suspected malaria cases	Data abstraction form (Patients records).
Proportion of confirmed out-patient malaria cases that received appropriate anti-malarial treatment according to national policy	Numerator: Number of confirmed (positive) out-patient malaria cases who received first-line antimalarial treatment according to national policy. Denominator: Number of confirmed (positive) out-patient malaria.	Data abstraction form (Patients records).
Proportion of suspected malaria patients that tested negative and were put on anti-malarial treatment	Numerator: Number of all suspected malaria cases whose test result was negative and were put on anti-malarial treatment. Denominator: Number of suspected malaria cases whose test result was negative	Data abstraction form (Patients records).
Proportion of out-patient confirmed malaria cases that received appropriate anti-malarial treatment and asked to come back for review.	Numerator: Number of out-patient confirmed malaria cases that received appropriate anti-malarial treatment and asked to come back for review. Denominator: Number of out-patient confirmed malaria cases that received appropriate anti-malarial treatment	Data abstraction form (Patients records).

3.5 Sampling

3.5.1 Study Population

All suspected malaria cases who reported at the OPD of the two health facilities within the first quarter of 2019 and key health personnel (Prescribers and Health Information Officers) of the selected health facilities involved in the implementation of the malaria 3T policy were included in this study.

3.5.1 Sampling method

The study used a census approach to enroll all cases with suspected malaria that is with "queried malaria" diagnosis, reported in the OPD register and database of the selected health facilities for the first quarter of 2019 as participants of the study. Therefore the sample size was not calculated.

Convenient sampling was employed to select the two facilities; Greater Accra Regional Hospital and the La General Hospital, all in the Greater Accra Region. The Greater Accra Regional Hospital is a tertiary facility while La General Hospital is a secondary facility. The facilities were selected due to the caseload of malaria registered at the OPD in each quarter

For the qualitative component of the study, prescribers and HIOs were purposively sampled for the interviews. Only health workers involved in the implementation of the 3Tpolicy were selected for the in-depth interviews. According to Wu Suen, Huang, & Lee, (2014) purposive sampling involves identifying and choosing groups or individuals who are knowledgeable and well informed about a phenomenon of interest.

3.5.2 Inclusion Criteria

All patients with suspected malaria, that is with "queried malaria" diagnosis, reported in the OPD register and database of the selected health facilities for the first quarter of 2019 were included in this study.

Any consenting health worker (Doctor or Physician Assistant), consulting at the OPD during the data collection period as well as the HIO of the two facilities were also included in this study.

3.5.3 Exclusion criteria

All patients who reported with fever within the first quarter of the year but were not suspected of malaria that is given a "queried malaria" diagnosis were excluded from the study.

Health workers not involved in diagnosis and treatment during our visit

Patients who were diagnosed with complicated malaria.

3.6 Ethical Considerations

3.6.1 Ethics Review and Approval

The research protocol was submitted to the Ghana Health Service Ethical Review Committee for ethical clearance and was approved with GHS-ERC number- GHS-ERC 035/03/19 before data was collected. Approval was also obtained from the Greater Accra Regional Health Directorate and the hospital authorities.

3.6.2 Informed Consent Process

A study information sheet which explained the purpose of the study, the potential risks and benefits, how privacy and confidentiality will be maintained, and an emphasis that participation in the research is voluntary, was presented to potential participants. (see appendix A). Trained research assistants were taken through the consent process and only those who agreed to participate were asked to sign the consent form.

3.6.3 Risks and Benefits to Research Participation

The research posed minimal risks to participants. Although there was no direct benefit to the participants, they contributed to generating knowledge that will improve health policies and practices.

3.6.4 Privacy and Confidentiality

All the interviews were conducted in a secured room at the selected health facilities. Confidentiality was maintained by anonymizing the data that were collected and keeping all interview transcripts in passworded computers. No names and personal identifiers of the participants was recorded or reported in the thesis. The data were accessible only to the student researcher and supervisor.

3.6.5 Compensation

Participants did not receive any payments or compensation for participating in this research

3.7 Data Collection Tools and Techniques

Two methods were used in collecting data for analysis. Data collection was done from 3rd to 28th June 2019. Both quantitative and qualitative methods were applied as explained below.

3.7.1 Quantitative Data Collection

The qualitative data were obtained by reviewing records and abstracting data using a checklist. Both facilities have gone paperless and are therefore using an electronic record system. Health records of suspected malaria cases or patients with a diagnosis of 'query malaria' were abstracted from the OPD database in the selected facilities and reviewed using a checklist. The checklist was designed to document the following information: sex, age, NHIS status, symptoms presented, Malaria test requested, test result, whether ACTs were prescribed or not and whether the patient was given a follow-up appointment or not.

3.7.2 Qualitative Data Collection

On days the team visited each health facility, Medical Doctors and Physician Assistants who were involved in malaria case management at the OPDs, and consented to participate in the study were interviewed. A semi-structured interview guide was used to explore perceptions of the healthcare workers, information about their views, values, feelings, and motivations underlying the implementation of the policy was captured using the qualitative approach. The following were also assessed; health worker knowledge about malaria diagnoses and treatment practices as well as training, supervision, work experience, and challenges.

The researcher conducted all the interviews. A tape recorder was used to record the conservations during the interview. A research assistant took detailed notes. The duration of the interviews ranged from 15 to 20 minutes.

3.8 Data processing and analysis

Strategies applied in analyzing the data obtained are described below;

3.8.1 Quantitative Data Analysis

Data collected were entered into Microsoft Excel, frequencies were run to identify missing variables, data were cleaned and checked for accuracy and completeness. The cleaned data were then imported into Stata version 15 for statistical analysis. Information collected such as sex, age, NHIS status, symptoms presented, laboratory investigations or tests and ACTs prescribed were summarized using descriptive statistics. For each objective, frequencies, proportions, and percentages were used to analyze data descriptively.

3.8.2 Qualitative Data Analysis

The researcher used a tape recorder to record all the interviews. The audio recorded voices were transcribed using a Microsoft Office Word text. The data analysis involved reading through each of the interview transcripts line-by-line, coding and categorizing the data into thematic domains. This enabled the summary data to be manually sorted and gathered based on three main themes. According to Creswell (2014), the impact of the qualitative research process is to aggregate data into a small number of themes. The three main themes explored were; Health system factors, Prescriber factors and External factors influencing the implementation of the 3T policy. Health system factors covered RDT/ACT stock out, training of health workers and challenges with tracking of cases. Prescriber factors involved knowledge on the policy, personal belief and experiences, preferred test, and antimalarial medication. External factors comprised issues with supervision, patient response to the policy and other challenges. Codes were used to identify the interviewees when quoted.

3.9 Quality Assurance

Credibility in qualitative research ensures ethical considerations and getting findings the way they really are (Macqueen, Guest, & Namey, 2005). Audit trail and peer debriefing were used to ensure quality in the qualitative research. Although all the selected facilities are implementing the policy, the atmosphere under which they operated differed. Audit trail included comprehensive field notes, memos and documentation of steps taken before arriving at a decision. Supervision by academic advisors such as main research supervisor, lecturers in the Department of Health Policy, Planning and Management in the School of Public Health, University of Ghana and officials at the National Malaria Control Programme also ensured the quality of data collected.

The following measures were also used to ensure data quality:

(1) A field test (pre-test) was done and relevant amendments made to the questionnaire before data collection was done.

(2) The research assistants selected for data collection had previous experience in data collection. They were also trained before data collection for the study

(3) They were all supervised by the principal investigator during the quantitative data collection.

CHAPTER FOUR

4.0 RESULTS

4.0 Introduction

This chapter presents the results as analyzed from both quantitative and qualitative studies. Quantitative results presented are on background characteristics of patients, the proportion of suspected malaria cases that were tested, proportion of patients with confirmed malaria who were treated with ACTs, proportion of patients with negative test results who were treated with antimalarial medication, proportion of patients who were given follow up appointments and the overall level of compliance in both facilities. Qualitative findings are grouped into knowledge and training on the policy, Preferred test requested to confirm malaria diagnosis, medications prescribed, Patients' response to the policy and Challenges with the implementation of the policy.

4.1 Quantitative Results

A total of 876 records were reviewed in all, 514 (58.7%) were from the Greater Accra Regional Hospital and 362(41.3%) form the La General Hospital.

4.1.1 Background characteristics of study participants

Ages of patients with suspected malaria in the first quarter of the year ranged from 1 year to 98 years with a mean age of 26.3 years (SD 26 years) and a median of 26.0 years. In both facilities, the majority of the patients were females (56.6%) and about a third were children aged below 5 years. With regard to NHIS status, the majority of the patients were insured. Table 4.1 shows the background characteristics of the patients.

Table 4. 1 Background characteristics of suspected malaria patients.

Variable (876)	GARH n(%)	La Gen. Hosp. n(%)	Total n(%)
Age group			
≤ 5	202 (39.3)	73 (20.2)	275 (31.4)
·5	312 (60.7)	289 (79.8)	601 (68.6)
Sex			
Male	227 (44.2)	153(42.3)	380 (43.4)
Female	287 (55.8)	209(57.7)	496 (56.6)
NHIS status			
Insured	363 (70.6)	295 (81.5)	658 (75.1)
Non-insured	151 (29.4)	67 (18.6)	218 (24.9)

4.1.2 Symptoms presented by suspected malaria patients in the GARH and La Hospital

In figure 3, the common symptoms presented by patients with suspected malaria in the two facilities are presented. The most common symptom among the patients was fever (GARH-87.7% and La General-91.4). Abdominal pain was the least reported symptom among the patients, 9% in both health facilities. Headache and chills were reported by more than half of the patients.

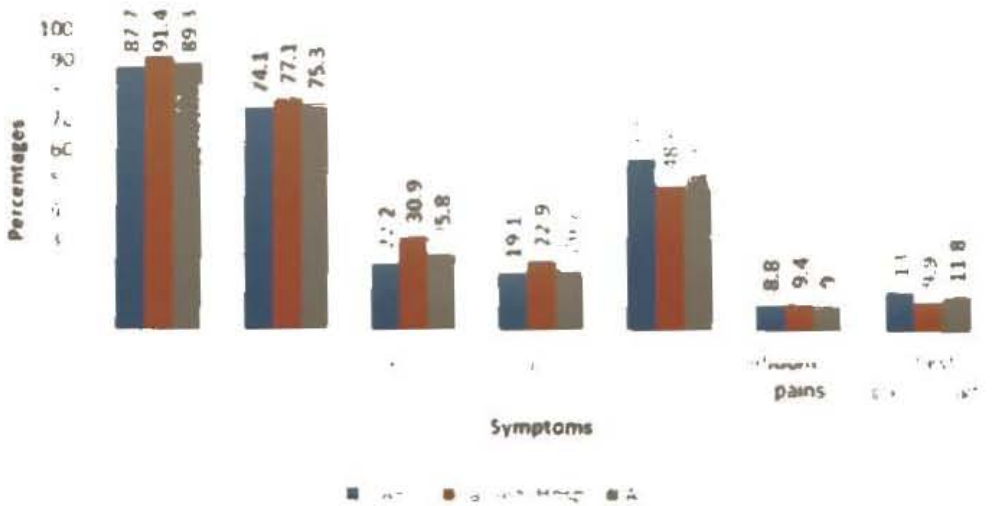

Figure 4.1: Common symptoms presented by suspected malaria patients in the GARH and La Hospital

4.1.3 Proportion of patients tested for malaria

The proportion of the patients with laboratory test requested, type of test done and test results are presented in Table 4.2.

Malaria test was requested for the majority of the patients (83.1%), mostly microscopy was the malaria test requested, RDT was requested for a little over a fifth of patients and almost a third of patients tested were negative, however, a greater number of test results (35.7%) were not documented.

Table 4. 2: Proportions of patients tested for malaria

Variable	GARH n(%)	La Gen. Hosp. n(%)	Total n(%)
Malaria test requested			
Yes	412 (80.2)	316 (87.3)	728(83.1)
No	102(19.8)	46 (12.7)	148(16.9)
Type of Laboratory test done			
RDT	78 (18.9)	79 (25.0)	157 (21.6)
Microscopy	334 (81.1)	237 (75.0)	571 (78.4)
Test result			
Positive	128(31.1)	88 (27.9)	216 (29.7)
Negative	111 (26.9)	141 (44.6)	252 (34.6)
Not documented	173 (42.0)	87 (27.5)	260 (35.7)

4.1.4 Patients prescribed with ACT

Only one patient with a positive test result was not put on an ACT, all the others were treated with ACTs. However, ACTs were also prescribed for more than a third of patients with negative test results. Over 70% of patients with undocumented test results and almost a fifth of those with no test requested were also put in ACTs.

Table 4. 3: Patient prescribed with ACT in the health facility

Variable	GARH n(%)	La Gen. Hosp. n(%)	Total n(%)
Patient with positive test prescribed with ACT	127 (99.2)	88(100.0)	215 (99.5)
Patient with negative test prescribed with ACT	44 (39.6)	47(33.3)	91(36.1)
Patient with undocumented Test result but prescribed with ACT	126 (72.8)	59(67.8)	185(71.2)
Patient with no test requested but Prescribed with ACT	79 (77.5)	34(74.0)	113(76.4)
Prescribed with ACTand given follow up appointment	159(42.3)	111(48.6)	270(44.7)

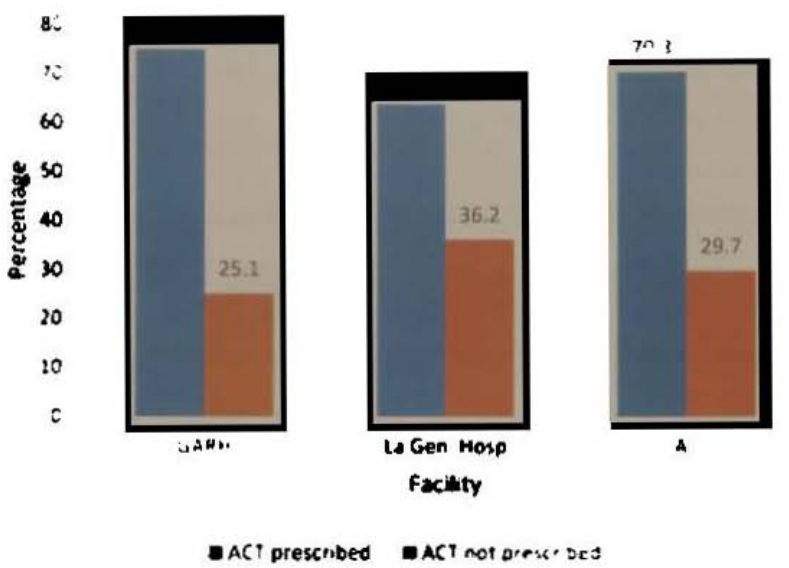

Figure 4. 2: Patient prescribed with ACT in the health facility

4.1.5 Compliance with the policy

The overall compliance with the test and treat policy for the two health facilities was 58.7% with La General Hospital having the highest level of compliance (63.6%).

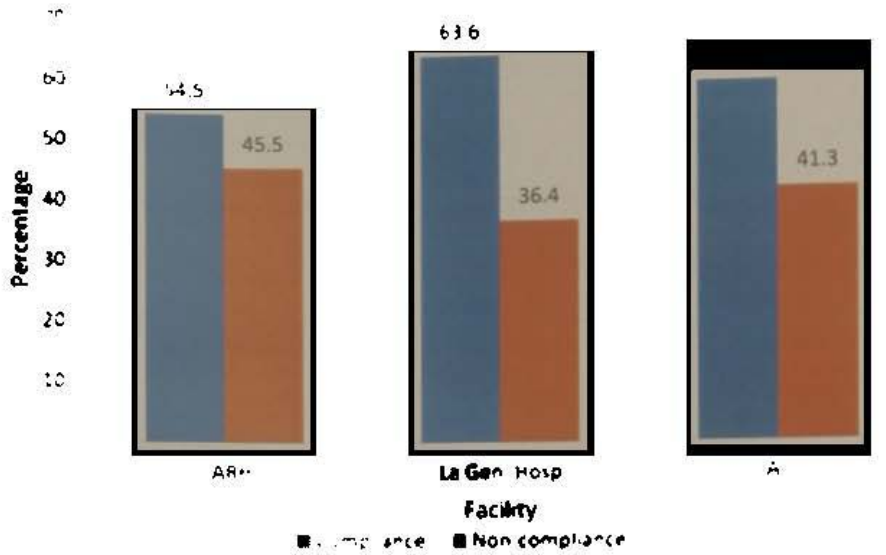

Figure 4.3: Compliance to the 3T policy at the health facilities

4.2 Qualitative Results

Saturation is defined as the point at which the data collection process no longer offers any new or relevant data (Dworkin, 2012). Data saturation was reached after conducting six and five In-depth interviews at the GARH and La General Hospitals respectively with the prescribers.

4.2.1 Background detail of Interview participants

Table 4.4 shows the background details of the interviewees. Most of the participants in both health facilities were below the age of 35. Majority of the participants are males, three were females. With respect to education, there were ten first degree and three postgraduate degree holders. Nine of the participants were medical doctors, two were physician assistants and two also were health information officers. Interviewees' years of experience ranged from 1 to 27 years

Table 4. 4 Background detail of Interview Participants

Variable	GARH	La Gen. Hosp.	Total
Age-group			
<35	6	3	9
>35	1	3	4
Sex			
Male	5	5	10
Female	2	1	3
Education			
First degree	5	5	10
Postgraduate	2	1	3
Cadre			
Medical Officer	6	2	8
Physician assistant	-	3	3
Health Information Officer	1	1	2
Working experience			
1 year	-	2	2
2 years	1	1	2
3 years	2	-	2
5 – 10 years	3	2	5
>10 years	1	1	2

4.2.2 Knowledge about the policy

Participants were asked to give a brief overview of the malaria 3T policy, it was noticed that all of the interviewees at the La General Hospital were aware or had knowledge of the policy with the exception of one as captured in the quotes below;

> *"I know it's a policy that has been initiated to help us be able to detect and treat malaria appropriately because of this resistance to our usual malaria drugs, we want to make sure that we only prescribe anti-malaria for cases that are actually malaria cases that is a little I can say about it". [MO, La General]*

> *"I have no idea about this policy. For several years no workshop has been organized for us." [PA, La General]*

This was however not the case in the Greater Accra Regional Hospital. Majority of the interviewees were not aware of the 3T malaria policy even though they were practicing it thus they test the majority of their suspected malaria cases before they treat. This is captured in the excerpts below;

"It's new to me anyway I haven't really heard malaria test, treat and track as a policy but what I know is, for we pediatricians, what we do is we don't just treat symptoms that we see it is sought of consistent with the malaria symptoms because we have so many infections that will mimic the symptoms of malaria, so usually what we do is we first of all when we come and we see the symptoms that they are telling us or base on examination findings, is more like malaria we would test first, if we can do the blood film for the malaria parasite at least you can do the rapid diagnostic malaria test."[MO, La General]

"... I'm not so familiar with it but I'm sure you have to prove malaria before you treat. And then you track the cases". [MO, La General]

4.2.3 Training on the policy

The interviewees were asked if they had any formal training on the policy or had any training in general on malaria case management after school, only two personnel one from each facility had ever been trained on malaria case management.

"Yes, I have had a series of workshops the last one was about 3months ago." [MO, La General]

"Yes, I have training on the policy. The last time I went for malaria update was early 2018. Not too long ago". [Specialist Pediatrician, GARH]

On the treatment guideline for malaria case management which was developed in 2014 availability in the facilities, none of the facilities had a copy of the treatment guideline. Moreover, only the two personnel who were formally trained on the policy had seen a copy before.

4.2.4 Preferred test requested to confirm malaria

The qualitative findings buttressed the quantitative data about microscopy being the preferred malaria test requested as noted by these participants:

"I don't usually trust RDT so I usually request for BF for MPs. Also because I want to see the parasitemia level in the blood." [MO, GARH]

"...well the RDT is just a rapid diagnostic test and it's expected as per control policy guideline that we must do blood film comment for malaria parasite as well. So one is a backup for the other if it comes and its positive I'm going ahead and decide that, yes its positive but if its negative, and I still strongly believe that the person still has malaria I'm going to continue the person is still going to wait for the blood film malaria parasite to come. And it will tell me what the counts of organisms are and even tell me what spices and dealing with so it's important to have that backup for the RDT." [MO La General]

" I usually request the BF, microscopy. I think err probably the kits are not easily available and it's probably not as sensitive as the BF, so we end up missing some of the cases" [MO, GARH]

4.2.5 Tracking component of the policy

When the participants were asked what the last T which is tracking in the3T policy was about, the majority of them said tracking is following up on the patients and asking them to come back usually after two weeks to conduct the test again to confirm their status as contained in the excerpts below;

"....it's about follow up on the patients when we see them we ask them to come in 2weeks time for the review once they are well, they usually don't come back, very few come back to show themselves to us". [MO La General].

Others also misunderstood the tracking

"The tracking is also a challenge because when I treat my child with malaria, I will be happy if I could get all other children in the household being tested. But our policy does not currently allow this, we can't just bring people in to do the test, especially when they don't have insurance". [MO, GARH]

4.2.6 Preferred ACT

WHO recommends ACTs for the treatment of patients with uncompleted malaria. Finding from the qualitative study supported that of the quantitative study in that all the clinicians mentioned ACTs specifically, AL as their drug of choice for treatment of uncomplicated malaria as said by these participants:

> *"For uncomplicated malaria, we use Arthemether Lumifantrine or Artesunate Amodiaquine." [MO, GARH]*

> *"so mostly I go for the tab Arthermeter Lumifantrine, Coartem to be specific if the patient can afford but if a patient cannot afford coartem then any other brand may be Lonart DS" [PA La General].*

4.2.7 Facilitative supervision to ensure compliance with the policy

Regular supportive supervision at health facilities by members of the NMCP on malaria case management is key in encouraging Clinicians to comply with the policy.

On whether their facilities were visited by the supervisors to ensure compliance with the policy responses were negative as indicated below:

> *"Personnel from the National Malaria Control Program and the Ghana Health Service come round once in a while They don't come too often The last one was from them was somewhere last year" [MO La General]*

> *"... for some time now we have not seen them it was supposed to be done at least on a quarterly basis" [HIO La General]*

4.2.8 Patients response to the policy

One of the key components of the Test, Treat and Track strategy is to ensure that prescribers request and document for all patients to return for review after treatment with ACTs.

When the participants were asked about patients' response to the policy, the following quotes were captured;

> *"For the first part that is testing whoever you suspect, you know a lot of them had the impression that you can have malaria and it will not show in your blood. Initially, well, we were having challenges but now I think it is better because a lot of them understand that when you test and its negative, you don't have to be treated, so when we counsel them, I think a lot of them are understanding but we still get a few people who are difficult but I think it is better than before. Retesting after treatment is the problem. Because we can't track with RDT because it will still be positive so we have to do microscopy and now asking them to come back after treatment to do microscopy which is most likely to be paid for from their pocket. . . ".[MO, La General]*

> *"For patients with uncomplicated malaria sometimes we write but me I haven't seen anyone who has come back before so " [MO, GARH]*

4.3 Compliance with the policy

The personal belief and past experiences in malaria case management by health workers influenced compliance with the policy as indicated below ;

> *"I have had such an encounter when RDT was negative, BF was negative but we treated and the person got better. Symptoms were very suggestive of malaria . . . .[MO, La General]*

> *"If clinically I'm convinced that the person has malaria, I will start and then request the test "[SMO, GARH]*

4.3.1 Challenges with the implementation of the policy

In most developing countries like Ghana, private pharmacy shops and over the counter medicine sellers are usually the first point of contact when people fall sick (Mbonye et al.,

2015). Clinicians complained that the activities of these dispensers do not promote compliance with the 3T policy and this was captured in the excerpts below.

> *"I think the challenges should be with the pharmacists, the pharmacists outside the hospital because patients go there, they complain of fever and they treat them without testing for malaria." [MO La General].*

> *"And then I think most of these chemical and pharmacy shops too that have come up, they want their money so they sell. Now they are testing with the RDT alright but they still sell when it's negative so we have to insist that they do the right thing." [MO GARH].*

> *"They go to the pharmacy and they are supplied with the drugs without even testing them." [PA, La General].*

4.3.1.1 Limited education or public awareness about the policy

Most of the respondents said there is a need for awareness creation on the policy. They feel that most people do not fully understand the entirety of the policy. Majority of the participants also said there is a need for them to be trained on the policy not just hearing about the policy from their colleagues

> *"I think the main challenge is educating clinicians and the general public because for a long time everybody has been blaming every illness on malaria. So they have to understand and accept that for malaria, you have to test before you treat. I think people are coming on board but we still have much to do." [MO, La General]*

4.3.1.2 RDT/ACT stock out

The problem of RDT and ACT shortages were also reported as negatively influencing compliance with the policy, as narrated below;

> *"RDT, you know it is provided by the program so we don't really have much control over it, if it is finished you can't do anything about it. ACT too, the hospital can run out of it but I advise them to buy it outside but it's not very often." [MA, La General]*

"We have challenges because sometimes the test kits are actually not enough not because the control program has not supplied it, because we have logistic issues on our ward that we ran out but nobody noticed and because it's an institution we don't do it single kit we do it in groups so there is a buffer that controls everything somebody has spilled the buffer in a certain department and comes to collect yours. They are little things that shouldn't happen but do sometimes happen, and you can't find buffer to do your test or even on weekends somebody forgot to sign for it and you walk up and down in different wards to look for it. Things like that ... You see I came this morning and somebody who should have had the malaria test done on Friday since hasn't done it". [Specialist Pediatrician, GARH]

"Availability of RDT kits is a very big issue, just last week I was looking for one for myself but I couldn't get one in the hospital". [MO, GARH]

4.3.2 Health information officers and the third T

The main component of the third T is accurate malaria surveillance to provide reliable data that will inform decision making at the various Ministries of Health and hence reduce the burden of the disease. The health information officers are responsible for collecting and reporting this information. At the facility level, they are also supposed to analyze their data and use results for decision making. The two HIO had not had any formal training on the policy and were therefore not informed about their role even though they were collecting and reporting malaria data into DHIMS-2.

"In the aspect of review of our performance half-yearly and annual at the facility level, it brings on board all the various sectors, TB, ART. So I being part of the OPD I feed the OPD in charge with the data on malaria and it is part of their presentation, we always look at the trend of malaria, like the number of suspected cases, how many were tested and out of the tested, how many were positive. This we do and we have seen over the years that our malaria data keeps decreasing, that is the number of suspected keeps falling for like 4 years now that malaria trend is downward but I didn't know it was part of the tracking". [HIO, GARH]

", ...no no no I have not had any training on the policy, we have a malaria focal person in the district directorate, so it was in one of our annual reviews that it was mentioned ..... So there has not been an official training at the facility level for me." [HIO, La General]

4.3.2.1 Challenges with tracking

4.3.2.1.1 Challenges with software

Both facilities have gone paperless and are using an electronic record system, every information is therefore entered into a software program. Issues with the software came up as a challenge as indicated in the statements below:

"The huge challenge has got to do with the software we are using and because we wanted to go paperless that is electronically for the OPD but now the challenge is that we don't have this current software at the lab, so test results of suspected cases are not entered directly from the lab So the client has to bring the result manually on a piece of paper to the clinicians who may not always enter test result, sometimes the clinicians who saw the patient might even have closed" [HIO, La General].

"There is supposed to be a linkage of ACTS from the pharmacy to the consulting room, the software we were using in the past could give us the number of people who came and were diagnosed with malaria and those who were treated with ACTS but as at now, they are unable to tell us so there's always been a tug of war between us who are supposed to work with the data and those who are supposed to generate the data" [HIO, GARH]

4.3.2.1.2 Incompleteness of the data

For malaria surveillance to be valid, records of all individual cases are to be collected, aggregated and analyzed to inform decisions. Malaria data was reported to be incomplete as indicated in the remarks below

"Some clinicians also consult outside the system, causing us to lose data which includes malaria data that is to some extent, making our data incomplete" [HIO, La general]

"...the big problem is with the quality of the data, the incompleteness.... If you have acquired a quantity of RDT today, then at the end of the month I expect you to produce for me the results of what you used the RDT for but then you tell me that when you were not here this person did it, another person will say when I was not here somebody took it so at the end of the day you don't know who to hold responsible Meanwhile, the number that you gave out has reduced, you gave out 50, and you are having 10 now they don't have anything to show that this was how we used it". [HIO, GARH]

"So I think just like we have task-shifting officers for TB, if they can get someone to be responsible for and do the recording for malaria, it will help" [HIO, GARH].

Both of them, however, stated that the process of entering data in DHMIS-2 is not a challenge at all.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

Presented in this chapter are the discussions based on the results obtained from the analysis of the data in chapter four. The chapter addresses the proportion of suspected patients tested for malaria, the proportion of patients prescribed with ACTs, Compliance with the policy and factors that influence compliance with the policy. The chapter closes with limitations.

The current WHO recommendation for malaria case management is that all suspected malaria cases should be tested to confirm diagnoses before being treated with ACTs which are the recommended antimalarial medications, this led to the introduction of the 3T policy in 2012.

This study evaluated the implementation of the malaria 3T policy in two health facilities within the Greater Region. Frequent supply of logistics such as RDT kits and ACTs, regular supervision and in-service training for health workers are key in complying with the policy.

5.2 Proportion of suspected patients tested for malaria

Testing patients with malaria symptoms parasitologically with RDT or microscopy to confirm the presence of malaria parasites is critical not only for case management but also for measuring malaria burden accurately (WHO., 2012). In this study, more than 80% of suspected malaria patients were tested to confirm diagnosis indicating that malaria test was not requested for almost a fifth of patients with suspected malaria. This is suboptimal because the second objective of the NMCP, Ghana is to provide parasitological diagnosis to

all suspected malaria cases and provide prompt and effective treatment to confirmed cases by the year 2020 (GHS, 2017).

In a study conducted by Sserwanga et al.,(2015) in Uganda on prescription practices among children admitted in six hospitals, a higher rate was recoded as almost all the children (96.9 %) were tested for malaria. However a lower testing rate of 67% was reported by Chanda-Kapata et al. (2014) in a retrospective evaluation of the quality of malaria case management in twelve health facilities in Zambia, likewise a testing rate of 58.5% which was recorded in a study in 10 health facilities in the Ho Municipality of Ghana among 300 children under-five years, (Kankpetinge et al., 2016).

Similarly, in Nigeria (Ezenduka C.C., 2014) reported in his study on adherence to treatment guidelines for uncomplicated malaria that, more than half of patients suspected were not tested before treatment.

In a different study on the quality of uncomplicated malaria case management in Ghana, A.P. et al.,(2014) concluded that with respect to testing to confirm malaria diagnosis before treatment, there was low adherence. On the average 16% of patients who were diagnosed with uncomplicated malaria had a parasitological test done.

Microscopy was the most performed test compared to RDT (78.3% vs 21.5%) in this current study. Participants in the qualitative interviews reported that microscopy was preferred to RDT because microscopy is more sensitive and provides more information, for instance, on the parasite count than RDT.

Even though the testing rate found in this study is high, more needs to be done to ensure that presumptive treatment without confirmation is discouraged in our health facilities. Also, more than a third (35.7%) of test results were not documented. This is unacceptably very high as the test result is the basis for treatment.

5.3 Proportion of patients prescribed with ACT

The second tenet of the 3T policy stipulates that every confirmed case of malaria should be treated with quality-assured antimalarial medications. It was revealed in this study that with regards to the treatment of uncomplicated malaria with ACTs, there was high compliance, 99.5% (215 out of 216) of the confirmed malaria cases were treated with ACTs. This is similar to the findings of Bawate et al., (2016) in which all confirmed cases (100%) were treated with ACTs and that of Ansah et al.,(2015) who discovered 90.8% conformity to ACTS as the first line of treatment in Ghana.

However, in Kenya, Juma and Zurouac (2011) in their study on Changes in health workers' malaria diagnosis and treatment practices found contrasting results as less than 70% of both children and adults with confirmed malaria were put in ACTs. The outcome of the study by Owusu – ofori (2013) when exploring Transfusion-transmitted malaria in Ghana was that only a quarter of patients who were given antimalarial mediation were tested to confirm diagnosis. contrary to WHO's recommendation of treating only confirmed cases with antimalarial medications

In this study, 70.3% of all suspected patients were prescribed with ACTs, however, only about a third of the suspected patients were confirmed to have malaria. This shows that clinicians or health workers do not always comply with WHO's recommendations.

Moreover, 36.1 % of the patients with negative results were still prescribed with ACTs, as well as, 71.2% of the patients whose test results were not documented (meaning the doctor did not see the test result before prescribing the ACT) and 76.4% of suspected patients who were not asked to do any test to confirm diagnosis were treated presumptively. This is in contravention to the guidelines and shows that the policy is not being followed by health personnel.

Contrary to the findings in this study, research on health worker adherence to malaria treatment guidelines at outpatient health facilities in southern Malawi revealed that 96.6% (500 out of 525) of patients with negative test results did not receive antimalarials (World Health Organization, 2017)

5.4 Compliance with the policy

The overall compliance rate recorded in this study was 58.7%. The compliance rate at La General Hospital was higher than the GARH. This finding is comparable to that of Bawate et al., (2016) where adherence to treatment guidelines was higher in the lower facilities than in the higher ones.

Compliance with the 3T policy requires that a parasitological test (Microscopy or RDT) is requested for a suspected malaria patient, an ACT is administered only to a patient with positive test result and patient is given follow up appointment or asked to return for review. A patient with a negative test result who is not put on an ACT is also termed compliance. Any contravention of these steps is non-compliance. This compliance rate shows that more needs to be done to ensure compliance with the policy.

It was also confirmed in the interviews that some of the health personnel and prescribers diagnose and treat malaria presumptively. Some also argued that sometimes when the laboratory results are negative and they have a strong suspicion of malaria they go ahead and treat for malaria. The practitioners depend on their clinical sense and perhaps not trusting laboratory results. Neglect of test negative results amounted to high over treatment and could be a driver for increasing drug resistance. The practices constitute non-compliance to the policy. Noncompliance of clinicians to the policy could be attributed to lack of training and occasional stock-out of RDTs in the health facilities (Mbacham et al., 2014). With respect to compliance with the policy, it was revealed that La General Hospital, had higher compliance compared to the Greater Accra Regional Hospital.

5.5 Challenges associated with the implementation compliance

Lack of training and supportive supervision was a major challenge identified in this study. Only two personnel had some form of formal training on the policy. Several studies have shown that well-trained healthcare staff could do better in practice most especially in the presence of adequate number and quality of guidelines and job aids (Smith L, 2009 & Mangham-Jefferies et al., 2014). As part of the training, the prescribers should be educated on the new treatment guidelines. When the prescribers were asked if they had or have seen a copy of the treatment guideline for malaria case management, the majority said they have not seen a copy of treatment guidelines. In a systematic review of malaria treatment in Sub-Saharan Africa, it was found that malaria treatment was fairly good when users had received training on the use of the guideline (Boyce & Meara, 2017).

Analysis of the qualitative study revealed that in both facilities, less than half of the patients, 42.3% at La General Hospital and 48.6% at GARH put on ACTs were given follow up

appointments. Similarly, in the Bongo District of Ghana, Akanteele Agandaa et al.,(2016) in their study on implementation and challenges of test, treat and track (T3) strategy for malaria case management reported that 91.2% of fever cases put on anti-malaria treatment were not given review appointments, less than 50% of the children completed the 3T. A key determinant of completing T3 was asking clients to return for a review (Akanteele Agandaa et al.,2016). It was reported in the interviews that there was limited public awareness on the policy. For some of the suspected malaria patients when tests are requested to confirm malaria diagnosis before treatment, rather want to be treated without doing any test. This is similar to the finding reported by Altaras et al.,(2016) in a qualitative study in western Uganda on Why health workers give antimalarials to patients with negative test results. Health providers encountered a major challenge of patients refusing to do requested tests or even denying negative test results and requesting for AL. More public education on the importance of the 3 T policy is therefore necessary.

In this study, both HIOs mentioned incompleteness of the malaria data reported into DHIMS as a great challenge. This correlates with the finding of Sergio et al.,(2017) who concluded in their study that even though efforts are being made to improve the quality of malaria data, tracking malaria cases continue to pose a challenge.

Stock-outs of ACTs and RDTs were some of the challenges reported by the interviewees. This challenge can be addressed by continuous monitoring and replenishing of the stocks. Evidence exists that continuous monitoring and supervision addresses the issues of frequent stock-out in implementation of the 3T policy (Ndong et al., 2019).

Tracking of the patients who were put on ACTs was a major concern expressed by the participants in this study. With respect to the tracking, key challenges outlined by the HIO included issues with the software and data quality issues, where data is incomplete mostly because of poor documentation and also some clinicians attending to patients outside the system.

From the qualitative inquiry, the majority of patients who are asked to return for review never do. All the same, this could be addressed by public education, engagement, and sensitization. The Ndong et al, (2019) study addressed the issue of tracking by using community health volunteers to follow up on the patients who did not return. An intervention of this sort has the potential to propel full implementation and compliance with the policy.

5. 6 Study Limitation

One of the limitations of this study is that factors that influenced clinician's compliance with the policy were not explored. Also, the validity of the data extracted from the database of the facilities could not be determined and the quality of malaria data reported by both facilities into DHIMS 2 could not be verified. Again, at the two facilities involved in the study, results on patients testing using both RDT and malaria microscopy were not distinguished.

Despite these limitations, the study achieved its main objective of evaluating how the 3T policy is being implemented in the two facilities by measuring the indicators, also key challenges associated with implementation of the policy were also discovered.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The key finding in this study was that compliance with the policy was just above average (58%). Suspected cases were tested, mostly using microscopy. All patients who tested positive with the exception of one were all put on ACTs indicating almost 100% compliance with the second T. Contrary to WHO guidelines, more than a third of patients with negative test results were also put on ACTs as well as a sizeable number of patients whose test results were not documented. Less than half of patients put on ACTS were given follow up appointments.

Full compliance with the 3T policy, therefore, remains a problem as the standard has not been reached yet even though compliance is average, there is still room for improvement. In the qualitative study, health workers highlighted a number of challenges they face. The widely reported ones included the occasional shortage of RDT kits, RDT tests not being done well, lack of education on the policy for the general public and health workers, fake drugs in the system and also pharmacist prescribing ACTS when the test has not been done or even when the test result is negative.

The process of entering the information into DHIMS as told is not a challenge at all.

6.2 Recommendations

Based on the findings in this study the following are recommended:

- The NMCP should organize periodic on-site training for clinicians, pharmacists, over the counter medicine sellers, nurses, and health information officers to improve compliance with the policy

- The NMCP should conduct periodic supportive supervision on malaria case management at the health facilities to increase compliance.
- The Ministry of Health and Ghana Health Service must ensure regular and sustained supply of logistics such as RDTs kits and ACTs to all the facilities, these should be available and accessible.
- Prescribers should document the test results to serve as evidence in compliance with the policy.
- Management of health facilities must ensure frequent upgrades of their electronic software for efficient capturing of data.

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APPENDICES

Appendix A: Participant Information Sheet

UNIVERSITY OF GHANA

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH POLICY, PLANNING AND MANAGEMENT

PARTICIPANTS INFORMATION SHEET FOR DOCTORS

The information sheet provides information about the research for participants to make an informed decision of whether to participate in the study or not. It outlines the nature of the research, what the research involves, risks, benefits and compensation.

i. **Title of Study:** An evaluation of the Malaria Test, Treat and Track (3T) Policy in two health facilities within the Greater Accra Region.

ii. **Introduction:** My name is Diana Akiwa Kai Odai, a Master of Science in Public Health Monitoring and Evaluation student of the School of Public Health, University of Ghana and I am the Principal Investigator. My telephone number is 0244953820, and email doriaah@yahoo.com

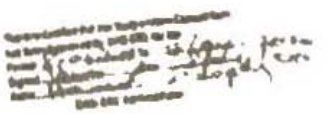
iii. **Background and Purpose of research:** Malaria is a life threatening vector-borne disease, which causes high morbidity and mortality, especially among children under five year. A relatively large proportion of the global burden of malaria was carried by WHO African region. Ninety two and ninety three percent cases and deaths respectively were recorded in the region during the period (World Health Organization, 2018). Clinical malaria treatment policy as per WHO recommendations, has changed from a system of widespread presumptive treatment based on clinical diagnosis of fever to targeted treatment following positive parasitological diagnosis also known as the Test, Treat and Track (3T) policy (World Health Organization, 2012). The Ghana National Malaria Control Program in accordance with WHO has instituted the 3T policy which recommends that all suspected cases of malaria are put on ACTs only after diagnosis has been confirmed by means of an RDT and or microscopy. Prompt and effective case management of uncomplicated malaria is a critical element of malaria control. It is anticipated findings from this study will provide useful information about compliance of the test, treat and track policy by health workers in Accra as well as establishing the

challenges and prospects of the 3T policy for monitoring and evaluation purposes as well as for decision making.

iv. Nature of research: This is a descriptive cross-sectional study. In depth interviews will be conducted to know your views and challenges with regards to the implementation of the Malaria Test, Treat and Track (3T) policy. You are being asked to take part in this study because you are a health worker who commits in the selected facilities for this study, should you agree to be part of this research, you will be asked to answer a few questions which will be posed to you by a member of the team. The interview will be recorded and transcribed without revealing your identity

v. Participants involvement

- Duration/what is involved: You will be required to give responses to questions related socio-demographics, your general knowledge about the current malaria treatment guideline, the 3Tpolicy and your experiences/challenges regarding the implementation of the 3T policy in this facility. It is expected the entire process will not last more than 30 minutes.
- Potential Risk: In participating in this study, you will be asked to share some personal views and experiences concerning the 3T policy implementation. You do not have to answer every question, you may also withdraw from the study at any time that you wish to do so. I will give you an opportunity at the end of the interview to review your responses, and you can ask to change any responses that you want. You do not have to give me any reason for withdrawing.
- Benefits: this study will provide no direct benefits to you, it will however provide useful information that will be used to improve health care delivery as far as malaria case management.



- **Cost:** You will not incur any cost by participating in this study
- **Compensation:** You will not receive any material compensation for participating in this study. You will be thanked for your effort and time.

- **Confidentiality:** Every information given will be kept strictly confidential, your name will not be needed. Electronic copies of data will be stored on a computer and encrypted with a password which will only be known to the PI. The information collected will be used only for research purposes and the interview will be conducted in a secured room. When analysing data, your name or any personal identifiable information will not be used.

- **Voluntary participation/withdrawal:** Participation in this study is voluntary and you can willingly withdraw from this study at any period without any consequences or penalty or having to give any reasons.

- **Outcome and Feedback:** Findings from this study will first be reported in a thesis as part of the partial fulfilment of a Masters of Public Health monitoring and evaluation degree at the University Of Ghana School Of Public Health. The Ministry of Health and our agencies such as the Ghana Health Service through the National Malaria Control Programme and the Ethics Review Committee will also be beneficiaries of the findings from this study.

- **Funding information:** The study is being funded solely by the Principal Investigator

- **Sharing of participants information/Data:** Data generated from this study will be owned solely by the Principal Investigator and kept strictly confidential

- **Provision of Information and Consent for participants**

  A copy of the information sheet and the consent form will be given you for keep after signing it.

- **Contacts for Additional Information**

  If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact me Dora Afriyie Kai Odai, School of Public Health, University of Ghana, Legon on: Tel 0244953820 or email [illegible]@yahoo.com or my supervisor, Dr Paulina Tindana Tel [illegible] or email [illegible]@gmail.com

- **For ethical issues and your right as a participant, contact**

  Madam Hannah Frimpong, GHS-ERC Administrator, and Office +233 302 681109, Mobile [illegible] or via email: Hannah.Frimpong@ghsmail.org

Appendix B: Participant Consent Form

CONSENT FORM FOR DOCTORS

STUDY TITLE: An evaluation of the Malaria Test, Treat and Track (3T) Policy in two health facilities within the Greater Accra Region.

PARTICIPANTS' STATEMENT

I acknowledge that I have read the purpose and contents of the Participants' Information Sheet and that all questions have been satisfactorily explained to me in a language I understand (English). I fully understand the consent and any potential implications as well as my right to change my mind (that is withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name or Initial of Participant . . . . . .

Participants' Signature . . . . . Date. . . .

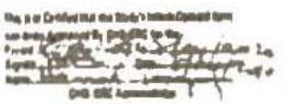
INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participants have been addressed.

Researcher's name

Signature.

Date



CONSENT FORM FOR PHYSICIAN ASSISTANTS

STUDY TITLE: An evaluation of the Infants Test, Tone and Track (3T) Policy in two health facilities within the Greater Accra Region.

PARTICIPANTS' STATEMENT

I acknowledge that I have read the purpose and contents of the Participants Information Sheet and that all questions have been satisfactorily explained to me in a language I understand (English). I fully understand the consent and any potential implications as well as my right to change my mind (that is withdraw from the research) even after I have signed this form

I voluntarily agree to be part of this research

Name or Initial of Participant.

Participants' Signature. Date

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participants have been addressed

Researcher's name

Signature

Date.

Appendix C: Checklist For Record Extraction

RECORDS REVIEW/ DATA EXTRACTION TOOL

Date..... .....

ID Number ....

1) Age of patient.....

2) Sex

a) Male

b) Female

3) Symptoms presented or reported (Tick fever and all that apply)

a) Fever

b) Headache

c) Vomit

d) Chills

e) Body pain

f) Abdominal pain

g) Cough /chest pain

4) Laboratory Test done

a) Yes

b) No

5) Type of Laboratory Test or investigation done

a) RDT

b) Microscopy

6) Test results

a) Positive

b) Negative

7) Medicine prescribed

a) ACT

b) Other antimalarial

8) Patient asked to come back for review

a) Yes

b) No

9) Patient on NHIS

a) Yes

b) No

Appendix D: Interview Guide

INTERVIEW GUIDE FOR PRESCRIBERS

Date .....

Participant ID number

Health facility name .....

Age of health worker.....

Sex of health worker.....

Introduction

- Thank health worker for their time and introduce project
- Go through consent form and give participant a signed copy
- Outline format of interview

Level of formal training/Cadre of health professional.....

1. Briefly outline your current position and responsibilities
2. Can you kindly give me an overview of the new antimalarial drug/treatment (3T) policy?
3. Have you had any training on the new policy? (Probe type of training and period trained as well as content and duration of training and training by which organization)
4. How accessible is the new treatment guideline for the policy to you in the course of your work? (Probe and ask to see policy guideline if available)
5. How often do you receive facilitative supervision on the new policy for treatment of malaria? (Probe form of supervision and who comes for supervision)
6. How are your clients responding to the new policy? (probe and ask whether patients come for reviews)

7. Can you share your experiences/challenges regarding the implementation of the 3T policy in this facility? (Probe waiting time, testing services, prescription challenges/experiences, and records)
8 In what ways do you think the policy can be improved for optimal adherence in this facility?

THANK YOU FOR YOUR TIME

Appendix E: Letter Of Introduction

In any reply the number and date of this letter should be quoted.

My Ref. No. GHS/GARHD/007/19

Your Ref. No.

GHANA HEALTH SERVICE
REGIONAL HEALTH DIRECTORATE
GREATER ACCRA
P. O. BOX 184
ACCRA

Tel: +233-0302-214215/226261

E-mail: c_brako@yahoo.com

13th June, 2019

THE MUNICIPAL DIRECTOR OF HEALTH SERVICES
LA DADE-KOTOPON MUNICIPAL DIRECTOR OF HEALTH SERVICES
LA

RE: LETTER OF INTRODUCTION
DORIS AFOLEY KALODAI

This is to introduce to you Doris Afoley Kai Odai MSc. Monitoring and Evaluation student of the Department of Health Policy, Planning and Management, School of Public Health. University of Ghana, Legon who has approval from the Regional Health Directorate to conduct a research on the topic *"An Evaluation of the Malaria Test, Treat and Track (3T) Policy in the Two Health Facilities with the Greater Accra Region"* in your District/Facility as per attached

You are kindly entreated to provide the needed assistance

Thank you.

DR. (MRS.) CHARITY SARPONG
REGIONAL DIRECTOR OF HEALTH SERVICES
GREATER ACCRA

UNIVERSITY OF GHANA
DEPARTMENT OF HEALTH POLICY, PLANNING AND MANAGEMENT
SCHOOL OF PUBLIC HEALTH

RECEIVED

[illegible]

[illegible] June, 2019

The Medical Director
Greater Accra Regional Hospital
Ridge-Accra.

LETTER OF INTRODUCTION

I wish to introduce to you Doris Afeley Kai Odai, MSc Monitoring and Evaluation student of the Department of Health Policy, Planning and Management, School of Public Health, University of Ghana, Legon. As part of the requirement for the award of MSc degree, she is expected to undertake a piece of research to enable her write her dissertation.

Her research topic is "An Evaluation of the Multiple Visit, Direct and Track (3T) Policy in the two health facilities within the Greater Accra Region".

Your facility was selected based on advised from the supervisory [illegible] and she plans to interact with providers on the 3T Policy and also verify some data from your [illegible].

I would be grateful if your outfit could assist her with any needed information [illegible] for her study.

Thank you for your [illegible].

Yours [illegible],

[illegible]

[illegible]

[illegible]

Appendix F: Approval Letter From GHS-ERC

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax: +233-302-685424
Email: [illegible]@gmail.com
6th April, 2019

My Ref. GHS/RDD/ERC/Admin/App/ [illegible]
Your Ref. No.

Doris Afriyie Kai Osei
University of Ghana
School of Public Health
Legon

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

GHS-ERC Number	GHS-ERC [illegible]
Project Title	An Evaluation of the Malaria Test, Treat and Track(3T) Policy in Two Health Facilities within the Greater Accra Region
Approval Date	8th April, 2019
Expiry Date	[illegible] April, 2020
GHS-ERC Decision	Approved

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.
- Please note that any modification of the study without ERC approval of the amendment is invalid

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

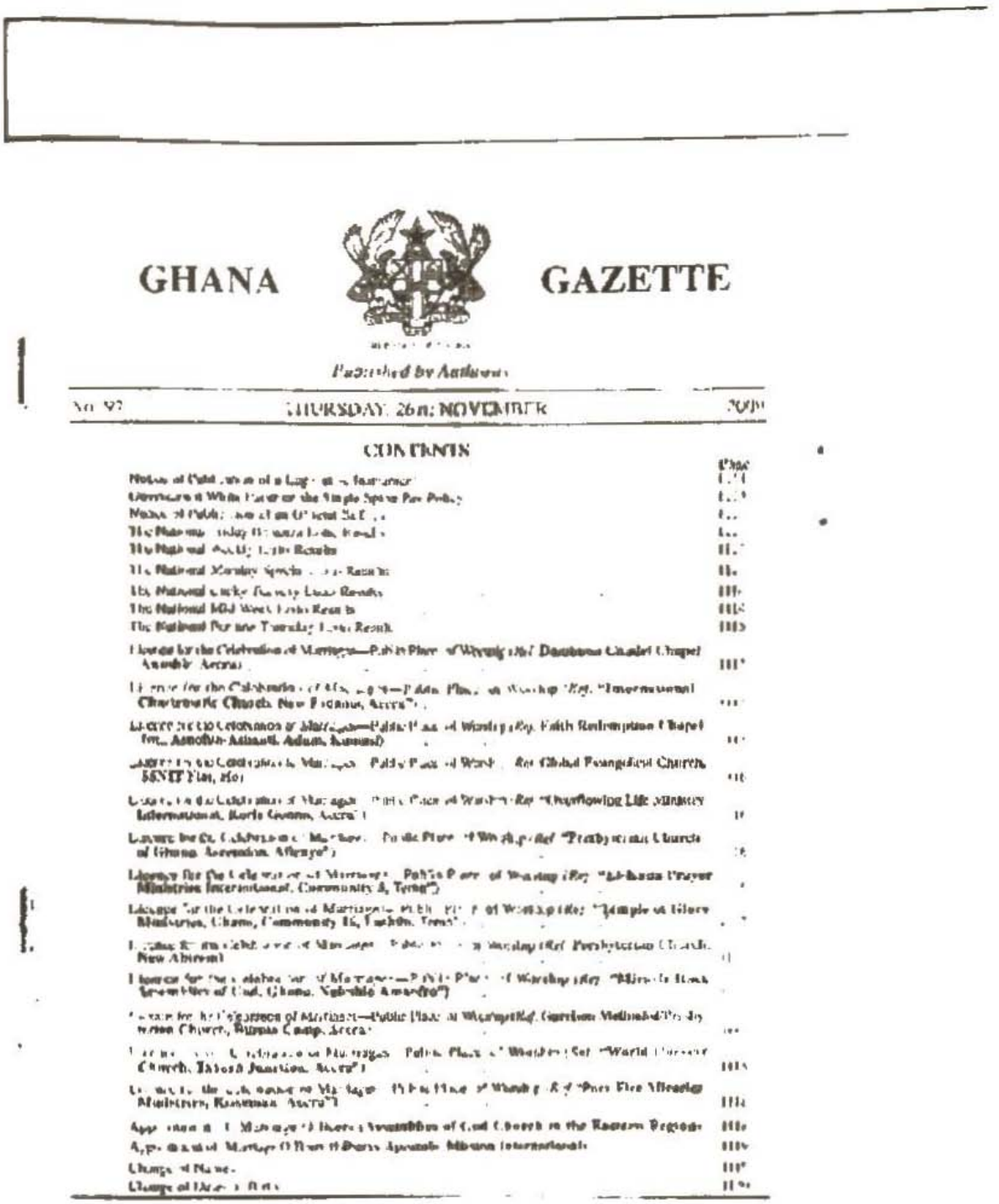
Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED

DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

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

Appendix G: Gazette



GHANA GAZETTE

Published by Authority

No. 97 THURSDAY, 26th NOVEMBER 2020

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Notice of Publication of a Legislative Instrument	[illegible]
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The National Democratic Congress Parliamentary Local Results	[illegible]
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