DETERMINANTS OF UPTAKE OF INTERMITTENT PREVENTION TREATMENT OF MALARIA AMONG PREGNANT WOMEN IN KISUMU COUNTY, KENYA

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS, POPULATION AND DEVELOPMENT STUDIES FOR THE PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF SCIENCE IN HEALTH ECONOMICS & POLICY OF ECONOMICS DEGREE OF UNIVERSITY OF NAIROBI.

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DECLARATION

This is to state that this research project is my own work independently done. I can thus confirm that it has not been submitted to any college, university or any other institution of higher learning for any award of degree.

Sign ……Edith C. Tonui………… date…30/11/22……………………...

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This is to confirm that this research project has been submitted to the University of Nairobi for examinations with my approval as the university supervisor.

Sign   date…30/11/2022.

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DEDICATION

This Document is dedicated to my Parents Mr Edward Tonui and Mrs. Elizabeth Tonui for their love and continuous prayers and support.

I also dedicate this to my Sisters; Mercy Faith and Carol

And brothers; Eric, Evans and Emmanuel Langat for the support encouragement and giving me reason to keep going.

Above all I acknowledge God, through his help I have made this milestone.

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ABBREVIATIONS AND ACRONYMS

ANC	Antenatal care
IPT	Intermittent Preventative Treatment
IPTp	Intermittent preventive treatment of malaria (IPTp)
KEPI	Kenya expansion on immunization program
KHIS	Kenya Health information System
MIP	Malaria in pregnancy
MOH	Ministry of Health
NMCP	National Malaria Control Programme
SES	Socio Economic Status
SP	Sulphamethoxazole/pyrimethamine
WHO	World Health Organization

ABSTRACT

Pregnant women and their unborn children face significant risks from malaria infection during pregnancy simply Malaria in pregnancy (MIP), which is recognized as a serious public health issue. According to the extent of transmission within a specific geographic area and a woman's level of acquired immunity, the signs and problems of MIP vary. In Kisumu County, one of the counties deemed to be geograhicaly located in one the endemic zones, malaria continues to have a significant impact on household spending despite numerous nterventions. Malaria and its consequences, such as maternal anemia, stillbirth, low birth weight, and, in the worst cases, infant mortality and morbidity, are more likely to affect pregnant women. The purpose of this research study was to establish the determinants of uptake of intermittent preventive treatment for malaria during pregnancy in Kisumu County. The specific objectives were to examine the pattern of intermittent preventions treatment of malaria uptake among pregnant women in Kisumu County, Kenya; determine the effect of demographic factors on the intermittent prevention treatment of malaria among pregnant women in Kisumu County, Kenya, and lastly, to establish the role of socio-economic status on the intermittent prevention treatment of malaria among pregnant women in Kisumu County, Kenya. The Kenya health information system (KHIS) was used to access malaria data as captured from the health facilities. To estimate the link, the study used the probit model to establish the effects of identified factors on uptake of IPT in Malaria during pregnancy in Kisumu County, Kenya. The tested significance at 5% level. The study findings reveal that that 63.03% percent of the pregnant women received 3 or more doses of IPTp-SP. From estimation; age, marital status, levels of education, socioeconomic status, employment status, health insurance cover, religion, awareness levels and residence were found to be positively linked with IPTp uptake in Kisumu County. The study recommends the national government to strengthen the development of effective integration between exisiting programs inaddition to harmonized policies to futher improve the results of MIP. The national government together with other county governments located in the endemic zones ought to intervene and register or develop interventions at community levels to further curb the malaria among the pregnant mothers.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Malaria in the African continent has remained to be a threat, it has claimed many. The most affected are children, adults especially the expectant mothers and young children (Palombi, Moramarco, 2018). According to world health organization (WHO) annual report 2020, it indicates that Africa is leading interms of malarial infections. According to the report about 82% reported cases of malarial are from Africa inaddition, about 90% of the total malaria related deaths in the world are reported inAfrica thus Africa bears the heaviest burden of malaria related effect. Out of these percentage the leading innumber are children of less than 5 years, pregnant mothers and lactating mothers.

Intermittent preventive treatment of malaria (IPTp) is one of the malaria control methods commonly supported by the WHO to prevent malaria for pregnant women and children under the age of 5 (Esu, Oringanje, & Meremikwu, 2021). Other malaria prevention nitiatives in employed by most sub-Saharan Africa nclude ndoor Residual Spraying (IRS), Long-Lasting nsecticidal Nets (LLINs), and Larval Source Management, among others. The IPTp is gaining popularity due to mounting evidence that the use significantly decreases the risk of unfavorable maternal and fetal results. This is critical since poor mother and child health results continue to be major public health issues in many developing nations (Mikomangwa, Oms, Aklillu, & Kamuhabwa, 2019).

Malaria control programs have by far reduce nfection-related sickness and death. The global malaria control plan of the World Health Organization (WHO) combines preventive interventions with early detection and treatment of symptomatic patients with artemisinin-based combination therapy (World health organization, 2018). Children, babies, and

pregnant women are among the vulnerable and at-risk categories for malaria IPT is one of the therapies indicated for malaria prevention in these groups.

Malaria in pregnancy (MiP) causes a negative maternal and neonatal consequences, ncluding anemia, mortality, stillbirth, low birth weight, and spontaneous abortion with an estimated 10,000 women and 100,000 nfants dying as a result of the disease (Olaleye, & Walker, 2020). Twenty percent of stillborns and 11 % of neonatal mortalities in Sub-Saharan Africa are attributed to MIP. (SSA). For regions with moderate to high malaria transmission, the World Health Organization (WHO) recommends sulfadoxine-pyrimethamine (SP) IPTp for pregnant women (World Health Organization, 2018). When IPTp is used, the risk of having a baby with a low birth weight drops by 29%, the risk of severe maternal anemia drops by 38%, and the risk of neonatal death drops by 31%. IPTp is one of the only health interventions that has been shown to reduce infant mortality and, in turn, malaria-related deaths, by a large margin in scientific studies.

Intermittent preventive treatment of malaria has been recommended as an alternative to prophylaxis (Esu, Oringanje, & Meremikwu, 2021). There is a school of thought that holds that giving newborns malaria prophylaxis might hinder their development of immunity to the disease, leaving them more susceptible to severe cases of malaria if and when the medication is withdrawn later in life (Hill, et al, 2016). Plasmodium parasite resistance to antimalarial medicines is a major worry, and its use for infant prophylaxis has sparked concern. Additional problems concerning chemoprophylaxis nclude its feasibility and long-term viability. While the mechanism of IPTp is unknown, available evidence suggests that posttreatment prophylaxis is a critical componentin areas with high transmission and the risk of reinfection. Studies that used IPTp with shorter acting drugs did not achieve the same level of prevention.

It's unclear whether this is due to the intermittent clearance of existing Plasmodium nfections or the long-acting medications' posttreatment preventive effect (Mbuya, & Humphrey, 2016). There's also the leaky vaccine theory, which suggests that combining a partially effective medication with high LLIN coverage could resultin attenuated blood stage nfections, allowing mmunity to build without clinical disease. According to Seddon et al (2019), nternment treatment may enhance subclinical llness and promote protectionin babies. IPTp protection is only effective for as long as the drug is not removed from the body, which is usually 1 to 2 months following delivery. This there requires that all the recommended doses be taken to ensure adequate levels within the body are maintained.

In Kenya for nstance, Malaria is the major cause of mortality and morbidity, about 74% of the population at risk of nfection (Kamau et al, 2020). Based on the danger of transmission, the country has four malaria epidemiological zones: endemic, highland epidemic prone, desert seasonal, and low risk. Despite the fact that around 29% of the population livesin malaria-endemic areas, seasonal malaria epidemicsin the highland and dry zones provide no mmunity, leaving the native population exposed to the disease (Nyagechanga, 2020).

The major determinants of uptakes include literacy rate, distance to the health facility, awareness of intermittent preventive treatment inpregnancy (IPTP), and quality of service provided by health facilities. Literacy rate means the level of education that an expectant mother attained. According to Yaya, Uthman, Amouzou, & Bishwajit, (2018) most of the mother who miss the IPTp are illiterate such that they don't value the essence of the prevention cares. On the other hand, Kilowua, and Otieno, (2019) associate the uptake with distance to health facilities deterring many pregnant mother from accessing the services from the health

facilities in their region. Mutanyi, et al (2021) argue that the main determinant of uptake is awareness to IPTp that deter many pregnant mothers from accessing the services.

County governments in Kenya were established in2013 through a 2010 constitutional amendment bill. There are a total of 47 counties inKenya, however not all counties have severe effect of malaria among pregnant mother inKenya (Owino, 2018). Additionally, health sector was also devolved, to counties such that the health system is manned by the county government (Kimathi, 2017). Since 2013, the health systems have undergone transformations which has led to their mprovement interms of service delivery though much is need to be done before attaining the required service delivery. Out of the 47 counties inKenya five counties are mostly affected malaria they include, Kisumu, Marsabit, Mombasa, Kisii and and Busia counties. Kisumu is one of the counties mostly affected by the malaria epidemic that why itwas selected for the research.

1.2 Statement of the Problem

According to WHO, over the years, there are a lot of progress that have been made regarding malaria prevention is concerned (World Health Organization, 2019). The developed countries have made a lot of progressing inensuring the issue of malaria is past tense. However, developing countries especially African countries are still lagging behind in their effort of malaria eradication. Smith, (2019) reiterates that malaria has been an issue of concern inAfrican countries resulting from lack of enough facilities. Moreover, Kilowua, and Otieno, (2019) associate the IPTP to poor health system on uptake of antenatal care by women of childrenbearing age. Thus, this still remains a challenge inAfrica.

The government of Kenya and non-governmental organizations have put inplace several mitigation mechanisms meant to reduce the uptake gap of the intermittent preventions treatment and hence reduce child mortality rate especially inmalaria endemic counties of

western, Nyanza and coastal regions. Some of the mechanisms nclude, the 2013 for all public health facilities free maternity policy, Establishment of Kenya expansion on mmunization program (KEPI) established in1980. IPT for prevention of malaria in pregnancy is a major element of Malaria Control Strategy in Kenya and Africa at large. Despite IPT strategies utilizing SP been shown to be beneficial in lowering malaria's negative effects on pregnant women, uptake and coverage have been poor in Kisumu County. For instance, IPT coverage inKisumu County interms of percentage according to KDHS 2014 was 58.2 % for the first dose, 26.9% for the second dose and then 5.9% for those who received 3 doses. From the statistics it is observed that whereas the minimum dosage to be taken should be three, very few pregnant women got to the minimum dosage. There is thus the need to understand what influenced this achievement and what can be done to further improve IPT coverage within the county.

Despite the milestone made indealing with malaria among pregnant women insub-Saharan Africa translating to Kenya, the anticipated levels of preventions have not been achieved as at yet. This can be as a result of several factors hindering the progress of the uptake of the intermittent prevention measures. Okello *et al* (2018) argue that the uptake of the intermittent prevention has been hindered by the quality of service offered by the health facilities and ministry of health. This argument is also supported by Boateng *et al* (2018), Portugaliza et al (2019) who reiterate that most health facilities offering the services lack then required and sufficient equipment for service delivery hence lowering the service quality offered by them and thus the service seekers shy away from seeking for the service hindering the actual uptake of the intermittent prevention treatment. Further the studies shows that most of health facilities offer poor quality of service thus, hindering the efficiency of the process. Therefore, given the persistence nature of the gaps in the uptake makes the current study appropriate, thus the aim

of the research is to look at the determinants of determinants of uptake of IPT of malaria among pregnant women of selected counties inKenya.

1.3 Research Questions

i. What is the pattern of intermittent preventions treatment of malaria uptake among pregnant women in Kisumu County, Kenya?

ii. What is the effect of demographic factors on intermittent preventions treatment of malaria among pregnant women inKisumu County, Kenya?

iii. How does socio-economic status affect the intermittent preventions treatment of malaria among pregnant women inKisumu County, Kenya?

1.4 Objectives of the study

General objective

The main objective of the study was to examine the pattern and determinants of uptake of intermittent preventions treatment of malaria among pregnant women inKisumu County, Kenya.

Specific Objectives

i. Establish the pattern of intermittent preventions treatment of malaria uptake among pregnant women inKisumu County, Kenya.

ii. Determine the effect of demographic factors on the intermitten prevention treatment of malaria among pregnant women inKisumu County, Kenya.

iii. Establish the role of socio-economic status on the intermittent prevention treatment of malaria among pregnant women inKisumu County, Kenya.

iv. To use the findings in1, 2 and 3 above to provide a policy suggestion.

1.5 Justification of the Study

Uptake of the intermittent prevention treatment has been a matter of concern over the years, this remains to a matter of concern in the public healthcare. Moreover, the challenges facing the sector has not been explored to the later. Further there is little relationship that has been established between the determinants of the uptake of the IPT of the malaria despite numerous resources used to ensure they are available. With the country's commitment towards the improving the uptake with an objective of reducing of infant mortality and improving of healthcare. Thus, this study is justified since the challenges facing the uptake have not been explored since the issue has remained a matter of concern over the years. Thus, the study will explore the determinants of uptake of IPT of malarial among pregnant women with an objective of reducing the maternal related deaths justifying the research.

1.6 Scope of the study

Scope of the research means the elements that will be involved in the study project. It defines the boundaries inwhich the study will cover (Farquhar, Michels, & Robson, 2020). The current study will cover one county that is Kisumu County. Specifically, the study will target pregnant women.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

There are two sections inthis chapter. Section one will illustrate the theories that the study will be anchored upon. Section two will elaborate the empirical literature review of the previous research that informs the variables in the current study regarding the determinants of the uptake of IPT of malaria and summarize them to establish the gap. Moreover, the chapter will provide the critique of the literature to establish the gaps and lastly present the conceptual framework based on the research hypothesis.

2.2 Theoretical Review

This chapter illustrates the theories that the research is anchored upon. The theories illustrated here elaborate the pertinent issues that regarding the objective of the study and their review on how they underpin the current study which is the uptake of IPTp among women.

2.2.1 Theory of fundamental causes

Jo C. Phelan and Bruce G. Link created the theory of fundamental causes in 1995. The persistence of health inequities across socio-economic groups is the focus of this theory, which seeks to describe why this is the case even if many of the underlying causes of illness among low-income people have been identified and treated (Phelan, Link & Tehranifar, 2010). According to Polonijo and Carpiano (2013) there is an ongoing relationship between socio-economic status and health status because SES "represents a collection of assets—including money, expertise, reputation, power, and supportive social connections—that serve to safeguard health in a variety of ways." To putit another way, despite advancementsin screening procedures, mmunizations, or despite advancements in medicine and scientific understanding, people living in low-income areas still lack access to the resources they need to

maintain or improve their health (Phelan, Link & Tehranifar, 2010). This theory is significant to our research since the socioeconomic position of ndividualsin a society has an mpact on their adoption of different disease intermittent prevention treatment methods, particularly for malaria.

2.2.2 Health belief model

According to the HBM, which was developedin the 1950s by rwin et al, social psychologists of the US Public Health Service. It explains why people did not participatein Public Health Service programs, why they did not respond to experienced symptoms, and why they did not comply with medical advice, health behavior is a cognitive model of behavior (Rosenstock, Strecher & Becker, 1994). The HBM is essentially a value-expectancy theory, which holds that behavior is driven by the subjective value placed on the result and the anticipation that doing a certain action would lead to the realization of that value. In the context of health-related actions, an individual's anticipation of a desired result is often the improvement of health or the avoidance of ill health. The individual's expectation is often that doing a healthy activity would increase the chance of attaining the desired result.

Individuals' perceptions of their susceptibility to a health threat, the likelihood of reducing the threat by engagingin a health-related behavior, the severity of the health threat, and the costs associated with engagingin a health-related behavior all nfluence their decision to engagein a health-related behavior (Strecher & Rosenstock, 1997). Whenit comes to health promotion and disease prevention nitiatives, the HBM is a theoretical model that may be utilized to describe and forecast ndividual changesin health-related behaviors and behaviors of others (Rosenstock, Strecher & Becker, 1994). It's one of the most popular tools for studying how people make decisions about their health.

Many important components of the HBM focus on people's perspectives about health problems and the ways in which those perspectives affect their own health-related behavior (Strecher & Rosenstock, 1997). Perceived susceptibility to illness or disease, belief in possible positive advantages of action, perception of obstacles to action, belief in consequence, exposure to stimuli that inspire action (cues to action), and confidence in ability to succeed are all defined as key factors that influence health behaviors in the model (self-efficacy). Applicability of the theory to this research is thatit explains the health behaviors of persons toward the acceptability of the uptake of IPTp among women.

2.2.3 Social cognitive theory

The model was suggested forward by Bandurain 1986. The Social Cognitive Theory (SCT) examines the connections between personal health practices, experiences, and other people's behavior and their environment. By increasing participants' self-efficacy and expectations, as well as by employing observational learning and other forms of reinforcement to modify their behavior, SCT opens new opportunities for social support.

Components of the SCT related to ndividual behavior change according to Lev (1997) nclude; Self-efficacy is described as the belief that one has control over and is capable of carrying out a given task, cognitive capacity is defined as the ability to grasp a action whilst also maintaining the capabilities to execute. Also, expectations nvolve dentifying and predicting the results of behavior modification. Expectancies are the results of behavior change that have a monetary value assigned to them. Also, self-control is the ability to regulate and monitor one's own conduct (Pajares & Valiante, 1997).its possible to learn by watching and studying the consequences of others executing or modeling the desired behavior (observational learning). Promotion of ncentives and rewards that stimulate behavior change is what reinforcements are all about.

2.2.4 Theory of planned behavior

Health behavior of person is predicted by their intention to do an action. According to the Theory as developed by cek Arjen 1967, a person's ntention to do an action (behavioral ntention) is predicted by the person's attitude toward the conduct as well as subjective norms about the behaviorin question. According to Hale, Householder and Greene (2002) People's concept of agency in shaping their own actions, as well as the social and environmental contexts in which they find themselves, combine to shape the norms by which they live. When people have a more optimistic outlook and higher personal standards, they are more likely to be motivated to make positive behavioral adjustments.

2.3 Empirical Literature

This section presents a literature review on the trends and proximal variables affecting women's adoption of IPTp. It provides evidence from related findings. Through the use of a decentralized health nstitution system strategy, Vision 2030 highlights health as one of the social pillars inwhich the government aims to ensure effective, high-quality, ntegrated, and affordable health care with a greater emphasis on preventive care at the household and community level of quality (Kombo et al, 2020). Chong and Ahmed (2014) argue that quality service offered by health facilities are considered of essence and fundamental inpublic organizations. Governments around the world have a responsibility to ensure that these services are available and that they are delivered in a bureaucratic manner. Quality of service delivered is a valuable asset in the health sector, and it is critical in ncreasing the acceptance of IPT intoday's complex and dynamic world. Having properly qualified staff, functional systems, and rewarding infrastructures leads to long-term competitiveness (Boxall & Purcell, 2016). It's the way a service increases client happiness that leads to a competitive edge.

Quality of maternal health services and distance to the health facilities plays a role indetermining utilization of health services among pregnant woman. Mochache, Irungu, El-Busaidy, Temmerman and Gichangi (2018) assessed the influence of quality of maternal care at health facility and improving service uptake inamong maternal mothers inhealth facility in Kwale County. The study used 21 public care facilities inKwale District. Two groups were used to examine the severely delivery and dentify the gaps. The study employed secondary data from the routine management register in these health facilities on daily basis form the District Health Management Office. Descriptive statistics as well as a paired sample t-test were used analysis. The findings revealed that pregnant mother's in the first trimester went for the checkups which increased from 8% to 24% in the subsequent times. From the results the number of pregnant women delivering inhospital increased from 33% to 52% over the study period given the decrement of distance form one facility to another due to health devolvement and enhancement of health care. The study concluded that there was a positive association between utilization of services and short distances to the nearest health facilities and quality of maternal health services offered.

Socio-economic characteristics have been linked with uptake of IPTp. Darteh, et al., (2021) carried out a study on factors nfluencing the intermittent preventive treatment uptake among pregnant womenin SSA. The data was obtained from malaria ndicators survey (2015-2019) of 12 countriesin African sub-Sahara for women aged fifteen to fourty nine years who participatedin the survey. Logistic regression model was employedin the study analyzing the association between uptake of IPT and ndividual and contextual factors. From the study the prevalence rate of uptake IPTp-SP among pregnant women was 30.69%in the studied sub-Saharan African countries. The low IPT uptake was attributed to younger women aged 15-19 years, women with lower education levels. Further, the

women who had media exposure on malaria messages had a higher probability of receiving three or more doses of IPTp-SP.

Ibrahim (2017) assessed the nfluence of education level on the uptake of intermittent prevention uptake (IPTp) among pregnant womenin Ghana. The target population was pregnant women at Trauma and Orthopedic Hospital, Winneba, Ghana. The sample size was 391 women attending antenatal care. The data collection nstrument was a questionnaire while the study was cross-sectionalin nature. The corrected data were analyzed using STATA version 14.2. Further, bivariate and multivariate analysis was conducted to establish the significance at a 5% level of significance. The findings revealed that the majority of women (71%) had a tertiary education level , and out of this 61% receive the three doses. On the other hand, those with a lower level of education that is 21% of this received one or less than one dose of the IPT level of education feared the side effects. These findings arein line with those by Olson (2017) which found that educational level nfluence the usage of right dosage among adults. The study found that the uptake level was high among the pregnant womenin the trauma and orthopedic hospital. The findings also noted that marital status, religion, education level had a positive effect on uptake of IPT.

Addai-Mensah et al. (2018) studied the determinants of the uptake of TPp-SP among pregnant womenin Ghana. The purpose of the research was the nfluence of educational level on the uptake of TPp-SP among pregnant women in Ghana. The research was cross-sectional in nature with the target population of 280 pregnant women attending the hospital in Kumasi Ghana. A well-structured questionnaire was utilized to collect primary data admitted to the participants of the IPTp-SP uptake. From the results, the study showed that out of the total of 280 women interviewed about 74.6% regularly attended antenatal care out of which only 31.8% completed the right dosage

recommended. Participants from the formal sector were about 47.4% and out of which about 78% completed the right dosage recommended. Further, the study depicted a positive and significant relationship between educational level and the right dosage uptake of the prevention's treatment. The study recommended that the women in the formal sector be encouraged to attend formal school. As well as policymakers to make the relevant policies that will enhance the education level. The study, however, failed to conduct other stochastic tests like normality test, heteroscedasticity test, and multicollinearity test to check the direction and strength of the prelateship between variables the current study will mitigate these by employing the omitted stochastic tests.

Escamilla, Calhoun, Winston, and Speizer (2018) examined the effect of the distance and service quality on the facility on the uptake the antenatal carein health facilities. The study employed data from Learning & Evaluation (MLE) and the Measurement, Projectin Kenya. The unit of analysis was the Kenya Urban Reproductive Health initiative. Moreover, longitudinal data was employed from form five centers; Kakamega, Mombasa Machakos, Kisumu, and Nairobi at baseline year (2010) and end line year (2014). A total of 5217 pregnant women were involved in the researh. The research focused on women who were found at the baseline (2010) and went to a health facility for birth. At the end of the research, 2814 women had reported using contemporary contraception. The results are in line with those by Ndovoyo et al (2020) who found a negative relationship between the distance to the health facility and the uptake of IPTp. At the end of the study, 800 women who had visited an MLE facility for a service had given birth, 1467 had acquired facility-based contraception, and 1112 had reported child health visits. Both studies were analyzed descriptively. Living near a health centre with a middle-quality index rank was linked to a lower likelihood of using facility-based contraception.

Akinleye, Falade, and Ajayi (2019) examined the nfluence of awareness of IPTp among pregnant women attending primary health centers in rural areas and determine factors that impact the uptake. The research objective was to assess the role of the influence of awareness of IPTp on the utilization of IPTp uptake in Nigeria. The target population was 209 pregnant mothers attending rural local government facilitiesin Nigeria. A systematic sampling method was employed to establish the sample size. Self-administered questionnaires were utilised in data collection. The research employed the descriptive statistics method in data analysis, also used means, ranges, and proportions in data analysis. Moreover, the chi-square test was employed to estimate the link between the variables in the study, and validity was established at 5% level significance from the results about 52.2% of the respondents were aware of the TP, and 26 were even able to define t. About 27.3% had access to the doses. However, about 61% were aware but had not received the doses. The study concluded that many pregnant women were aware of the TPs but there was a low turnout to receive the doses. The study, however, failed to examine the quality-of-service providers and distance to health facilities thus the current study will mitigate this.

Nkunzimana (2020) assessed the nfluence of knowledge and utilizations of intermittent Preventive Treatmentin pregnancy (IPTp)in Burundi among pregnant mothers. The research objective was to examine the effect of distance from health centers on the IPTs. Effect of formal education on the uptake of IPTp, the role of optimal dose on the uptake of IPTp. The population target was 370 pregnant women living within the Muramvya health district. Moreover, a cross-sectional research design was carried out covering the period from 2017-2018. Primary data was employed the data collected through a well-structured questionnaire to gather nformation regarding the social demographic characteristics and uptake from the target populations. Microsoft Excel

2016 software was used to analyse data and also to perform a univariate, bivariate, and multivariate analysis. From the findings, it was revealed that minimal pregnant women take minimal doses of the IPTp while a large number were livingin rural areas thus access to the facility was an issue and also 95% of the respondents have formal education. On the other hand, a minimal number of the respondents were unaware of the IPTp which meant that awareness and ANC visits had a positive impact on uptake of IPTp. Results from the study indicated that healthcare practitioners in the Muramvya district might improve health outcomes by increasing the uptake of IPTp-SP by emphasizing the importance of girl child education and early ANC visit.

Hill, et al, (2015) Researchers in Kenya and Mali looked at the operational, socio-economic, and cultural hurdles that keep pregnant women from receiving IPTp, long-lasting insecticide-treated nets (LLINs), and case management. To better understand how interventions to prevent malaria in pregnancy are delivered, accessed, and utilized, FGDs were conducted. Using content analysis, themes and subthemes were derived from the data. Positive and beneficial effects of antenatal care visits, as perceived by both women and men, were found. These visits were seen as important for a number of reasons, including women's motivation to have a healthy pregnancy and prevent disease for themselves and their unborn child, as well as for ensuring that the baby was in the correct position for delivery and that they would be admitted to the hospital in the event of complications. Factors preventing patients from getting the treatment they need include doubts about doctors' abilities, a lack of insurance coverage, high medicine prices, and limited access. Because of the high expense of medical care, many pregnant women resort to home remedies or over-the-counter medications rather than see a health care provider for a proper diagnosis and treatment of malaria. Many women did not know how safe, effective, or risky it was to use antimalarial medications while pregnant.

In another study, Mushi et al. (2021) looked at what factors influence pregnant women in Tanzania to take sulfadoxine-pyrimethamine for intermittent prophylaxis against malaria. The 2015-2016 Tanzania Demographic and Health Survey and Malaria Indicator Survey (TDHS-MIS) were used as secondary sources for this research. Women who had birth during the two years before to the poll were eligible, and the final tally was 4,111 women aged 15 to 49. The independent factors connected to IPTp-SP were evaluated using multivariate logistic regression. The study found that fewer than 10% of women got the recommended 3 doses of SP for IPTp. Factors that were statistically significant and positively related with uptake of ≥3 doses of IPTp-SP ncluded having secondary or higher education, ≥ 4 Antenatal care visits (ANC), ANC visits made in first trimester, being knowledgeable on IPTp-SP and previous history of birth delivery at least once, geographic zones (in malaria endemic regions) and attending government owned health facilities for ANC services.

Increased uptake of IPTp is associated with mproved birth outcome. Similarly, Qukyi et al. (2019) also did a cross-sectional research showing that higher rates of IPTp are linked to higher birth weight in Ghanaian infants. The data was analyzed employing a logistic regression model. The findings showed that 64.5% of women had received 3 doses of IPTp-SP before to birth. Further, the studies showed that there was mproved birth weight ncrease.

Nigussie et al. (2020) aimed to evaluate how health system determinants influence the use of prenatal care services. The study employed a descriptive cross-sectional research design. In Kisumu County, the population under investigation was comprised of chosen community household members, facility administrators, and community resource individuals. The research used a purposive sampling technique to choose the Key informants. Three hundred people were questioned in all. Interviews and questionnaires were utilized to gather data for the research as well as Chi-square analysis. The research found that health system determinants influence ANC

uptake. Specifically, the great distance to the hospital, the long wait times, the poor quality of the treatments, the shortage of supplies, and the terrible attitude of the employees. The combination of these variables decreased ANC participation.

Oppong et al. (2020) revealed the prevalence of IPTp-SP usage among pregnant women between 2011 and 2015, as well as the influence of different sociodemographic categories on IPTp-SP uptake. All pregnant women in the area covered by the Kintampo Health and Demographic Surveillance System were surveyed to determine IPTp-SP coverage. Specifically, the municipalities of Kintampo North and South in Ghana's Kintampo South District. Any and all expectant mothers living in the area monitored by Kintampo's health and population data collection infrastructure. Looking at how many doses of IPTp-SP pregnant ladies took. Multiple pregnancies in women: a logistic regression analysis of the factors affecting IPTp-SP uptake, controlling for within-subject correlation. Used information on 17,484 pregnant women, collected between 2011 and 2015. In 2011, 44.0% of pregnant women got three or more doses of IPTp-SP; in 2012, 45.9% did; in 2013, 20.9% did; and in 2015, 32.4% did. After controlling for a number of factors, the study found an association between receiving three or more doses of IPTp-SP and older age, larger households, higher levels of education, religious affiliation, more prenatal care visits, being married, having a higher income, and living in a different region. Middle school education or higher, age 20 or older, accessing prenatal care five times or more, marriage, and higher income quintiles substantially increased the likelihood of receiving three or more doses of IPTp-SP.

Okethwangu et al. (2019) examined the impact of malaria on pregnant women inUganda. This was a supplemental examination of the 2016 UDHS data collection. The outcome variable was the number of IPTp-SP doses administered to women aged 15–49 who had given birth to a live child in the two years before to the survey. Independent factors were education, age, marital status, wealth, housing type, location of residence, parity, number of ANC attendance, timing

of first ANC visit, and radio exposure. Utilizing logistic regression, the study identified parameters related with optimum IPTp-SP dosage uptake. In Uganda, the proportion of pregnant women between 15 and 49 years of age who get appropriate dosages of IPTp-SP remains low, according to the study's results. A secondary education, attendance at ANC at least 4 times during pregnancy, exposure to health-related radio broadcasts at least once per week, and residence in the Lango area were linked with appropriate IPTp-SP dosing. However, women older than 34 years and those who visited ANC for the first time in their third trimester had a lower likelihood of receiving adequate IPTp-SP dosages.

In Sabatia Sub-County, Western Kenya, Nabatanzi et al. (2020) investigated the prevalence of the variables affecting optimum uptake of IPTp of malaria inpregnancy with sulphadoxine pyrimethamine (IPTp-SP). From April to October of 2020, a cross-sectional research was conducted out inSabatia Sub County. The data were gathered from 372 postpartum women (those who had given birth to a live child during the preceding year) between the ages of 15 and 49 that used a validated semi-structured questionnaire. Pregnant women on cotrimoxazole prophylaxis were excluded. As measures of correlation, Pearson Chi-square and Fisher's exact tests were used. The determinants of optimum IPTp-SP uptake were examined using logistic regression. Those who initiated the ANC late were less likely to receive the recommended dose of IPTp-SP. Women who had received 4 ANC visits, had a thorough awareness of the benefits of IPTp-SP, and knew the correct deal SP dosage were more likely to achieve optimal IPTp-SP use. Women who never missed receiving SP were likely to obtain the deal IPTp-SP.

Mutanyi et al. (2021) investigated the reasons for the low use of IPTp and TNs inNigeria's lowest socioeconomic areas. Researchers spoke with 201 key informants from six villages in Ogun State, South-Western Nigeria, via semi-structured interviews (SSI) and FGD. Twelve SSIs were performed with TBAs, religious birth attendants, and healthcare providers at public health facilities. Different groups of people were interviewed: 7 community leaders, 30

pregnant women, and 20 caregivers. Sixteen FGDs were completed with groups of multi- and first-time pregnant women stratified by region and pregnancy history. For data analysis, a thematic approach was applied. Knowledge about MiP, its effects, and TNs was high at the individual and societal levels, but knowledge of IPTp was low, with the kind of ANC provider being the most relevant factor in predicting access to IPTp. The choice of ANC provider, which provides access to IPTp and TNs, is impacted by the experiences of women, family, and friends, as well as the attitudes and opinions of ANC providers and the society regarding the types of ANC providers. The concurrent usage of several ANC providers and the connections between ANC providers also affect the acceptance and coverage of IPTp and ITN utilization.

In rural areas, the community plays a key role in malaria prevention for pregnant women. The malaria experiences, knowledge, as well as perceived function in MiP, as well as the acceptability of community-directed distribution of IPTp, were investigated by Oladimeji et al. (2019) in rural Southeast Nigeria. Interviews and surveys were used to collect information from 817 local residents (FGDs). Most of those who responded had either used an ITN or suffered fever within the past year. The majority of residents (88.6%) identified malaria as their top health concern. While most people (74.1%), including pregnant women and children, believe that mosquito bites spread malaria, the majority of people are incorrect. The majority of people (54.3%), citing sleeping under a TN, a clean environment (397%) and herbal treatments (268%) as the most effective means of warding off malaria. Eighteen percent of respondents felt well informed on IPTp, and only nine percent could name common IPTp medications. The most crucial roles in malaria prevention were seen to be referring pregnant women to a health facility, encouraging the use of TN at home, and maintaining malaria-related programs. Overall, a large majority of respondents (77.2%) agreed that community-directed distribution of IPTp was appropriate, and a similar percentage (74.4%) of pregnant women favoured community administration of IPTp to constitutional administration. Community-directed IPTp

distribution was broadly accepted, and the benefits of malaria prophylaxis during pregnancy were highly regarded. For malaria prevention in pregnant women, community-based control efforts should try out a whole-community strategy and community distribution techniques for IPTp.

Akpa et al. (2022) did a study to determine whether rural pregnant women lacked access to IPTp throughout pregnancy. Comparative cross-sectional studies were conducted on 864 women of reproductive age who were recruited. Utilizing a standardized interviewer-administered questionnaire, we gathered information on the socio-demographic characteristics and IPTp use of respondents. If 3 doses were consumed, absorption was deemed acceptable; otherwise, it is inadequate. The average ages of urban and rural respondents were 28, 54.6 and 27, 45.0 years, respectively. Women in rural regions who had fewer than four ANC visits were 2.5 times less likely to utilize IPTp than those who had more than four ANC visits. IPTp adoption was greater in Ebonyia's urban areas than in its rural ones.

Henry et al. (2018) conducted an examination of the acceptance and implementation of the 2012 WHO guidelines for IPTp for women insub-Saharan Africa by ndividual countries. Malaria during pregnancy raises the risk of adverse maternal and fetal outcomes. In 2012, the WHO changed its recommendations for the administration of IPTp, recommending that a least of three doses be given during the second and third trimesters rather than just two. Although significant coverage increases were anticipated, progress has been slower than anticipated. Using information from household surveys, common health MIS, and programmatic statistics given by PMI, the President's Malaria Initiative (PMI) evaluated IPTp acceptance before and after nations implemented the new WHO guideline, as well as the length of implementation. Countries waited an average of two years to update their IPTp regulations, and it wasn't until 2015 that all 17 PMI countries had done so. Only seven countries have fully implemented the new policy as of the beginning of 2018, including upgrading their prenatal care registries to

capture information on IPTp3+ coverage. Several nations still needed to conclude policy dissemination and training.

Amankwah, and Anto (2019) conducted a research to identify parameters linked with the use of IPT malaria medication in pregnancy. To study parameters related with IPTp-SP uptake, a cross-sectional survey was conducted among pregnant women at private health institutions inTema using the mixed method. In-depth interviews with attending midwives were done, and information about ANC service delivery was gathered. The interviews were examined manually. To identify parameters linked with SP intake, bivariate and multivariate logistic regression analyses were performed. 178 (46.6%) of the 382 responders took three doses of SP. The rate of take-up was comparable for those who had delivered and those who had yet to deliver. Ninety-seven (55.1%) of the 176 (55.1%) Women who started their prenatal care in the first trimester received three doses of SP, compared to 42.0% (76/181) of those who started in the second trimester. Those who started ANC in the second trimester received higher dosages than those who started in the third. In comparison to respondents who attended ANC five times or less, respondents who attended ANC more than five times improved their participation by 83%. Midwives had minimal knowledge of the IPTp-SP regimen and there was insufficient adherence to the directly monitored treatment.

Malaria is a major public health concern inMozambique, especially among pregnant women and children under the age of five. Analdo et al. (2019) did research on the availability and utilization of IPT for malaria during pregnancy. Despite the popularity and high price of IPTp-broad SP, coverage remained constrained. The factors limiting use and availability of IPTp-SP in a rural region of Mozambique were examined in this study. Semi-structured interviews were used to gather information from 46 pregnant women and four health workers in the rural community of Chokwè in southern Mozambique. Data were manually labeled, translated as needed, and transcribed before being analyzed for important themes. The women who were

questioned were not aware of the risks associated with MiP or the benefits of avoiding it. Suboptimal IPTp delivery was caused by delayed initiation of prenatal care, irregular attendance at appointments, and a lack of time for effective antenatal care coaching by medical experts. Pregnant women have significant challenges to adequate IPTp-SP uptake. The key variables impacting access to and use of IPTp-SP were found as health system hurdles and a lack of understanding of the dangers and effects of MiP, as well as the preventative interventions available.

Researchers Ataguba, Ojo, and Ichoku (2016) looked into the causes of income gaps in Nigeria's vaccination rates. The research used data from the Nigerian National Bureau of Statistics's 2006 Core Welfare Indicators Questionnaire Survey (CWIQ), which is representative of the entire country. It was made to go along with the 2003–2004 National Survey on Housing and Community. The vaccination rates of wealthy children are far higher than those of low-income families. The correlation is significant at the typical levels of statistical analysis. For example, it was projected that all the youngsters had an indirectly standardized concentration index (E C) of 0.221, based on Erreygers' normalization. Full vaccination is concentrated among wealthier households than poorer ones, and this disparity exists across all geographic zones and in both rural and urban settings. Partial vaccination is more common in lower socioeconomic status groups than in higher socioeconomic status groups (E C = 0.217), as indicated by the concentration indices, which are consistently negative and statistically significant at the 1% level. Both rural or urban areas and political regions show the same correlation.

2.4 Overview of Literature

Globally, malaria has remained to be a major challenge and adversely affecting Subsaharan Africa among pregnant women who are more prone to malaria. Despite the key measures taken,

prevalence rate of uptake of IPTp among pregnant women is still low. Based on theoretical and empirical literature, several factors including quality of care, educational levels, socioeconomic status, knowledge, awareness levels, geographical zones and distance to the nearest health facility among other factors have been considered to be significant inuptake of healthcare services including IPT among pregnant women. Studies done by (Mushi et al., 2021; Darteh, et al 2021; brahim, 2017; Addai-Mensah et al., 2018;) showed that age, education attainment, religion, frequency of ANC visits and geographical zones (malaria endemic regions). Further, awareness, quality of maternal health services offered, rural residence and distance were negatively associated with uptake of IPTp (Akinleye, Falade, and Ajayi, 2019; Mochache et al., 2018; Escamilla, et al., 2018; Nkunzimana, 2020;). Increased uptake of IPTp among pregnant women was related with improved birth weight increase (Quakyi, et al., (2019).

The estimation techniques that have been used are descriptive statistics, Chi square and logistic regression models among others (Mochache et al., 2018; Escamilla, et al., 2018; Akinleye, Falade & Ajayi, 2019; Nkunzimana, 2020). Few studies have employed probit regression model which is considered to more robust. There is need to utilize other econometric models like probit models and hence will be employed inthis study. Further, few studies have been done in Kenya, on determinants of uptake of IPTp among women inareas considered to be malaria endemic regions like Kisumu.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The theoretical model, model specification, variable definitions, and measurements are all covered inthis chapter. Diagnostic tests, data types, and data sources are also being studied.

3.2 Theoretical Framework

Mwabu's (2007) framework was used for this investigation. In the model Rosenzweig and Schultz's (1983) integrated theory of health care input demand as well as health production is laid out. The following utility function is expected to be maximized by an individual:

$$U = U(X, Y, H)$$ …………………..…………………………………… Equation 3. 1

As a result, corresponding utility is determined by a good neutral health (X), a good individual behaviour that affects health (Y), and the individual's health state (Y). The following health creation function is used to create the individual's health.

$$H = F(Y, Z, \mu)$$ …………………………………………........................… Equation 3. 2

Where Z denotes healthcare services paid by the individual, such as malaria treatments or further immunization treatments. μ represents the hereditary and environmental elements which may have an effect on a person's health condition but over which he or she has no control.

The individual tries to maximise his or her utility function while taking into account both the health production function and the budget limitation, which are stated as follows:

$$I = XP_x + YP_y + ZP_z$$ …………………………………………... Equation 3. 3

Whereby is the exogenous income,

P_x is the price of the good neutral health

P_y is the price of the health related good

P_z is the price of immunization or vaccination services

The demand for health related good, non-health related good and malaria IPT among pregnant women services can be expressed as follows:

$$X = Dx\ (Px, Py, I, \mu) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Equation 3. 4}$$

$$Y = Dy\ (Px, Py, I, \mu) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Equation 3. 5}$$

$$Z = Dz\ (Px, Py, I, \mu) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Equation 3. 6}$$

This depicts that utilization for IPT uptake by individuals is determined by the cost of malaria IPT, costs of related and unrelated commodities as well as levels of earnings.

3.3 Model specification and estimation

The research used probit regression model with maximum likelihood to estimate the relationship. In this study, dependent variable was measured on an individual who sought IPT for malaria hence binary probit model. This model was also employed by (Muriithi, 2013) inestimation of health seeking behavior. Binary probit regression model assumed a normal distribution of errors (ε). This model generally assumes there is a linear association between the dependent variable y^* and independent factors (X) represented as:

$$y^* = \alpha + \beta'x' + \varepsilon \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{Equation 3. 7}$$

Where y^* is the dependent/latent variable that is uptake of IPT among pregnant women of 15-49 years.

x' are the independent variables such as: socioeconomic status, distance to health and awareness levels amongst the pregnant women.

α is the coefficient of constant

β' are the other parameters to be estimated

ε is the error term.

Binary probit model assumes predictions that lie between the limiting interval (0, 1). From the equation 3.7 above, the link between unobserved variable y* to the observed variable x' is expressed as;

$$y = \begin{cases} 1 & \text{if} \quad y^*>0 \\ 0 & \text{if otherwise} \end{cases} \quad \text{..} \text{ Equation 3. 8}$$

Where y_i the probability of consuming IPT of malaria by pregnant women is aged 15-49 years; 1 if visited health facility for malaria IPT, 0 otherwise. Hence probit model was adopted. The values of *Xs*, the probability of y* is as shown below:

Probability (y*=1/x) = Probability (y>0/x) .... Equation 3. 9

Substituting equation 3.8 into equation 3.9; we get the cumulative density function of the error term (ε) and assuming ε assumes a normal distribution, the probit model can be presented as:

Probability (y*=1/x) = Φ ($\alpha + \beta'x' + \varepsilon$)……………………………….. Equation 3. 10

Whereas Φ, denotes the standard nocumulative distribution function. The probit model is estimated using maximum likelihood method implying any increase inexplanatory factors increases or reduces the likelihood that y is observed.

The resulting empirical model is therefore specified as follows:

$$y = \beta 0 + \beta 1x1 + \beta 2x2 + \beta 3x3 + \beta 4x4 + \beta 5x5 + \beta 6x6 + \beta 7x7 + \beta 8x8 + \beta 9x9 +$$
$$\beta 10x10 + \varepsilon \text{..} \text{Equation 3. 11}$$

Where *y* is dummy variable (uptake of IPT for malaria), then variables of iinterest nclude; X_1= socioeconomic status, X_2= distance to health facility, X_3= awareness levels, and the control variables nclude; X_4= age of the pregnant women, X_5= marital status, X_6= education level of pregnant women, X_7= residence, X_8=employment status, X_9=medical nsurance, X_{10}= religion, β=coefficient of *x* which represents the marginal effect of the exploratory factor on y and έ=error term.

3.4 Definition of Variables, Measurement and Expected sign

The Table 3.1 indicates the variables definition for both independent and dependent variables under study.

Table 3.1: Description of Variables used in the Study

Variable name	Definition	Measurement	Expected Sign	Source
Dependent Variable				
Uptake of intermittent preventions treatment of malaria	Use of IPT	Dummy where 1= use of IPT, 0 otherwise		Adinan et al., (2017) Akech et al (2020)
Independent Variables				
Socioeconomic status	Wealth ndex	1=Poor, 0 ifotherwise 1=middle, 0 otherwise 1 = rich, 0 otherwise	*Positive*	Ochako et al (2011)
Distance to health facility	The distance from the nearest health facility	1 iffar, 0 otherwise	*Positive*	Nkunzimana (2020)

Awareness levels	Exposure to health nformation	1 ifaccess to radio, TV or newspaper, 0 otherwise	*Positive*	Akinleye, Falade, and Ajayi (2019)
Age of the mother	Age of the mother	Age incomplete years	*Positive*	Sigunga, (2020)
Age of mother squared	The square mother's age	Continuous variable	*Negative*	Sigunga, (2020)
Marital status	Currently mother married	1 -if married 0- otherwise	*Positive*	Shah et al., (2015)
Education level	Education status of the parent/guardian	1 – Primary, 0 otherwise 1– Secondary, 0 Otherwise 1–post-Secondary,0 otherwise	*Positive*	Addai-Mensah et al (2018)
Employment	Current working status	1 -if employed 0- otherwise	*Positive*	Shah et al., (2015)
Residence of the mother	uptake of malaria vaccine by pregnant women aged 15-49 years	1- ifUrban 0 – Otherwise	*Positive*	Shah et al., (2015) Adinan et al., (2017)
Medical nsurance	Health nsurance coverage	1 ifcovered by medical nsurance, 0 ifnot medical nsurance	*Positive*	Adinan et al., (2017)
Religion	Individual faith/ denomination	1-if has religion, 0 ifno religion	*Negative*	Adinan et al., (2017)

3.5 Data Type and Sources

The research used secondary data obtained from the Ministry of Health database (KHIS) to examine the uptake of IPT of malaria among pregnant women. The database includes number of pregnant women aged 15-49 years who visited health facilities in the county to obtain malaria IPT in Kisumu County. It is always being updated. The research looked at pregnant women aged 15–49 years for the period between the month of January 2021 to December 2021 in Kisumu County.

3.6 Diagnostic Tests/ Data Issues

3.6.1 Multicollinearity

When the independent variables are correlated with one another, this is referred to as multicollinearity or collinearity. This suggests that one predictor variable can predict the others. It also generates a big estimate for the regression variables' standard deviation. As a result, even if there is an association between the response and the explanatory variables, the computed regression coefficient would not be statistically significant on its own. This may result in redundant information and further skewing of the regression model's results. The variance inflation factor will be used to assess multicollinearity. A VIF of 10 or above shows the presence of multicollinearity (Everitt & Skrondal, 2010). If this occurs, the estimates are impacted, and the coefficients associated with the variable become unstable, and this associated statistics may shift dramatically as other independent variables are included or excluded.

3.6.2 Heteroscedasticity

The term "heteroscedasticity" statistically means a collection of random variables that is non-similarity in the variance of errors for all observations or simply the opposite of homoscedasticity. This may make the estimation of variances unreliable. The test that will used to check for the presence of heteroscedasticity is the scatter plots and iffound robust standard errors are used (Berry et al., 1985).

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Introduction

This section presents the empirical results examining the drivers of uptake of intermittent preventions treatment of malaria among pregnant women in Kisumu County, Kenya. Specifically, the study analyses; the pattern of intermittent preventions treatment of malaria uptake, effect of demographic factors on the intermittent prevention treatment of malaria among pregnant women in Kisumu County, Kenya as well as role of socio-economic status on the intermittent prevention treatment of malaria among pregnant women in Kisumu County, Kenya. Findings are shown in figures and tables.

4.2. Description of the demographic and socio economic characterisics

This section presents descriptive characteristics of pregnant women in Kisumu County sampled from KHIS. The variables under study include; wealth index, distance to health facility, awareness levels, age of the pregnant women, marital status, education level of pregnant women, residence, employment status, medical nsurance and religion.

4.2.1 Demographic and socio-economic characteristics

The average age of 1,198 pregnant women who were reported to have utilized IPTp was 29 years. The young mother was fifteen years while the eldest was forty nine years. On marital status, majority of the respondents were married (52 percent), in assessing maternal educational attainment, majority of the pregnant women (40.4 percent) had primary education whereas 37.7 percent had secondary education level while only 22 percent had tertiary level. Considering wealth quintiles, it was revealed that approximately 47 percent and 39 percent of 1,198 pregnant women were associated with lower and middle wealth quintiles while only approximately 15 percent of the respondents were in the rich wealth quintile level. In addition,

those who indicated to have work were 43.3 percent while women who showed to have health cover for insurance were 15.2 percent. Pregnant women who had exposure to mass media were about 60.5 percent. With regard to how far the nearest health facility was, it was found that most respondents were within a distance of 4.08 kilometres on average with respondents reporting to range between 2 and 14 kilometres.

Table 4.1: Demographic and socio-economic profiles

Variables	Observations	Mean	Std. Dev.	Min	Max
Age	1,198	29.57	10.71	15	49
Marital status	1,198	0.5205	0.4980	0	1
Education level					
Primary	1,198	0.4039	0.2671	0	1
Secondary	1,198	0.3765	0.3699	0	1
Tertiary	1,198	0.2196	0.1859	0	1
Wealth ndex					
Poor	1,198	0.4658	0.2851	0	1
Middle	1,198	0.3850	0.2478	0	1
Rich	1,198	0.1492	0.1794	0	1
Employment status	1,172	0.4326	0.4954	0	1
Medical nsurance	1,198	0.1520	0.3591	0	1
Awareness levels	1,198	0.6051	0.0989	0	1
Distance (1 = >4 km)	1,198	4.0819	0.8983	2	15
Residence (1=urban)	1,198	0.3737	0.4838	0	1
Religion	1,198	0.8894	0.3194	0	1

Approximately, 37.4 percent of the respondents resided inurban areas with more than half of them residing in the rural parts of Kisumu County. Lastly respondents who reported to belong to a religion were approximately 88.8 percent.

4.2.2 Prevalence of IPTp uptake of pregnant women inKisumu County

In the first specific objective, the study looked at establishing the the pattern of IPT of malaria uptake among pregnant women inKisumu County, Kenya.

The study findings intable 4.2 reveal that that 755 (63.03 percent) of the pregnant women received 3 or more doses of IPTp-SP while 443 (36.98 percent) received less than recommended IPTp-SP doses.

Table 4.2: Prevalence of IPTp uptake

IPTp uptake	Frequency	Percentage
Received 3 or > doses of IPTp-SP	755	63.03
Received < 3 doses of IPTp-SP	443	36.97
Total	**1, 198**	**100**

4.3 Diagnostic Tests

4.3.1 Heteroscedasticity Test

The research made use of the heteroscedasticity residual plot and observed for a consistent trend. The results are as shown infigure 4.1. Based on the test findings, a consistent pattern can be observed inall curves meaning lack of constant variance with the fitting full probit model given significantly lesser alterations. Hence a need to adopt a robust standard error while estimating the final model.
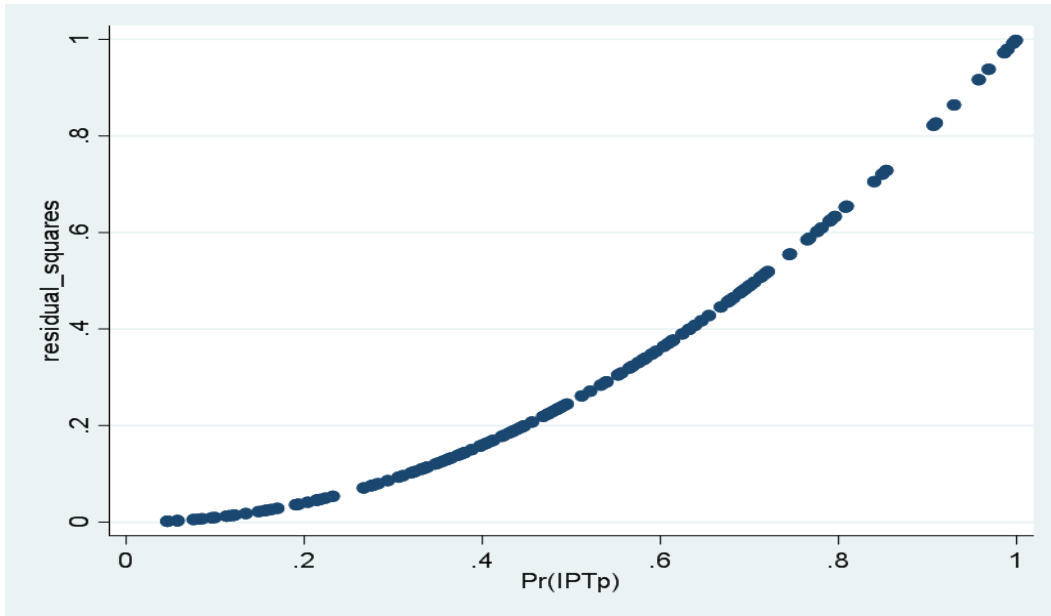
Figure 4.1: Test of Heteroscedasticity

4.3.2 Correlation Analysis

From table 4.3, the research revealed that all pairs of factors considered were fairly correlated with employment, distance, marital status being negatively correlated with health insurance coverage at 0.2742, -0.1076, -0.0052 respectively. The rest of the variables were positively correlated.

Table 4.3: Correlation Matrix

Variables	IPTp	Age	Education	Wealth	Employment	Insurance	Awareness	Distance	Residence	Religion	Marital status
IPTp	1.0000										
Age	0.0708	1.0000									
Education	0.2752	0.2477	1.0000								
Wealth	0.0787	0.1033	-0.0004	1.0000							
Employment	-0.1579	0.6960	-0.2966	0.1316	1.0000						
Insurance	0.4075	-0.0607	0.4042	-0.0058	-0.3633	1.0000					
Awareness	0.3720	-0.0174	0.3056	-0.0071	-0.3378	0.5192	1.0000				
Distance	-0.1076	0.3048	-0.1424	-0.0413	0.5249	-0.1981	-0.2070	1.0000			
Residence	0.1593	-0.0743	0.1531	-0.0468	-0.2269	0.2599	0.4539	-0.1945	1.0000		
Religion	0.2718	0.0347	0.2168	0.0140	-0.1161	0.3998	0.2319	-0.0659	0.1501	1.0000	
Marital status	-0.0052	0.0099	0.0007	0.0355	0.0300	-0.0330	0.0010	0.0457	0.0638	0.0190	1.0000

4.4 Estimating the effect of socio-economic status on the IPT of malaria among pregnant women inKisumu County, Kenya.

The study in the second objective was focused at estimating the impact of socio-economic levels on the intermittent prevention treatment of malaria among pregnant women in Kisumu County, Kenya. The findings are as shown inTable 4.4. Based on the findings of the regression, the overall p-value were below the 5 percent significance level (P value was 0.0575 for the model implying that the socioeconomic factors revealed (including demographic determinants) described significantly the dependent variable (uptake of IPTp among pregnant women in Kisumu County, Kenya. In addition, the pseudo R2 of 5.75 percent shows the percentage of explanatory variables that explained maternal healthcare use.

Table 4.4: Probit Regression Results

Probit regression

Number of obs   =   1, 157

LR chi2(15)   =   204.11

Prob > chi2   =   0.0000

Log likelihood = -1673.4183

Pseudo R2   =   0.0575

Utilization of IPTp	Coefficient	Std. Err.	t	P>t	[95% Conf. nterval]	
Age	.05095**	.0255	2.00	0.046	.00097	.1009
Age Squared	-.00056	.00022	-2.52	0.028	-.0013	.00016
Marital status	.4109**	.0384	10.71	0.000	.3357	.4862
Education levels						
Primary	.4440**	.1268	3.50	0.000	.1955	.6925
Secondary	.4934**	.1356	3.64	0.000	.2277	.7592
Tertiary	.4847**	.1609	3.01	0.003	.1694	.8000
Wealth ndex						
Middle	.2315**	.0623	3.71	0.000	.1093	.3536

Rich	.2791**	.0634	4.40	0.000	.1549	.4034
Employment status	.4851**	.1253	3.87	0.000	.2395	.7307
Medical nsurance	.3283**	.0672	4.89	0.000	.1967	.4599
Awareness levels	.2436**	.0718	3.39	0.001	.1029	.3844
Distance (1 = >4 km)	-.6044**	.1322	-4.57	0.000	-.8634	-.3454
Residence (1=urban)	.2436**	.0718	3.39	0.001	.1029	.3844
Religion	.0542	.4106	4.302	0.132	.0372	.0631
Constant	.1220	.0581	2.099	0.000	.0082	.2359

From the regression results intable 4.4; age, being married, levels of education, socioeconomic status (wealthindex), being employed, health insurance, religion, awareness levels and residence were found to be positively associated with IPTp uptake according to WHO recommendations. Further, these associations were reveaved to have significance at 5] percent level. On the other hand variables such as age squared of the mother, distance of more than 4 Km were found to be core determinants but had an inverse effect on IPTp uptake.

Age of the respondent was shown to have a significant as well as a positive impact on uptake of IPTp uptake. An additional year to the age of the respondent led to a higher probability (β=.0509505; p=0.046) of optimizing IPTp holding other factors constant by 0.05095 points. Also, age of the respondent squared (β= -.0005623; p=0.028) was shown to have a significantly inverse effect on IPTp uptake by 0.000562 points. This shows a nonlinear link between use and age in the IPT model.

The study found that marital status of the respondent (β= .4109, p=.0.000) increased the likelihood uptake of IPTp. It was revealed that being married had higher probability of

enhancing uptake of IPTp compared to their counterparts who were not married significantly by 0.4109 points ceteris paribus. On educational levels, the study assessed primary, secondary and post-secondary education where no education being the base variable. A patient who had either level of education level had higher likelihood of uptake of IPTp compared to a patient with no education level. The effect was statistically significant The findings revealed that having primary education (β=.4440281 p=0.000) significantly ncreased the probability of receiving IPTp among pregnant women by 0.4440 points compared to having no education holding other factors constant. Also, having secondary education (β=0.4934257, p=0.000) significantly increased the probability of IPTp uptake by 0.4934 points compared to having no education holding other factors constant. Further, having a tertiary education (β=0.4847424, p=0.003) increased the likelihood of uptake of IPTp.

Wealth index measured socio-economic status was also revealed to have a significant impact on IPTp uptake. Pregnant women who were in the third quantile (middle) were more likely to utilize IPTp uptake compared to respondents in the second quantile (poor) (β=0.2315, p=0.000) by 0.2315 points. Individuals considered to be in the fourth quintile had significantly higher uptake of IPTp (β=0.2791, p=0.000) at 5% level of significance by 0.2791points ceteris paribus.

The effect of employment (β= 0.4850826, p =0.000) was significant with a positive association. The findings indicate that being in employment ncreased the chances of respondent utilizing IPTp by 0.4851 points holding other factors constant. This finding imply pregnant women who are on any work are more likely to afford the cost of using or accessing IPTp as well as other related amounts than their unemployed counterpart. The coefficient on medical insurance was shown to be significant as well aspositive (β= 0.328322, p value=0.000). The findingd indicate that pregnant women who had a medical insurance cover were more likely to use IPTp by 0.3282 points ceteris paribus.

The coefficient on level of awareness was measured by the respondent having access to radio, TV or newspaper. The coefficient was statistically significant and also found to have a positive and significant effect on utilizing IPTp (β = 0.2436367, p=0.001). The findings means that respondents who had access to mass media had a significant ncrease inuptake of IPTp uptake at 5% level by 0.2436 points compared to ndividuals who were not exposed of listening to radio, Tv or newspaper ceteris paribus. This implies that individuals, who have frequent access to health information, are likely to be more nformed on significance of utilizing IPTp and other available services offered by public primary health facilities hence ncreased uptake of IPTp.

The effect on how far or near a health facility was, had a statistically significant with a inverse effect at five percent (β= -0.604428, p value=0.000). The findings indicate that an additional Kilometer to the nearest hospital had an inverse effect on use of IPTp by 0.6044 points. The coefficient on residence was statistically significant and found to have a positive effect on IPTp uptake (β = 0.2436367, p=0.001). The findings depict that respondents who resided inurban regions were more likely to utilize IPTp compared to respondents who resided inrural region by 0.2437 points.

The coefficient on religion was positively as well as not significant at 5 percent level (β= 0. 0542, p value=0.132). The findings depict that having religious beliefs affect use of IPTp by 0.0542 points at ceteris paribus. In order to interpret theprobit findings for policy considerations, the study undertook marginal effects (ME) of factors used in the IPT utilization model. The results for marginal effects are as shown intable 4.5

Table 4.5: Average Marginal Effects (IPTp uptake)

IPTp	ME (Robust Std. Err)	z	P>z	[95% Conf.	[95% Conf.
Age	.0275** (.0023)	11.89	0.000	.0230	.0321
Age Squared	-.0004** (.00004)	-12.35	0.000	-.0005	-.0004
Marital status	.0584** (.0054)	10.66	0.000	.0476	.0691
Education levels					
Primary	.0528** (.007)	7.50	0.000	.0390	.0666
Secondary	.0480** (.0082)	5.89	0.000	.0320	.0640
Tertiary	.0684** (.0114)	6.00	0.000	.0461	.0908
Wealth ndex					
Middle	.3283** (0.0672)	4.89	0.000	.1967	.4599
Rich	.4851** (0.1253)	3.87	0.000	.2395	.7307
Employment status	.3621** (.1124)	3.22	0.000	.1118	.4412
Medical nsurance	.2787** (.1207)	2.31	0.022	.0890	.4464
Awareness levels	.0480** (.0082)	5.89	0.000	.0320	.0640
Distance (1 = >4 km)	-.3786** (.1544)	-2.45	0.014	-.6813	-.0759
Residence (1=urban)	.0275** (0.0023)	11.89	0.000	.0230	.0321
Religion	.1965 (.1144)	1.72	0.099	-.0277	.2080

Malaria control programs have by far reduce infection-related sickness and death. The global malaria control plan of the World Health Organization (WHO) combines preventive interventions with early detection and treatment of symptomatic patients with artemisinin-based combination therapy (World health organization, 2018). Children, infant, and pregnant women are among the vulnerable and at-risk categories for malaria IPT is one of the therapies indicated for malaria prevention in these groups. As shown inTable 4.5, the findings reveal that age, age squared of the mother, marital status, education levels, socioeconomic status (wealth Index), employment status, medically insurance, awareness levels, residence, distance of more than 4 Km were significant. However other factors such as religion was not statistically significant at 5% level.

4.5 Discussion of the results

The empirical results are supported by the theory of health belief. It explains why people did not take part in Public Health Service programs, why they did not respond to experienced symptoms, and why they did not comply with medical advice, health behavior is a cognitive model of behavior (Rosenstock, Strecher & Becker, 1994). The HBM is essentially a value-expectancy theory, which holds that behavior is driven by the subjective value placed on the result and the anticipation that doing a certain action would lead to the realization of that value. In the context of health-related actions, an individual's anticipation of a desired result is often the improvement of health or the avoidance of ill health.

Age of the respondent was shown to have a significant and positive impact on uptake of IPTp uptake. An additional year to the age of the respondent led to a higher probability ($\beta=0.0275$; $p=0.000$) of optimizing IPTp by 2.75 at ceteris paribus. Also, age of the respondent squared ($\beta= -.0004$; $p=0.128$) was shown to have a significant but inverse effect on IPTp uptake. This indicates a non-linear assocation between age and uptake of IPTp. This finding is similar to

study done by Darteh, et al., (2021) who attributed low IPT uptake to younger women aged 15-19 years,

The study found that marital status of the respondent (β= 0.0584, p=.0.000) increased the likelihood uptake of IPTp. It was revealed that being married had higher probability of enhancing uptake of IPTp compared to their counterparts who were not married by 5.84 percent at cetris paribus. The effect was statistically significant. The fingings were inline with Ibrahim (2017) who found a positive association been uptake of IPTp and respondent being married. In addition, the finding agree with that of Addai-Mensah et al., (2018), who found out that married women utilized IPTp more compared to those who had low education lewere not married.

On educational levels, no education was being treated as the base variable. A mother who had either level of education level had higher likelihood of uptake of IPTp compared to a patient with no education level. The effect was statistically significant. The findings revealed that having primary education (β=.05281 p=0.000) significantly increased the probability of receiving IPTp among pregnant women by 5.28 percent compared to having no education holding other factors constant. Also, having secondary education (β=0.0480, p=0.000) significantly increased the probability of IPTp uptake by 4.8 percent compared to having no education holding other factors constant. Further, having a tertiary education (β=0.0684, p=0.003) increased the likelihood of uptake of IPTp by 6.84 percent. The finding concurs with (Addai-Mensah et al., 2018), who found out that educated women utilized IPTp more compared to those who had low education levels.

Wealth index measured socio-economic status was also revealed to have a significant impact on IPTp uptake. Pregnant women who were in the third quantile (middle) were more likely to utilize IPTp uptake compared to respondents in the second quantile (poor) (β=0.328322, p=0.000) by 32.83 percent. Individuals considered to be in the fourth quintile had significantly

higher uptake of IPTp (β=0.4850826, p=0.000) at 5 percent significance levels by 48.50 percent ceteris paribus constant. The findings inline with (Darteh, et al., 2021) who found out socio-economic ststus of the woman was a significant determinant with uptake of IPTp being high among women inhigh socio-economic class.

In addition, researchers Ataguba, Ojo, and Ichoku (2016) who looked into the causes of income gaps in Nigeria's vaccination rates. The findings indicated that the vaccination rates of wealthy children are far higher than those of low-income families. The correlation is significant at the typical levels of statistical analysis. For example, it was projected that all the youngsters had an indirectly standardized concentration index (E C) of 0.221, based on Erreygers' normalization. Full vaccination is concentrated among wealthier households than poorer ones, and this disparity exists across all geographic zones and in both rural and urban settings. Partial vaccination is more prevalent in poor wealth status categories compared to higher socio-economic groups (E C = 0.217), as indicated by the concentration indices, which are consistently inverse and statistically significant at the 1% level. Both rural or urban areas and political regions show the same correlation.

The impact on being employed (β= 0.362065, p =0.000) was positive as well as having significant effect at 5 percent level. The results depict that being employee or worker raises the chances of respondent utilizing IPTp by 36.20 percent holding other factors constant. This finding or the result is insupport of (Darteh, et al., 2021).

The coefficient on medical insurance was revealed to be significant positive impact (β= 0.278712, p value=0.022). The finding show that pregnant women who had a medical insurance cover were more likely to use IPTp 27 percent holding other factors constant. The findings agree with Darteh et al., 2021 who showed out that pregnant women who were enrolled to a health insurance were more likely to utilize IPTp services.

The coefficient on level of awareness was measured by the respondent having access to radio, TV or newspaper. The coefficient was statistically significant and also indicated to have a positive as well as impact on utilizing IPTp (β = .0480, p=0.000). The findings means that respondents who had access to mass media had a significant ncrease inuptake of IPTp uptake at 5% level by 4.8 percent compared to ndividuals who were not exposed of listening to radio, Tv or newspaper ceteris paribus. This implies that individuals, who have frequent access to health information, are likely to be more informed on significance of utilizing IPTp and other available services offered by public primary health facilities hence ncreased uptake of IPTp. The findings correlate with studies done by (Nkunzimana 2020), who noted that awareness ans sensitizations led to increased uptake of IPTp.

The effect on how far or near a health facility was, had a statistically significant with a inverse effect at five percent (β= -0.604428, p value=0.000). The results show that an additional Kilometer to the nearest health facility had an inverseneffect on use of IPTp by 37.86 percent the results agree with (Mochache et al., 2018) who concluded that there was a positive association between utilization of services and short distances to the nearest health facilities and quality of maternal health services offered.

The coefficient on residence was statistically significant and found to have a positive effect on IPTp uptake (β = 0.2436367, p=0.001). The findings depict that respondents who resided inurban regions were more likely to utilize IPTp compared to respondents who resided inrural region by 0.2437 points. Similar studies done by Yaya et al. (2018) who noted that utilization of IPTp was was increased among mothers who resided inurban areas.

In addition, the coefficient on religion was insignificantly positive at 5% (β= .0542, p value=0.099). Findings depict that having relogional believes affect use of IPTp by 0.0542 points at ceteris paribus. The finding differ on the significance of effect with the results of

brahim (2017) who revealed that religion significantly nfluenced the uptake of intermittent prevention uptake (IPTp) among pregnant womenin Ghana. These findings are notin line with those by Olson (2017) who found that uptake level was high among the pregnant womenin the trauma and orthopedic hospital. The findings also noted that marital status, religion, education level had a vital effect on utilization of IPTp.

From the findings, it could be learnt that individuals' perceptions of their susceptibility to a health threat, the severity of the health threat, the likelihood of reducing the threat by engagingin a health-related behavior, and the costs associated with engagingin a health-related behavior all nfluence their decision to engagein a health-related behavior (Strecher & Rosenstock, 1997). When it comes to health promotion and disease prevention nitiatives, a theoretical model such as HBM may be utilized to describe and forecast ndividual changesin health-related behaviors and behaviors of others . Chong and Ahmed (2014) argue that quality service offered by health facilities are considered of essence and fundamental inpublic organizations. Governments around the world have a responsibility to ensure that these services are available and that they are delivered in a bureaucratic manner. Quality of service delivered is a valuable asset in the health sector, and it is critical in ncreasing the acceptance of IPT intoday's complex and dynamic world.

As indicated in the literature, studies explored (Mushi et al., 2021; Darteh, et al 2021; Ibrahim, 2017; Addai-Mensah et al., 2018) largely supported our findings except a few. They conspecously indicated that age, education attainment, religion, frequency of ANC visits and geographical zones (malaria endemic regions). Further, awareness, quality of maternal health services offered, rural residence and distance were negatively associated with uptake of IPTp (Akinleye, Falade, and Ajayi, 2019; Mochache et al., 2018; Escamilla, et al., 2018; Nkunzimana, 2020;). Increased uptake of IPTp among pregnant women was related with improved birth weight (Quakyi, et al., 2019).

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This section summarizes the results of this reseach and presents main observations which provides an explanation on the identified determinants and utilization of IPT of malaria among pregnant women inKisumu County, Kenya.

5.2 Summary of the study findings

In Africa, Malaria has persistently remained to be a threat. Malaria has led to loss of many lives. Children and expectant mothers are the most affected. in2018, Sub Saharan Africa was leading interms of infections associated with malarial. In addition, about 90% of the total number of fatalities caused by malaria across the globe are reported inAfrica thus Africa bears the heaviest burden of malaria related effect. Out of these percentage the leading innumber are children of less than 5 years, pregnant mothers and lactating mothers. This study mainly endevoured to establish determinants of uptake of IPT of malaria among pregnant women inKisumu County, Kenya.

In particular, the study analyses; the pattern of IPT of malaria uptake among pregnant women inKisumu County, Kenya; effect of demographic factors on the intermittent prevention treatment of the same among the core study among pregnant women inKisumu County, Kenya as well as role of socio-economic status on the intermittent prevention treatment of malaria among pregnant women inKisumu County, Kenya. The study extracted data from Kenya health Information System (KHIS) obtainable at the facility, county and national levels, housed by the ministry of health.

The research used the binary probit estimated model to establish the effects of various determinants on uptake of IPT in Malaria during pregnancy inKisumu County, Kenya. The study used five level of significance to test significance of the coefficients. Dependant variable was utilization of IPTp. Determinants considered inthis study include; age, age squared of the mother, marital status, education levels, wealth ndex, employment status, medical nsurance, religion, awareness levels, residence, distance of more than 4 Km.

5.3 Conclusions

In the first specific objective, the study findings reveal that that 755 (63.03 percent) of the pregnant women got 3 or more doses of IPTp-SP while 443 (36.97 percent) received less than recommended IPTp-SP doses. From the regression results; marital status, age, education levels, socioeconomic status (wealthindex), employment status, medical insurance, religion, awareness levels and residence were found to be positively linked with IPTp use. Only religion was found to have non statisticalsognificant effect. On the other hand, factors such as age squared of the mother, distance of more than 4 Km were revealed be predictors that had significant impact but had an inverse association with IPTp uptake in Kisumu County.

5.4 Policy Recommendations

Significant indicators of the best IPTp-SP adoption are characteristics at the community and regional levels. To reduce the high prevalence of malaria in the at the national level, all current IPTp-SP treatments that solely concentrate on individual level determinants need to be reassessed to take into account larger community and region level factors. More specifically, increasing IPTp-SP uptake in the majority of disadvantaged populations will necessitate careful consideration of appropriate strategies to enable access by removing all obstacles. Based on the findings, there is need for the government at national and county levels to review the malaria policy on completion of dosage as well as increase awareness levels to ensure all

women of reproductive age especially those who are pregnant and located inhighly endemic zones are included in the program. Additionally, to get the prescribed dosage, contextually appropriate behavioral change communication interventions may arouse women's passion.

The study recommends for appropriate programmes needed to be designed to ensure pregnant mothers of across the counties inKenya are trained malaria management during pregnancy. The national government should strengthen the development of effective integration between programs inaddition to harmonized policies to improve the results of MIP. In addition, health education helps dispel common myths that discourage women from seeking treatment during pregnancy, such as worries about the safety of using medicine while pregnant, the dangers of taking medication on an empty stomach, and the possibility of experiencing negative side effects.. Lastly, the study significantly linked to uptake of IPT inMalaria during pregnancy. The Kisumu County government incollaboration with the county governments located in the endemic zones ought to intervene and register or develop interventions at community levels to further curb the malaria among the pregnant mothers.

5.5 Areas of Further Research

This research concentrated on investigating the determinants of uptake of IPT for malaria during pregnancy in Kisumu County. In particular, the research was conducted to explore the patterns of the uptake of IPT inMalaria during pregnancy in Kisumu County, Kenya, and then to investigate whether demographic and socioeconomic determinants affecting uptake of IPT in Malaria during pregnancy inKisumu County, Kenya. The study thus recommends for further study on the same with the use of longitudinal data so as to cater for time dynamics as well as develop clear and better trends. Also, longitudinal studies are predictive and can thus be used to forecast the impact of these determinants into many years infuture.

The dataset used was extracted from the KHIS and the data may somehow have some missiong observations. In other words, the research relied on pre-existing data, therefore health system aspects could not be questioned because there was no information on them. It is therefore recommended that primary data, both qualitative and quantitative be collected to draw an up to date and more detailed nference. More studies are required to compare non endemic and malaria endemic regions.

REFERENCES

Addai-Mensah, O., Annani-Akollor, M. E., Fondjo, L. A., Sarbeng, K., Anto, E. O., Owiredu, E. W., & Arthur, S. N. (2018). Regular antenatal attendance and education influence the uptake of intermittent preventive treatment of malaria inpregnancy: a cross-sectional study at the university hospital, Kumasi, Ghana. Journal of tropical medicine, 2018.

Akinleye, S. O., Falade, C. O., & Ajayi, . O. (2019). Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics inprimary health care centers inrural southwest, Nigeria: a cross-sectional study. BMC pregnancy and childbirth, 9(1), 1-9.

Ataguba, J. E., Ojo, K. O., & Ichoku, H. E. (2016). Explaining socio-economic inequalities in immunization coverage in Nigeria. *Health policy and planning*, *31*(9), 1212-1224.

Boateng, E. Y., Anyormi, G. E., Otoo, J., & Abaye, D. A. (2018, December). Drivers of intermittent preventive treatment of malaria during pregnancy inGhana: a generalized linear model with negative binomial approach. In Applied informatics (Vol. 5, No. 1, pp. 1-12). SpringerOpen.

Chong, Y. S., & Ahmed, P. (2014). A phenomenology of university service quality experience: Uncovering the essence of meaning among business undergraduates inMalaysia. International Journal of Educational Management.

Clouston, S. A., Yukich, J., & Anglewicz, P. (2015). Social inequalities inmalaria knowledge, prevention and prevalence among children under 5 years old and women aged 15–49 inMadagascar. Malaria journal, 14(1), 1-10.

Darteh, E. K. M., Dickson, K. S., Ahinkorah, B. O., Owusu, B. A., Okyere, J., Salihu, T., ... & Seidu, A. A. (2021). Factors influencing the uptake of intermittent preventive treatment among pregnant women insub-Saharan Africa: a multilevel analysis. Archives of Public Health, 79(1), 1-9.

Dahabreh, . J., & Hernán, M. A. (2019). Extending inferences from a randomized trial to a target population. European journal of epidemiology, 34(8), 719-722.

Duffy, F., Bernabeu, M., Babar, P. H., Kessler, A., Wang, C. W., Vaz, M., & Smith, J. D. (2019). Meta-analysis of Plasmodium falciparum var signatures contributing to severe malaria inAfrican children and Indian adults. MBio, 10(2), e00217-19.

Escamilla, V., Chibwesha, C. J., Gartland, M., Chintu, N., Mubiana-Mbewe, M., Musokotwane, K., & Chi, B. H. (2015). Distance from household to clinic and its association with the uptake of prevention of mother-to-child HIV transmission regimens inrural Zambia. Journal of acquired immune deficiency syndromes (1999), 70(3), e94.

Esu, E. B., Oringanje, C., & Meremikwu, M. M. (2021). Intermittent preventive treatment for malaria in nfants. Cochrane Database of Systematic Reviews, (7).

Fulbrook, P., Lawrence, P., & Miles, S. (2019). Australian nurses' knowledge of pressure injury prevention and management: a cross-sectional survey. Journal of Wound, Ostomy, and Continence Nursing, 46(2), 106.

Gammino, V. M., Diaz, M. R., Pallas, S. W., Greenleaf, A. R., & Kurnit, M. R. (2020). Health services uptake among nomadic pastoralist populations inAfrica: A systematic review of the literature. PLoS neglected tropical diseases, 14(7), e0008474.

Goni, M. D., Hasan, H., Wan-Arfah, N., Naing, N. N., Deris, Z. Z., Arifin, W. N., ... & Adam, B. M. (2020). Health Education intervention as an Effective Means for Prevention of Respiratory infections Among Hajj Pilgrims: A Review. Frontiers inpublic health, 8, 449.

Green, M., Otieno, K., Katana, A., Slutsker, L., Kariuki, S., Ouma, P., & Desai, M. (2016). Pharmacokinetics of mefloquine and its effect on sulfamethoxazole and trimethoprim steady-state blood levels in intermittent preventive treatment (IPTp) of pregnant HIV-infected women inKenya. Malaria journal, 15(1), 1-8.

Hale, J. L., Householder, B. J., & Greene, K. L. (2002). The theory of reasoned action. *The persuasion handbook: Developments in theory and practice*, *14*(2002), 259-286.

Hassan, S. A. (2019). Data collection instruments based on the definition of hadith. International Journal of Academic Research inBusiness and Social Sciences, 9(12), 685-693.

Hill, J., Hoyt, J., Achieng, F., Ouma, P., L'lanziva, A., Kariuki, S., & Webster, J. (2016). User and provider acceptability of intermittent screening and treatment and intermittent preventive treatment with Dihydroartemisinin-Piperaquine to prevent malaria inpregnancy In Western Kenya. PLoS One, 11(3), e0150259.

Hill, J., Kayentao, K., Achieng, F., Diarra, S., Dellicour, S., Diawara, S. ., ... & Webster, J. (2015). Access and use of interventions to prevent and treat malaria among pregnant women inKenya and Mali: a qualitative study. *PLoS One*, *10*(3), e0119848.

Ibrahim, H., Maya, E. T., ssah, K., Apanga, P. A., Bachan, E. G., & Noora, C. L. (2017). Factors influencing uptake of intermittent preventive treatment of malaria inpregnancy using sulphadoxine pyrimethamine inSunyani Municipality, Ghana. The Pan African medical journal, 28.

Kamau, A., Mtanje, G., Mataza, C., Mwambingu, G., Mturi, N., Mohammed, S., & Snow, R. W. (2020). Malaria infection, disease and mortality among children and adults on the coast of Kenya. Malaria journal, 19(1), 1-12.

Kilowua, L. M., & Otieno, K. O. (2019). Health System Factors Affecting Uptake of Antenatal Care by Women of Reproductive Age inKisumu County, Kenya. International Journal of Public Health and Epidemiology Research, 5(2), 119-124.

Kimathi, L. (2017). Challenges of the devolved health sector inKenya: teething problems or systemic contradictions?. Africa Development, 42(1), 55-77.

Lev, E. L. (1997). Bandura's theory of self-efficacy: applications to oncology. *Scholarly inquiry for nursing practice*.

Mbuya, M. N., & Humphrey, J. H. (2016). Preventing environmental enteric dysfunction through improved water, sanitation and hygiene: an opportunity for stunting reduction indeveloping countries. Maternal & child nutrition, 12, 106-120.

Mikomangwa, W. P., Oms, M., Aklillu, E., & Kamuhabwa, A. A. (2019). Adverse birth outcomes among mothers who received intermittent preventive treatment with Sulphadoxine-Pyrimethamine in the low malaria transmission region. BMC pregnancy and childbirth, 19(1), 1-11.

Mirkovic, K. R., Lathrop, E., Hulland, E. N., Jean-Louis, R., Lauture, D., D'Alexis, G. D., ... & Grand-Pierre, R. (2017). Quality and uptake of antenatal and postnatal care inHaiti. BMC pregnancy and childbirth, 17(1), 1-10.

Mochache, V., Irungu, E., El-Busaidy, H., Temmerman, M., & Gichangi, P. (2018). "Our voices matter": a before-after assessment of the effect of a community-participatory ntervention to promote uptake of maternal and child health services inKwale, Kenya. BMC health services research, 18(1), 1-12.

Mugenda, L. W. (2019). Refining and Validating an on-site Canine Welfare Assessment Tool Developed for use inCommercial Breeding Kennels (Doctoral dissertation, Purdue University Graduate School).

Mushi, V., Mbotwa, C. H., Zacharia, A., Ambrose, T., & Moshi, F. V. (2021). Predictors for the uptake of optimal doses of sulfadoxine-pyrimethamine for intermittent preventive treatment of malaria during pregnancy inTanzania: further analysis of the data of the 2015–2016 Tanzania demographic and health survey and malaria indicator survey. Malaria Journal, 20(1), 1-9.

Mutanyi, J. A., Onguru, D. O., Ogolla, S. O., & Adipo, L. B. (2021). Determinants of the Uptake of intermittent Preventive Treatment of Malaria inPregnancy with Sulphadoxine Pyrimethamine inSabatia Sub County, Western Kenya.

Ndovoyo, J., Arudo, J., Kipmerewo, M., Mukaka, V., & Kosgey, S. (2019). Predictors of Optimum Uptake of intermittent Presumptive Treatment of Malaria during Pregnancy among Women at Navakholo Sub-County, Kakamega County-Kenya. Journal of Health, Medicine and Nursing, 60, 86-96.

Nkunzimana, E. (2020). Knowledge and Utilization of intermittent Preventive Treatment of Malaria among Pregnant Women inMuramvya Health District, Burundi, 2018. EA Health Research Journal, 4(1), 81-91.

Nyagechanga, O. E. (2020). The impact of climatic variability and malaria control interventions on malaria parasite prevalence and vector abundance inwestern Kenya (doctoral dissertation, Kenyatta University).

Okello, G., Gerrets, R., Zakayo, S., Molyneux, S., & Jones, C. (2018). "Every day they keep adding new tools but they don't take any away": Producing indicators for intermittent preventive treatment for malaria inpregnancy (IPTp) from routine data inKenya. PloS one, 13(1), e0189699.

Olaleye, A. O., & Walker, O. (2020). Impact of health systems on the mplementation of intermittent preventive treatment for malaria inpregnancy insub-saharan Africa: A narrative synthesis. Tropical Medicine and infectious Disease, 5(3), 134.

Olson, J. E., Vitek, C. R. R., Bell, E. J., McGree, M. E., Jacobson, D. J., Sauver, J. L. S., ... & Bielinski, S. J. (2017). Participant-perceived understanding and perspectives on pharmacogenomics: the Mayo Clinic RIGHT protocol (right drug, right dose, right time). Genetics inMedicine, 19(7), 819-825.

Owino, E. A. (2018). Kenya needs cohesive policies and better strategies in ts war against malaria inarid and semi-arid areas. Int. J. Mosq. Res, 5, 124-126.

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research*, *90*(6), 353-360.

Palombi, L., & Moramarco, S. (2018). Health insub-Saharan Africa: HIV, TB and malaria epidemiology. In Multi disciplinary Teleconsultation inDeveloping Countries (pp. 3-16). Springer, Cham.

Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social conditions as fundamental causes of health inequalities: theory, evidence, and policy implications. *Journal of health and social behavior*, *51*(1_suppl), S28-S40.

Polonijo, A. N., & Carpiano, R. M. (2013). Social inequalities inadolescent human papillomavirus (HPV) vaccination: a test of fundamental cause theory. *Social Science & Medicine*, *82*, 115-125.

Portugaliza, H. P., Galatas, B., Nhantumbo, H., Djive, H., Murato, ., Saúte, F., & Munguambe, K. (2019). Examining community perceptions of malaria to inform elimination efforts in Southern Mozambique: a qualitative study. Malaria journal, 18(1), 1-14.

Quakyi, ., Tornyigah, B., Houze, P., Kusi, K. A., Coleman, N., Escriou, G., ... & Ndam, N. T. (2019). High uptake of intermittent Preventive Treatment of malaria in pregnancy is associated with improved birth weight among pregnant women inGhana. Scientific reports, 9(1), 1-8.

Rassi, C., Gore-Langton, G. R., Gidudu Walimbwa, B., Strachan, C. E., King, R., Basharat, S., ... & Gudoi, S. S. (2018). Improving health worker performance through text messaging: A mixed-methods evaluation of a pilot intervention designed to increase coverage of intermittent preventive treatment of malaria inpregnancy inWest Nile, Uganda. PloS one, 13(9), e0203554.

Rosenstock, . M., Strecher, V. J., & Becker, M. H. (1994). The health belief model and HIV risk behavior change. In *Preventing AIDS* (pp. 5-24). Springer, Boston, MA.

Scudder, T., & Colson, E. (2019). From welfare to development: A conceptual framework for the analysis of dislocated people. in nvoluntary migration and resettlement (pp. 267-287). Routledge.

Seddon, J. A., Whittaker, E., Kampmann, B., Lewinsohn, D. A., Osman, M., Hesseling, A. C., ... & Amanullah, F. (2019). The evolving research agenda for paediatric tuberculosis infection. The Lancet infectious Diseases, 19(9), e322-e329.

Sileyew, K. J. (2019). Research design and methodology. In Cyberspace. IntechOpen.

Strecher, V. J., & Rosenstock, . M. (1997). The health belief model. *Cambridge handbook of psychology, health and medicine*, *113*, 117.

van der Elst, E. M., Mudza, R., Onguso, J. M., Kiirika, L., Kombo, B., Jahangir, N., ... & Sanders, E. J. (2020). A more responsive, multi-pronged strategy is needed to strengthen HIV healthcare for men who have sex with men in a decentralized health system: qualitative insights of a case study in the Kenyan coast. Journal of the international AIDS Society, 23, e25597.

World Health Organization. (2018). Report of a WHO–FIND meeting on diagnostics for Buruli ulcer: Geneva, 26–27 March 2018 (No. WHO/CDS/NTD/IDM/2018.09). World Health Organization.

World Health Organization. (2019). driving progress towards rabies elimination: results of Gavi's learning agenda on rabies and new WHO position on rabies immunization: meeting report 1-3 May 2018, Kathmandu, Nepal (No. WHO/CDS/NTD/NZD/2019.01). World Health Organization.

Yaya, S., Uthman, O. A., Amouzou, A., & Bishwajit, G. (2018). Mass media exposure and its impact on malaria prevention behavior among adult women insub-Saharan Africa: results from malaria indicator surveys. Global health research and policy, 3(1), 1-9.