Predictors of pregnant women's uptake of intermittent preventive treatment of malaria in public health facilities in Kigoma district Tanzania

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Master of Public Health Dissertation
Muhimbili University of Health and Allied Sciences
October 2019
Muhimbili University of Health and Allied Sciences

Department of Public Health and Social Sciences

PREDICTORS OF PREGNANT WOMEN'S UPTAKE OF INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PUBLIC HEALTH FACILITIES IN KIGOMA DISTRICT TANZANIA

By

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A Dissertation Submitted in (Partial) Fulfillment of the Requirements for the Degree of Public Health of

Muhimbili University of Health and Allied Sciences Tanzania
October, 2019

CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled: **''Predictors of Pregnant Women's Uptake of Intermittent Preventive Treatment of Malaria in Public Health Facilities in Kigoma District Tanzania'',** in (partial) fulfillment of the requirements for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences.

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Dr. Billy Ngasala (PhD)

(Supervisor)

_____

Date

DECLARATION AND COPYRIGHT

I, **Benedict Nyiro Chidzao**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature…….. **Date**…….....….....

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DEDICATION

This work is dedicated to My Family for their efforts to ensure I succeed, My beloved wife Gilda and my children Shaleen, Brian and Nicole.But again I dedicate this work to my Father Mr. Emmanuel and my mother who were supportive and encouraged me whenever I wanted to give up.

ACKNOWLEDGEMENT

I acknowledge the the Kigoma RHMT and Kigoma Ujiji CHMT for their support, The RCH Staffs Ujiji Health Centre, Baptist Health Centre and Maweni Hospital respectively especially on guiding me through and supporting.

I acknowledge myPathfinder staffs for supporting my roles on my absence and representing me when I was not in the office.

I acknowledge my supervisor Dr. Billy Ngasala for guiding me through the research work,Working tirelessly to ensure I accomplish my dissertation.

Thanks to the Muhimbili School of Public health and social sciences(SPHSS),For proving scholarships to some students.

ABSTRACT

Malaria, a mosquito-borne illnessis a major public health concern mostly to pregnant women in Tanzaniaparticularly in Kigoma District although the disease is preventable and treatable. Currently, WHO and National Malaria Control Programme recommend the Intermittent Prevention and Treatment of malaria by using scheduled SP doses for pregnant womenwhich is administered as DOT duringantenatal care (ANC) visit. The main objective of this study was to assess predictors of pregnant women's uptake of IPTpSP provided at Antenatal clinics as Directly Observed Therapy in public health facilities in Kigoma District Tanzania. A cross sectional study design was adopted in which a mixed approach of qualitative and quantitative techniques was used. The sample size of the study was 369 respondents that comprised 367 conveniently selected women who delivered live births in 2016 and 2 medical doctors in charge from Maweni Referral Hospital and Ujiji Health Centre. Primary data were collected from respondents while secondary data were gathered from published and unpublished reports from public health facilities, library and internet. Survey and interview were used as methods of data collection whereas structured questionnaire and interview guides were instruments of data collection. Quantitative data wasanalysed through SPSS to reveal descriptive and inferential statistics.Content analysis was used for qualitative data. Logistic regression was used to examine predictors of IPTpSP2+ uptake. The findings show that there is low rate of IPTpSP2+ wherebyan average of 25% of pregnant women used at least 2 doses of SP in pregnancybetween 2014 and 2017. Social predictorsof uptake of IPTpSP2+ of malaria for pregnant women were motivation from colleagues ($\beta4=1.693$, $p<0.001$), education ($\beta3=0.803$, $p=0.025$) and spouses' agreement ($\beta5=1.242$, $p<0.001$). Institutional predictors of were knowledge from training ($\beta7=1.022$, $p<0.001$) and first 3 months antenatal care ($\beta10=0.764$, $p=0.014$).

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LIST OF ABBREVIATIONS

AMO	-Assistant Medical Officer
ANC	-Antenatal Care
ANOVA	-Analysis of variance
CHWs	-Community Health Workers
CSOs	-Civil Society Organisations
DOT	-Directly Observed Therapy
FBOs	-Faith Based Organisations
HBM	-Health Belief Model
HC	-Health Centre
IEC	-Information, Education and Communication
ILLN	-Long Lasting Treated Net
ITN	-Insecticide Treated Net
IPTp	-Intermittent Preventive Treatment of Malaria in Pregnancy
MoHCDGEC	-Ministry of Health, Community Development, Gender, Elderly and Children
NMCP	-National Malaria Control Program
RH	-Referral Hospital
SP	-Sulfadoxine-pyrimethamine
SPSS	-Statistical Package for Social Science
TBAs	-Traditional Birth Attendants
THMIS	-Tanzania HIV/AIDS and Malaria Indicator Survey
TDHS-MIS	-Tanzania Demographic and Health Survey and Malaria indicator Survey
URT	-United Republic of Tanzania
WHO	-World Health Organization
ZMCP	-Zanzibar Malaria Control Program

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Malaria, a mosquito-borne illness, which is preventable and treatable, is a major public health concern. In 2013, 97 countries had ongoing malaria transmission. An estimated 3.4 billion people are at risk for malaria (WHO, 2013). In 2012, there were an estimated 207 million cases of malaria and an estimated 627,000 deaths. 90 % of all malaria deaths occur in sub-Saharan Africa. In 2012, malaria killed an estimated 482,000 children under five years of age. That is 1,300 children every day, or one child almost every minute (WHO, 2013 cited in Kabusi et al., 2015). Between 2000 and 2012, the increase in malaria interventions helped to reduce malaria incidence rates by 25 % globally, and by 31 % in the World Health Organization (WHO) African Region. Additionally, the global malaria mortality rate was reduced by 42 % during the same period, and the decrease in the malaria mortality rate in the WHO African Region was 49 %. During this same time period, increased malaria interventions saved an estimated 3.3 million lives. 90 %, or 3 million of these, are in the under-five age group in sub-Saharan Africa (WHO, 2013).

Malaria infection during pregnancy has adverse consequences for both the woman and foetus, accounting for an estimated 26% of severe maternal anaemia in sub-Saharan Africa (Guyatt, 2001) and causing an estimated 100,000 – 200,000 infant deaths each year through low birth weight (Guyatt, 2004). To address this burden, the World Health Organization recommends a package of interventions including intermittent preventive treatment (IPTp) with the anti-malarial drug sulphadoxine-pyrimethamine (SP) at least twice during the second and third trimesters of pregnancy, use of insecticide-treated nets (ITNs) and effective case management (WHO, 2004). The efficacy of IPTp in reducing maternal parasitaemia and anaemia has been demonstrated in several studies (Schultz et al., 1996; Shulman et al., 1999; van Eijk et al., 2004), and the WHO strategy has now been adopted by almost all malaria-endemic countries in Africa (Crawley et al., 2007).

Although malaria is preventable and treatable, it remains a major public health concern mostly for underfive children and pregnant women. In 2012, there were an estimated 207 million cases of malaria and an estimated 627,000 deaths. 90 % of all malaria deaths occur in sub-Saharan Africa whereas malaria killed an estimated 482,000 children underage of 5 years. That is 1,300 children every day, or one child almost every minute (WHO, 2013 cited in Kabusi et al., 2015).

According tomRDT results reported by Tanzania Demographic and Health Survey and Malaria Indicator Survey (TDHS-MIS), Kigoma is among of the regions having high prevalence of Malaria disease (38%) in children under age of 5 years, together with Kagera (41%)and Geita (38%) (URT, 2016). National Malaria Control Program (NMCP) and Zanzibar Malaria Control Program (ZMCP) guidelines in Tanzania require that pregnant women receive intermittent preventative treatment for malaria in pregnancy (IPTp). Specifically, IPTp is preventive treatment with the antimalarial drugs SP/Fansidar which should be administered as Direct Observed Therapy (DOT) twice or thrice during ANC visits. In general, one dose of SP is taken at the beginning of the second trimester of pregnancy and other dose at the beginning of the third trimester (URT, 2013).

The number of reported cases of malaria for Tanzania in 2010, 2011, and 2012 were 1,278,998; 2,150,761; and 1,986,955, respectively. The number of reported deaths from malaria in 2010, 2011, and 2012 were 15,867; 11,806; and 7,820 respectively (WHO, 2013). Although the number of deaths from malaria has decreased, Tanzania still has a high burden of malaria disease and each year many people become infected with the disease. Current recommendations from WHO for IPTp include administration of sulfadoxine-pyrimethamine (SP) to pregnant women at each scheduled antenatal care (ANC) visit, starting as early as possible in the second trimester, provided that the doses are given at least one month apart. SP should not be given during the first trimester of pregnancy. WHO recommends a schedule of at least four ANC visits during pregnancy (WHO, 2013).Tanzania’s currently National Malaria Control Program (NMCP) and Zanzibar Malaria Control Program (ZMCP) guidelines which are reflective of WHO recommendations require that pregnant women receive

intermittent preventative treatment for malaria in pregnancy (IPTp) (URT, 2013). Given the importance of IPTpSP in prevention of malaria in pregnancy and its resulting outcomes such as maternal illness and low birth weight, WHO continues to recommend IPTpSP use (WHO, 2013).

Several factors are behind the low uptake of IPTpSP in developing countries. Environmental influences such as community misconceptions about SP tablets, economic constraints, long distance to health facilities and cultural beliefs, among others are possible reasons for failure in behavior change to SP dose uptake(McEwen and Wills, 2011). On the other hand, demographic characteristics such as marital status, education and age; partner opinion about ANC visits; peer influence; media and economic constraints are also reported in different areas to be influencing women's decision towards SP dose uptake during pregnancy (Ali, 2002). Based on this background, the researcher assessed predictors of pregnant women's uptake of IPTpSP of malaria in Kigoma District, Tanzania.

1.2 Problem Statement

In spite of the IPTpSP dose being recommended by World Health Organization for malaria prevention during pregnancy, there has been observed a declining effort to scale-up the dose uptake in a number of African countries as IPTp noticed to be lagging behind other malaria control measures (WHO, 2016).Tanzania Demographic and Health Survey/ Malaria Indicator Survey (TDHS-MIS)(2016) reported that only 24% of women started ANC before the fourth month of pregnancy, and 26% did not seek care until at least the sixth month of pregnancy.

For Kigoma Region, uptake to IPTp reported by Tanzania HIV/AIDS and Malaria Monitoring Indicator Survey (THMIS), 2012 indicated that only 28.3% of pregnant women received at least one dose during ANC visit (URT, 2013) despite the fact that the region is facing high burden of malaria among pregnant women and high malaria prevalence of about 26% among underfive children (URT, 2013). Uncertainly, the uptake ofIPTp-SP dose can be influenced social factors such as age, education, marital status, spouse agreement, and frequency of births (WHO, 2012; Florey, 2013), and institutional factors such as availability ofSP doses, user knowledge, awareness to IPTp policy, home-to-clinic distance, number of antenatal visits, adverse effect of SP dose, alternative malaria control methods may affect pregnant women's uptake of IPTp-SP (WHO, 2012; Florey, 2013).

Still there is scanty information regarding predictors of IPTpSP uptake among pregnant women. A few empirical studies assessed the usefulness of intermittent preventive treatment of malaria(Peter, 2013; Florey, 2013; Hurley et al., 2016) and the need to scale up the uptake of IPTp of malaria (Hurley et al., 2016; WHO, 2012; 2013). In order to address the information gap, this study assessed predictors of pregnancy women's uptake of intermittent preventive treatmentof malaria using SP dose (IPTpSP) in public health facilities in Kigoma District, Tanzania.

1.3 Significance of the Study

The study will contribute data on policy formulation and amendment regarding Intermittent Preventive Treatment of malaria for pregnant women so as to come up with appropriate policies and effective strategies which can enhance the use of SP doses among pregnant women. Appropriate policy on women's use of IPTpSP2+ may help further reduceof malaria incidences and deaths of mothers and infants. Also, the expected outputs of the study may assist planning of the interventions at district and ministerial levels for prevention and treatment of malaria to pregnant women by using SP doses as per directives from antenatal clinics. In addition to that, the study will add useful literature to academicians pertaining to predictors of IPTpSP2+uptakefor pregnant women in developing countries particularly in sub-Saharan Africa.

1.4 Research Questions

The study was guided by the following research questions which were addressed by using a mixed research approach:

1. What is rate of uptake of IPTpSP2+ dose among pregnant women in Kigoma District?
2. What are social predictors for pregnant women's uptakeof IPTpSP2+ of malaria provided in public health facilities?
3. What are institutional predictors for pregnant women's uptake of IPTpSP2+ of malaria provided in public health facilities?

1.5 Broad Objective

The general objective of the study was to explore predictors for pregnant women's uptake of intermittent preventive treatment of malaria using SP dose (IPTp-SP) in public health facilities in Kigoma District, Tanzania.

1.6 Specific Objectives

In specific, the study intends:

i. To assess rate of uptake of IPTpSP2+ dose among pregnant women in Kigoma District.

ii. To examine social predictors for pregnant women's uptake of IPTpSP2+ of malaria provided at public health facilities.

iii. To exploreinstitutional predictors for pregnant women'suptake of IPTpSP2+ of malaria provided at public health facilities.

1.7 Study Limitations and Mitigation

Table 1: Study mitigations and mitigation measures used

No.	Possible limitation	Mitigation measure
1	Women respondents who are not able to read and/or write can fail to fill questionnaires.	Relatives, colleagues and research assistant assisted in filling questionnaires.
2	Some women respondents may not remember their number of IPTpSP doses uptaken at ANC.	Records of health facility where she was attending ANC assisted to obtain her IPTpSP dose uptake status.
3	Respondents who were not able to read Swahili but have ability to speak tribal languages might fail to respond questionnaires written in Swahili.	A translator from the area where the respondent is coming from assisted the respondent in responding the questionnaire.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Literature Review

2.1.1 Theoretical literature review

The study was guided by three theories which areDiffusion of Innovation Theory, Health Business Model and Health Relief Model as detailed described below. They are useful sources of concepts and variables of the study.

1) Diffusion of Innovation Theory

Understanding how ideas and technologies diffuse or spread among people has been studied in many fields. Toexplain the factors that promote or hinder the acceptance of a technology (such as use of IPTpSP for malaria), several models have been proposed, such as the Technology Acceptance Model (VenkateshandBala, 2008) and the Lazy User Model (TetardandCollan, 2009 cited in Rogers, 2003). Perhaps the leading and most influential model, however, is Everett Rogers's Diffusion of Innovations (2003). Although several researchers preceded him, Rogers (2003) is viewed as the pioneer of technology adoption research. Rogers theory is applicable indifferent fields including medicine, agriculture and marketing as he found multiple commonalities from these studies.

One of Rogers's key insights was not just focusing on technology or commercial products. Instead, he developed the concept of innovation, which he defined an as any object, idea, technology, or practice that isnew to users. An innovation can include tangible, physical objects such as a new device or medicine (such as IPTpSP dose usage).

a) The Innovation-Decision Process

One of the general findings of Rogers's literature review was what he termed the innovation-decision process (Rogers, 2003). Shown in Figure 1, the innovation-decision process describes the steps an entity goes through in deciding whether to adopt an innovation. The entity involved may be a solitary individual or a group such as a community or company. Rogers

generally focus on the decision process of an individual with RD deciding whether or not to use a technology to support some element of the reading process.

(i) Knowledge

The innovation-decision process begins with the Knowledge Stage. One cannot begin the adoption process without knowing about the innovation. In this stage, a person first becomes aware of the technology. The use of IPTpSP is among the technologies in which a woman is supposed to be aware of it. Perhaps she sees someone use the technology in real life. She may also see said technology advertised on television or read about it in a magazine or on the web. A peer or mentor may inform her about it as well.

(ii) Persuasion

A person moves into the next stage, the Persuasion Stage, when she moves beyond simple awareness of the technology. She begins to show interest in the technology and seeks out information about the technology: costs, features, user reviews, etc. It is at this point that she begins to consider herself as a potential user of thetechnology (such as IPTpSP dosage) and begins to actively consider whether or not to adopt the technology into her regular activities (in this case is prevention of malaria during pregnancy).

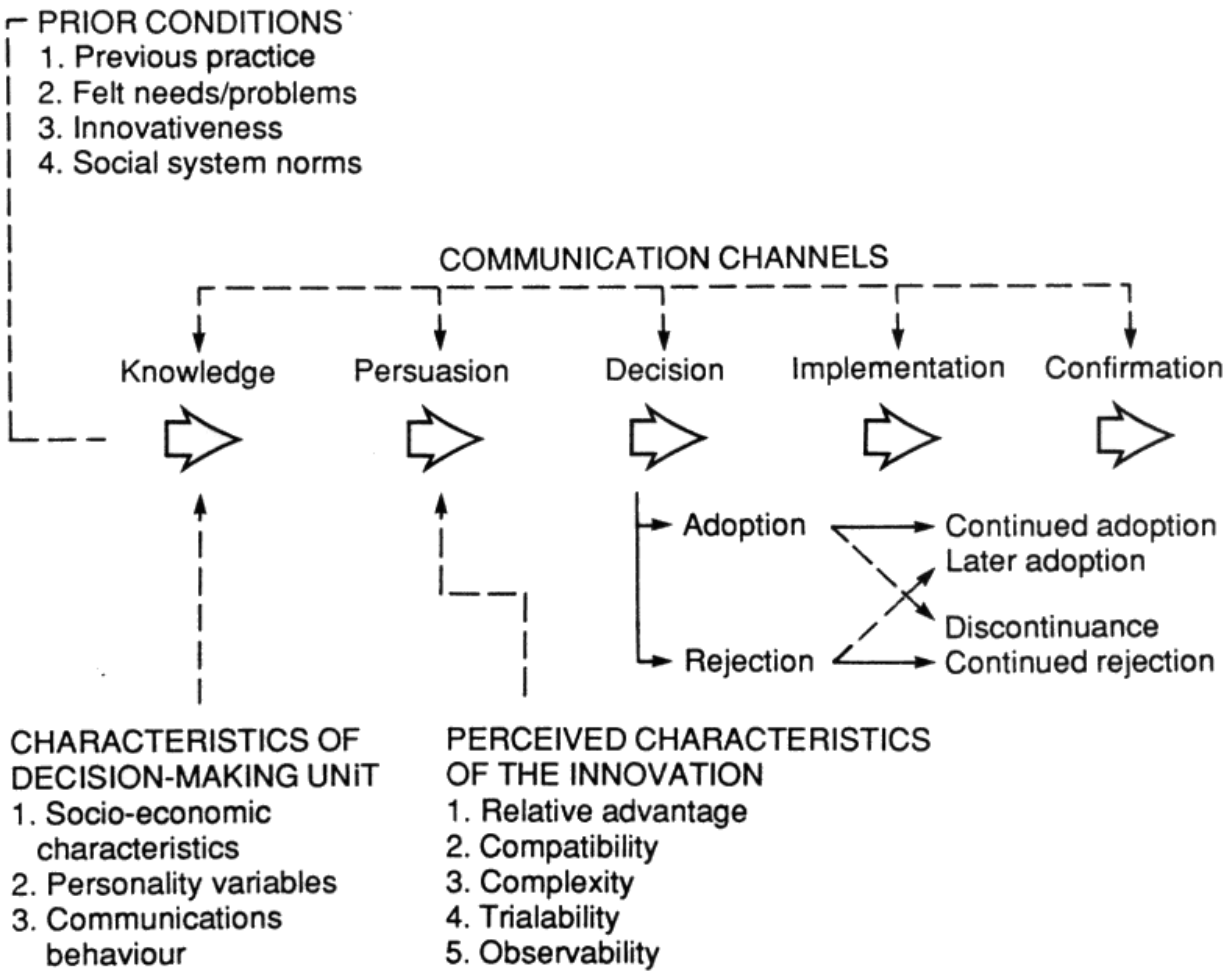


Figure 1: Rogers's innovation-decision process of technology adoption

Source: Diffusion of innovation (Rogers, 2003)

(iii) Decision

At the decision stage, a person makes the choice to reject or adopt the technology (e.g. IPTpSP). This personal process involves the weighing of advantages, disadvantages, costs, benefits, and trade-offs. The decision to not adopt (rejection) is an active choice to not acquire the technology or ever use it. Otherwise, the person begins to use and integrate the technology into her daily life.Although this stage is perhaps one of the most critical for understanding technology adoption, it is perhaps one of the most difficult to study. As Rogers (2003) points

out, the process of deciding occurs silently and invisibly to the outside researcher; one can rarely capture the exact moment of decision. Instead, the researcher can only assess the adopter's reflections and retrospectives of the decision to adopt or not, sometimes months or years later. Such data is, of course, fraught with validity concerns.

(iv) Implementation

The task of integrating the innovation into regular use is called the Implementation Stage. This can be a slow and time-consuming process. For the person involved, changes to her usual habits and practices may be necessary. The technology is also being evaluated at this time to see if it meets expectations. Further information about the technology such as IPTp-SP may also be sought in order to improve usability and usefulness of the technology.

During this stage, re-invention may occur. Re-invention refers to the process by which a person adapts or modifies a technology to better meet her needs and improve its overall compatibility. This modification may also involve using the technology for a task different from the technology's original intent. For instance, pregnant woman's own use of SP dose for treatment of malaria instead of using the dose provided as DOT at antenatal care centres for preventive treatment of malaria as it is supposed to be. In some cases, re-inventory of technology is useful. For example, in an AT study by Dawe (2006) cited in Rogers (2003), parents repurposed a memo-recording device as a communication aid for anon-verbal teenager with autism.

Rogers comments that the importance and ubiquity of re-invention was overlooked by him and other technology adoption researchers for many years (Rogers, 2003, p. 17). Once aware of the concept, researchers found that many adopters re-invent the technology to some degree. For instance, in case of IPT adherence, pregnant women may vary in SP use for malaria control. Some may end up with first SP dose, second SP dose or third SP dosein pregancy. Moreover, technologies that are more readily repurposed were found to be adopted more quickly than less flexible technologies.

(v) Discontinuance

After the adoption of a technology, the person does not always continue to use the technology, though. After an initial period in which the technology is used, the person may abandon the technology. Such discontinuance can occur in several ways. Some technologies face obsolescence in that they cease working or have a limited expectation for the duration of their use. For example, an intermittent preventive malaria dose ceases when pregnant women completed the SP doses intake registered during ANC visit.

Another form of discontinuance is replacement. If a broken technology is substituted with a new version, this is one form of replacement. A technology may be also abandoned in order to replace it with a newer or older version. The final type of discontinuance is perhaps the most regrettable. Disenchantment rejection, also called abandonment, is when the user (e.g. woman) becomes dissatisfied with the technology and quits using it. Although thedecision to stop using may be conscious, the user may instead just gradually use the technology less and lessuntil it is forgotten. For instance, pregnant women who decided to end with SP1 or SP2 instead of continuing with other remaining SP doses as directed by health workers at antenatal care clinics. At the heart of it, disenchantment discontinuance means that the adopter's entire effort of learning, deciding and implementing the innovation into her life has been ultimately for naught. She haswasted her time, resources, and efforts.

(vi) Influences of adoption

The innovation-decision process explains how an innovation becomes adopted, rejected, or abandoned. It does not, however, explain why one technology may be adopted over another. Rogers's diffusion of innovations proposes five factors that shape the rate and likelihood of adoption. Some factors are inherent to the innovation, while others concern the adopters themselves and their usage of the innovation (Rogers, 2003).

(vii) Relative advantage

For a person to choose to use a technology (such as IPTp-SP) for a specified task, it should provide some form of benefit for the task concerned. To be more specific, the innovation should demonstrate a relative advantage over other options, ideally including the technology

currently used for the task (Example, Insecticidal Treated Nets). Better technologies will be adopted, plain and simple. However, what defines "better" is rarely a single and simple statistic. Increased performance, cheaper costs, increased social standing, or even a wow factor may all contribute to the sense of relative advantage.

(viii) Compatibility

Another factor is the compatibility of the innovation with the user's life and practices. An adopted technology will be integrated into one's life and therefore must mesh well. This compatibility may be of a technical basis such as software or hardware compatibility issues with a computer. Any interruption to one's workflow should also be minimal. Additionally, the technology should not cross one's value or belief system. For example, if a person is against the mistreatment of animals, any medication tested on animals would be incompatible. The same applies to women, when a pregnant woman has negative attitudes towards SP dose, it becomes difficult to make her use and complete all the required SP doses as preventive treatment of malaria.

(ix) Complexity

When deciding to adopt an innovation, the inherent difficulty of using the technology is a major concern. Complexity refers to the sense of difficulty that the user has in using and understanding an innovation. The learning curve associated with learning how to use a technology is considered. Also considered are traditional human-technology interaction notions of usability and affordances as espoused by Norman (2002) and others.

Complexity goes beyond these elements, though. A potential user must also understand why the innovation is appropriate or beneficial. The level of such an understanding need not be to an extreme depth but should at least convince the user of the innovation's value. In a case study of an attempt to promote the boiling of water in a Peruvian village, germ theory was used to motivate the adoption of boiling water. However, the villagers had difficulty accepting germ theory as the cause of illness. Thus, they overwhelmingly rejectedwater boiling as they failed to understand the motivation to do so (Wellin, 1955; Rogers, 2003). In the other case, if a pregnant woman is not persuaded to why SP dose is recommended in malaria prevention

during pregnancy and not other medication such as ALU, she can find the complexity to judge whether to use SP or decide not use it.

(x) Trialability

A fourth factor in promoting the adoptability of an innovation (e.g. IPTpSP) is the opportunity for a potential user toexperience using the innovation itself. Such trialability covers opportunities such as test drives, demonstration units, and simulations. The user gets the chance to try the technology without having to fully commitment of purchasing or adopting it. Trials can be great sources of information searched for and needed duringthe Persuasion and Implementation stages. In particular, trials directly limit or prevent forming inaccurate assumptions about the technology (Rogers, 2003).

(xi) Observability

The fifth and most critical factor that shapes innovation diffusion is observability. Observability refers tohow visible the use of the technology is to those around. For a person to adopt a technology, seeing, hearingabout, or otherwise knowing that other individuals are using that technology (such as IPTpSP) dramatically encourages adoption. Observing a technology stimulates awareness of the innovation and conversations among one's peers.Rogers found evidence for the power of observability when he plotted the number of adoptions over time. Consistently, these plots revealed a normal Bell curve, while plots of the cumulative number of adoptions overtime showed a sigmoid or s-curve. Adoption is slow in the beginning as awareness ofthe technology is limited. As more and more people use the technology, the public becomes more aware of the technology and thus the rate of adoption increases until the technology is in common use and has saturated the market. At this point, the numbers of adoptiondrops off, as there are fewer and fewer new consumers available.

(xii) Communication channels

For Rogers, the power of observability encouraged research on what makes an innovation more readily noticed.Mass media is a major influence on the public's awareness of new innovations such using SP doses for preventive treatment of malaria in pregnant women. Some are complete strangers, but we might notice them using the new recommended

technology (such as IPTpSP). Others are much closer to us such as friends, family, and coworkers. Our technology choices are influenced by their choices and recommendations. Thus, understanding the diffusion of an innovation isgreatly facilitated by understanding the communication channels and social networks involved. For instance, messages disseminated by trained health workers at ANC, radios and newspapers regarding SP use for malaria prevention among pregnant women can assist the adoption of IPTpSP.

As such, many diffusion studies identify who talks to whom and how adoption spreads through the identifiedsocial network. Some individuals are more influential than others. Known as change agents, these persons areoften highly connected within the network or are held in high esteem by their peers. Change agents such as CHWs may alsohold a position of power, such as in the case of a manager or director position. Regardless, when a changeagent decides to adopt or reject a technology, his peers will likely follow suit.

2) Health Belief Model

Health Belief Model (HBM) as shown in Figure 2 emerged in the 1950s to explain why medical screening programs offered by the US Public Health Service were not always successful. The model holds that perceptions about a disease and strategies available to decrease its occurrence determine health behavior (Hockbaum, 1958). The original HBM consisted of four constructs, namely: *perceived seriousness, perceived susceptibility, perceived benefits* and *perceived barriers*. However, HBM scholars later improved the accuracy of the model by including three new constructs, namely, *cues to action, modifying factors* and *self-efficacy* (Glanz and Rimer, 2002).

Perceived seriousness signifies an individual's belief about the severity of a disease. While the perception of seriousness arises from medical information or knowledge, it may also come from beliefs a person holds about the difficulties a disease would create in his or her life. For instance, an individual may view that flue is less serious than malaria infection, because, while flue would require a few days to clear, malaria requires a longer period and finances to treat. Hence, one (such as pregnant woman) is likely to change behavior faster when facing the risk of malaria than flue (McCormick, 1999).

Perceived susceptibilit y is one of the powerful perceptions causing the adoption of prescribed health behaviors. The greater the perceived risk of infection, the higher the chance of behavior change. For instance, perceived susceptibility is what drives pregnant women to use Long Lasting Impregnated Nets (ILLNs) and IPTpSP to decrease their susceptibility to malaria infection. When people perceive that they are at risk of infection, they are likely to prevent it from happening by adopting prescribed measures. However, when people believe that they are not at risk, the adoption of preventive behaviors remains low (Belcher, 2005).

Perceived benefits refer to an individual's opinion about the value of a new behavior in decreasing the risk of contracting an infection such as malaria among pregnant women. People tend to adopt healthier behaviours when they believe such new behaviours will decrease their chances of developing a disease. Perceived benefits play an important role in the adoption of preventive behaviours, such as consistent use of LLINs, regular visits to ANC clinics for preventive medication (Mutulei, 2013).

Perceived barriers address the issue of obstacles to behavior change. This is an individual's own evaluation of the obstacles to the adoption of preventive behaviors. As noted by (Janz and Becker, 2002), of all the constructs, perceived barriers are the most significant in determining health behaviour change. To start visiting ANC clinics during the early stages of pregnancy, a pregnant woman needs to believe that the benefits of such visits outweigh the consequences of not visiting the facilities. Such positive behavioursto overcome barriers and encourages one to seek antenatal care services. Barriers to behavior change may also include financial constraints, stigma, embarrassment or fear of pain, among others (Mutulei, 2013).

Modifying variables such as gender, age, religion, marital status, parity, gravidity, education level, occupation, past experiences and average income, among others influence the strength of the original theoretical constructs. These characteristics influence personal perceptions regarding a particular behaviour and the likelihood of behaviour adoption. *Cues to action*, including events or people may move an individual to change behavior. Examples include

illness of a family member, partner's opinion about antenatal care, peer influence or health warnings in the media, associated with non-conformity (Ali, 2002).

Self-efficacy refers to one's own belief on his/her ability to do something (Bandura, 1977). Generally, people do not try out new things unless they believe they can do it. If someone believes that a new behavior is useful, but does not think he or she is capable of doing it; chances are high that such new behaviors may not be tried. For instance, if a pregnant woman believes that medication during pregnancy may harm her fetus, then the uptake of IPTpSP as a new behaviour for reducing susceptibility to malaria infection may be constrained (Mutulei, 2013).

The HBM is however, faulted for inadequate consideration of attitude in behavior change. Attitude is a subjective attribute, synonymous to liking or disliking service quality, service providers or health facilities. Socialization, pertinent information, religion and education level, among others shape attitudes. Even though a particular behaviour may be effective in reducing vulnerability to malaria infection, its adoption largely depends of an individual's attitude. Nevertheless, HBM is applauded for taking into consideration the effect of personal attributes, including demographic and socio-economic factors (Glanz and Rimer, 2002), which make the model most appropriate for this study. Figure 2 summarizes the linkage between different constructs of the model.

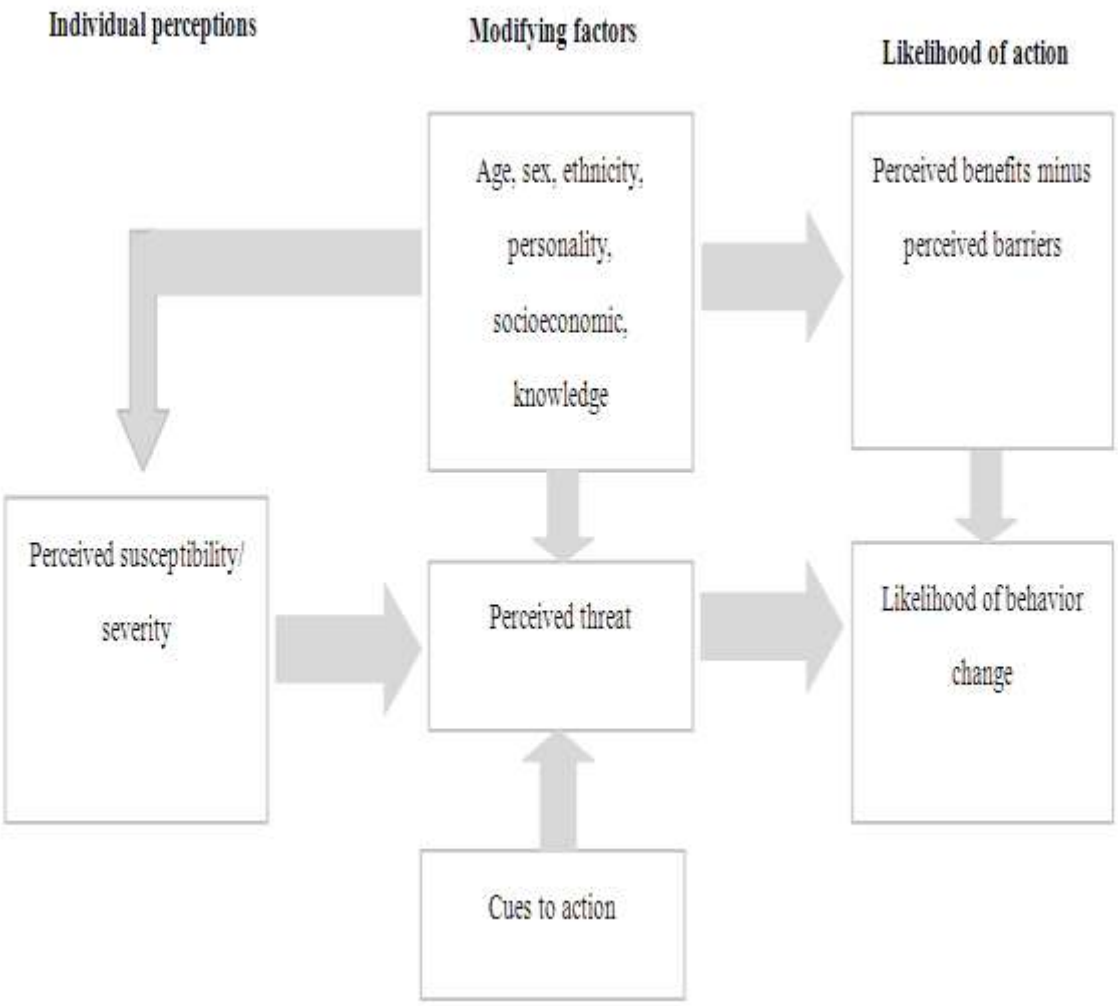


Figure 2: The linkage between different constructs of the Health Belief Model.

Source: Adopted from Mutulei (2013)

3) Health Promotion Model

Nola Pender, a Professor of Nursing at the University of Michigan developed the Health Promotion Model (HPM) in 1982 to guide research activities explaining and predicting health behaviour. The model derived inspiration from HBM, which came into existence about two and half decades earlier. Unlike HBM, whose theoretical thrust centers on the notion that fear of infection is the key factor motivating individuals to seek preventive interventions, HPM

provides a broader picture of health and determinants of health behaviour. The model posits that good health does not merely mean the absence of disease; rather, it includes measures taken to promote good health, instill a sense of self-care responsibility, access early detection and prevent illness (Galloway, 2003; Pender, 1996; Peterson and Brendow, 2009).

The model assumes that people: attempt to create optimal living conditions, have the ability to complete a self-assessment and know their strengths, value growth, seek to regulate their behaviour, as well as interact and transform their environment. Besides, the model assumes that health workers are an integral part of the community and that people have the ability to change their behaviour as necessary (Pender, 2011).

HPM's concepts anchor on two theories – the expectancy value theory and the social cognitive theory. The expectancy value theory stems from the idea that the course of action is likely to lead to desired outcome, which is likely to be of personal value (Reed and Shearer, 2009). The social cognitive theory centers on the concept of self-efficacy, which is an individual's perception about their ability to carry out a particular behaviour. The stronger it is, the higher the likelihood that behavior change will be achieved (Pender, 2011; Reed and Shearer, 2009).

The major concepts constituting HPM are three and they include individual characteristics and experiences, behaviour specific cognitions and effect, as well as behavior outcome (McEwen and Wills, 2011). Individuals seek to utilize past experience and behaviour to assess the possibility of change. In this regard, women's decision to take IPTpSP2+ depends on their experiences with IPTp-SP dose 1 in terms of general weakness of the body, the waiting time at the facility and providers' attitude, among other variables. Personal characteristics such as educational attainment, partner support and income level, among others, influence an individual's health behaviour decisions. Personal attributes also help individuals to identify patterns that maybe beneficial, strengths and weaknesses and is a great way to create a platform to formulate a plan of action (McEwen and Wills, 2011).

Behaviour specific cognitions and affect concept is extrapolated from situational influences. Due to environmental influences such as community misconceptions about SP tablets, economic constraints, long distance to health facilities and cultural beliefs, among others, each plan considers possible reasons for failure in behavior change or factors that may impede behavior change. This plan will clearly outline the benefit of changing one's behaviour and the steps necessary to attain such a goal (McEwen and Wills, 2011).

Behavioural outcome measures the viability of the plan of action and resources available versus resources to be attained. In this tailored plan, health workers should seek to empower individuals with information necessary to achieve success, good health and increased capacity for self-care, thereby highlighting the behavioral outcome of health promotion. Through health promotion, pregnant women are empowered with necessary knowledge and skills on malaria prevention, signs and symptoms and the importance of the IPTp intervention. Besides, through health promotion, providers instill self-care responsibilities, which may go a long way in improving IPTpSP2+ uptakes (McEwen and Wills, 2011).

2.1.2 Empirical literature review

Anders et al. (2008) investigated the timing of delivery of IPTp to pregnant women attending antenatal clinics (ANC), and the potential determinants of timely uptake.Structured interviews were conducted with staff and pregnant women at antenatal clinics in northeast Tanzania, and antenatal consultations were observed. Facility-based and individual factors were analysed for any correlation with timing of IPTp uptake.Almost half the women interviewed first attended ANC during or before the fourth month of gestation, however 86% of these early attendees did not receive IPTp on their first visit. The timing of IPTp delivery complied closely with the national guidelines which stipulate giving the first dose at 20–24 weeks gestation. Uptake of at least one dose of IPTp among women who had reached this gestation age was 67%, although this varied considerably between clinics. At one facility, IPTp was not delivered because SP was out of stock.

Kibusi et al. (2015) examined factors that are responsible for the uptake of IPTp among pregnant Tanzanian women.Data was analyzed from the 2011–2012 Tanzania HIV and Malaria Indicators Survey (THMIS) of 1,616 women aged 15–49 years who had a live birth in the 2 years prior to the survey and received antenatal care (ANC) services.Logistic regression analysis results showed that (1) being in the age groups 30–34 and 35–39 versus other age groups and being married or living with partner versus those who reported as never married or divorced/separated were associated with high uptake of IPTp; (2) women pregnant with their first or second child versus those who already have had two or more children had higher odds of completing the recommended number of IPTp dosage; and (3) being a resident from the Eastern Zone versus Lake Zone as well as having the first antenatal visit in the first or second trimester versus third trimester were associated with higher uptake of IPTp.

The study revealed that about 75% of the pregnant women studied had access to intermittent preventive treatment of malaria. Among the women attending the antenatal clinic that received sulphadoxine-pyrimethamine (SP), about 78% of them took two doses of SP. The prevalence of clinical malaria was statistically higher in women who did not receive intermittent preventive treatment with SP during pregnancy (44.7% *vs*. 31.3%, $P = 0.0001$) and among women who had one dose of the drug instead of two doses (40.0% *vs*. 28.7%, $P = 0.0001$). There was no statistical significant difference in the mean age in years (31.53 ± 5.238 *vs*. 31.07 ± 4.751, $P = 0.09$ and the gestational age at delivery (38.76 ± 1.784 *vs*. 38.85 ± 1.459, $P = 0.122$) between the women who did not receive SP and those who had it. There was a statistical significant difference in the outcome of pregnancy among women who had Intermittent Preventive Treatment in pregnancy (IPTp) and those who did not *viz*.-a-*viz*. in the duration of labour (8.6 ± 1.491 *vs*. 8.7 ± 1.634, $P = 0.011$) and the birth weight of the babies (3.138 ± 0.402 *vs*. 3.263 ± 0.398, $P = 0.0001$).

Hurley et al. (2016) assessed factors contributing to low uptake of intermittent preventive treatment of malaria in pregnancy with sulfadoxine-pyrimethamine (IPTp-SP) in rural Mali. The study based on secondary data analysis on Mali's 2012–2013 Demographic and Health Survey (DHS) to determine the proportion of women who failed to take IPTp-SP due to

ineligibility or non-attendance at antenatal care (ANC). The studyintended to identify the proportion who reported taking other or unknown medications to prevent malaria in pregnancy and those who did not know if they took any medication to prevent malaria in pregnancy. Qualitative interviews, focus groups and ANC observations have used in six rural sites in Mali's Sikasso and Koulikoro regions to identify reasons for missed opportunities. The study found that reported IPTp-SP coverage estimates are misleading due to their dependence on a variable ("source of IPTp") that is missing 62% of its data points. Among all women who gave birth in the two years prior to the survey, 56.2% reported taking at least one dose of IPTp-SP. Another 5.2% reported taking chloroquine, 1.9% taking another drug to prevent malaria in pregnancy, 4.4% not knowing what drug they took to prevent malaria, and 1.1% not knowing if they took any drug to prevent malaria. The majority of women who did not receive IPTp-SP were women who also did not attend ANC. Our qualitative data revealed that many health centers neither administer IPTp-SP by directly observed therapy, nor give IPTp-SP at one month intervals through the second and third trimesters, nor provide IPTp-SP free of charge. Women generally reported IPTp-SP as available and tolerable, but frequently could not identify its name or purpose, potentially affecting accuracy of responses in household surveys.

Olukemi et al. (2009) assessed the use of intermittent preventive treatment with sulphadoxine-pyrimethamine in pregnancy in Ibadan, Nigeria. Using interviewer administered questionnaires, information on knowledge of the burden, consequences and the use of SP for malaria control in pregnancy was obtained from 800 mothers within 24h after delivery at two health centres in Ibadan. Women who attended antenatal care (ANC) at the secondary facility were less likely to demonstrate poor knowledge of causes (OR = 0.18,95% CI = 0.08, 0.38), consequences (OR = 0.37, 95% CI = 0.24, 0.55) and control strategies (OR = 0.32,95% = 0.18, 0.59) compared with tertiary facility. Only 56.4% of all the mothers were aware of IPTp SP asgovernment policy for prevention of MIP out of which 16.9% used IPTp SP in index pregnancy. Overall, only 18.4% of all mothers used IPTp SP. Being unaware of the existing government policy and educational attainment of 9 years independently predicted non-usage of IPTp SP. The study revealed that the uptake of IPTp SP in pregnancy is poor in spite of

good knowledge of burden of malaria in pregnancy and underscores the need to scale up awareness campaign and monitor implementation atall levels of health care.

2.1.3 Literature gap

Several studies have assessed the usefulness of intermittent preventive treatment of malaria (Peter, 2013; Florey, 2013; Hurley et al., 2016) and the need to scale up the uptake of IPTp of malaria (Hurley et al., 2016; WHO, 2012; 2013) as strategies of preventing pregnant women and infant from malaria disease.

Little is known with regard to predictors of IPTpuse among women especially in Kigoma district(Salaam, 2014). For instance, Kibusi et al. (2015) assessed predictors for uptake of IPTp in Tanzania but institutional factors were not adequately explored. Unders et al. (2008) assessed timing of IPTp of malaria and the implication of current policy in Tanzania. On the other hand, Florey (2013) examined determinants of effective IPTp delivery, using DHS analysed studies in the United States. However, Florey (2013) focused on a few number of social factors, and many factors remain unexplained. In order to address the knowledge gap, the study explored predictors of pregnant women's uptake of IPTp using SP doses in Kigoma district, Tanzania. The study was specifically evaluated the rate of uptake of IPTpSP2+ of malaria among pregnant; and assessed social and institutional predictors of pregnant women's uptake of IPTpSP2+ of malaria at antenatal clinics.

2.1.4 Conceptual framework

The framework in figure 3 presents relationship between social and institutional predictors (independent variables) and women's uptake of IPTpSP2+ (dependent variable). In order to control malaria in pregnancy, pregnant women are supposed to comply with intermittent preventive treatment of malaria in which at least 2 doses of SP are recommended to be provided as DOT in pregnancy. The Directly Observed Therapy (DOT) of the right dose of SP reduces the chance of getting the *Plasmodium falciparum*for women. Pregnant woman is required to administer at least 2 doses or a maximum of 3 doses of IPTpSP in pregnancy as recommended by WHO (2012) and National Malaria Control Programme. SP can be safely

administered from the beginning of the second trimester untildelivery, provided that doses are given one month apartas directed by health workers at antenatal care centres (WHO, 2013).

There might be social and institutional predictors for IPTpSP2+ doses uptakein pregnant women. Social predictors such as age, education, marital status, colleague's motivation, spouse agreement and frequency of births may affect IPTp-SP2+ uptake among pregnant women (WHO, 2012; Florey, 2013). Also, institutional predictors such as availability of SP doses, user knowledge, awareness to IPTp policy, home-to-clinic distance, period of starting antenatal visits, adverse effect of SP dose, and alternative malaria control methods (example of Insecticidal Treated Nets) may also affect pregnant women's uptake of IPTp-SP2+(WHO, 2012; Florey, 2013).

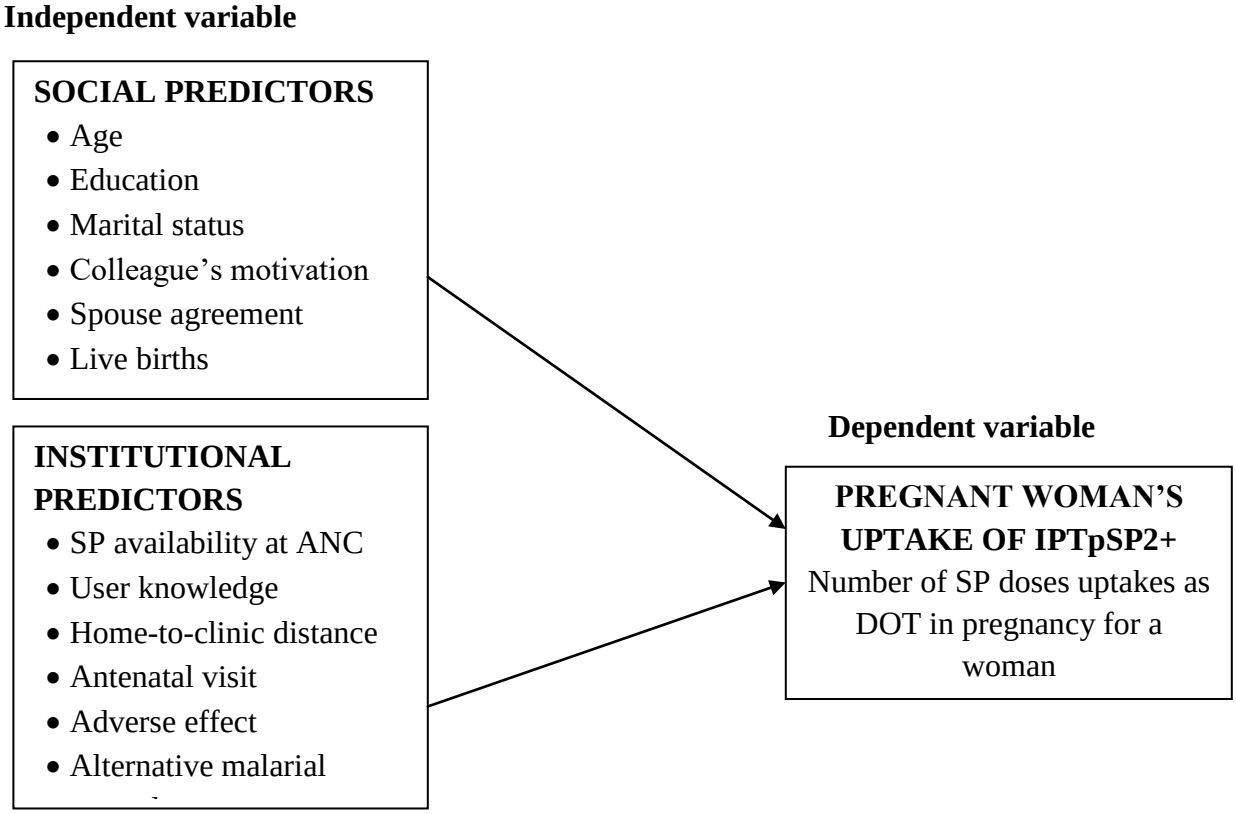


Figure 3: The conceptual framework showing research variables

Source: Modified from Florey (2013) and WHO (2012)

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Study Area

Kigoma district has a population of 427,024 (NBS, 2013) is one of the six districts of Kigoma region and it is the region's headquarters. The Municipality receives moderate rainfall ranging from 800mm to 1600 mm per year (between November and April) with relatively variable and unpredictable patterns. There are 21 health facilities in the district including two hospitals (one of them is the regional hospital, Maweni), three health centres and 16 dispensaries whereby five of these (three dispensaries, one health centre and a hospital) are private facilities. The district is chosen for the study because it has high prevalence of malaria reaching 26% among underfives based on mRDT results and only 28.3% of pregnant women reported to receive at least one dose of IPTpSp during ANC visit (URT, 2013). According tomRDT results reported by Tanzania Demographic and Health Survey and Malaria Indicator Survey (TDHS-MIS), Kigoma is among of the regions with high malaria prevalence (38%) in children followingKagera (41%), Geita (38%) (URT, 2016). Therefore, Kigoma District is chosen for undertaking the proposed study.

Antenatal care in public health facilities in Kigoma District provide health services for a woman early in her pregnancy, it provides an opportunity for early diagnosis and treatment of infections in the mother, and for monitoring her pregnancy and screening for complications for both the mother and her baby. Antenatal care services in Kigoma District is provided to pregnant women have been done by skilled providers, that is, a doctor/assistant medical officer (AMO), clinical officer, assistant clinical officer, nurse/midwife, assistant nurse, and maternal and child health (MCH) aids.

3.2 Study Design

A cross-sectional study design was used since it allows data to be collected at a single point in time. The study is useful in obtaining information relevant for the description of variables and testing relationships between variables. Based on the nature of information gathered, the

research adoptedmixed approaches comprising of quantitative and qualitative approaches since the study will collect quantitative and qualitative datawhich helped the researcher to cross-check the findings given by women and health workers. The quantitative approach will be used in gathering information through structured questionnaires from women who delivered live births in 2016. The qualitative approach will be used for 2 medical officers in charge (one from Ujiji Medical Centre and the other from Maweni Referral Hospital) through in-depth interview. The interview guides were constructed for medical officers in charge to answer the research questions in detail. On the other hand, the research is explanatory because it seeks to examine relationship between research variables by using inferential statistics such as logistic regression.

3.3 Study Population

The population of the study was4389women (including 706 women who administered at least 2 doses of IPTpSP and 3683 women who didn't uptake at least 2 doses of IPTpSP) who gave live births in 2016 at Maweni Referral Hospital and Ujiji Health Centre and 2 medical doctors from these two public health facilities.

3.4 Sample Size and Sample Selection

The study was purposively selected Maweni Referral Hospital and Ujiji Health Centre since they are public health facilities in Kigoma District receiving many pregnant women and SP doses are provided to pregnant women as DOT for preventive treatment of malaria. The survey population of women who delivered live births in 2016 from the two selected public health facilities was 4389 women whereby women who administered at IPTpSP2+were 706while 3683 women reported by these two health centres as either administered a single dose of IPTpSP or not at all administered SP dose as intermittent preventive treatment of malaria in pregancy. Since the population of women who were pregnant and delivered live births in 2016 is known, Slovins's formula adopted from Methu (2017) was used to arrive to the sample size of 367 respondents as calculated below. From the sample size, the study will use purposive sampling to select 200 women who didn't use IPTpSP2+ in pregnancy and 167

women who used IPTpSP2+in pregnancy in order to obtain proportionality between the two groups of women who participated in the survey and allow running logistic regression model.

$$\frac{N}{1+Ne^2} = \frac{4389}{1+4389(0.05)^2} = \frac{4389}{1+4389x0.0025} = 367$$

Whereby;

n is minimum sample size

N is survey population

e is error at 95% confidence interval

Based on the list of pregnant women attended antenatal clinics and gave live births in 2016 available in log books of the two selected public health facilities, the researcher used those log books to select respondents conveniently depending on their availability of during the days of survey. In addition to that, the researcher involved local government leaders and residents to trace the respondents based on theirdemographic profile such as names, location and age recorded in log books. The two (2) medical officers in charge (one from each selected public health facility) were selected by using purposive sampling as key informants because they are in charge of all health service programsimplemented in health facilities including malarial control program. Therefore, the overall sample size of the study was 369 respondents.

3.5 Variables and Measurement

3.5.1 Dependent variable

The dependent variable of the study is pregnant woman's uptake of IPTp-SP2+as intermittent preventive treatmentofmalaria in pregnancy. The study assumed that for awomanto comply with the IPTp-SP, she is required toend up with either second or thirddosedepending to the prescriptions given bymedical doctor or assistant medical officer. At least two SP doses are regarded as optimum dosesfor intermittent preventive treatment of malaria for pregnant women as per recommended from WHO and National Malaria Control Programme. An

indication of IPTp-SP dose uptake was also traced from 2014 to 2017 in order to evaluate the rate and trend of implementation of the intervention.

3.5.2 Independent variable

Table 2: Social predictors of women's uptake of IPTpSP2+ and measurements

Variable	Description	Measurement
Age (X1)	Number of years since a respondent was born.	Number of years
Marital status (X2)	Marital status of the respondent.	1, if married; 0, otherwise
Education (X3)	Level of education of the respondent.	Number of years spent in education
Colleagues' motivation(X4)	If a respondent motivated by her colleague (about using IPTp-SP).	1, if motivated; 0, otherwise
Spouse agreement (X5)	Agreement of couple towards IPTp-SP.	1, if both agreed to use IPTpSP doses; 0, Otherwise
Live birth (X6)	Frequency of live births of the respondent.	Number of live births

Table 3: Institutional predictors of women's uptake of IPTpSP2+ and measurements

Variable	Description	Measurement
User knowledge (X7)	If respondent participated in a training pertaining to IPTp-SP usage.	1,Yes; 0, No
Availability of SP at ANC (X8)	If SP medication is available at antenatal clinics.	5 point rating scale
Home-to-clinic distance (X9)	Perceived home-to-clinic distance	5 point rating scale
Antenatal visit (X10)	Frequency of antenatal visit of the respondent.	Period of starting ANC visit
Adverse effect (X11)	If the respondent perceived adverse effect after using IPTpSP dose.	3 point rating scale
Alternative malaria control (X12)	If the respondent perceived other malaria control interventions such as insecticidal treated net (ITN) as more important than using IPTpSP doses.	5 point rating scale

3.6 Methods of Data Collection

The study adoptedmixed approach technique which usedsurvey and interview as methods of data collectionbasing on each research question. The survey method was applied for women who were pregnant and thereafter gave live births in 2016. The interview method involved two medical doctors in charge (one from each selected public health facilities). The interview for each interviewee was in-depth and face-to-face focused on study objectives aiming at revealing overall detailed information regarding predictors of pregnant women's uptake of IPTpSP2+ for malaria prevention and treatment in pregnancy. The mixed research will help

the researcher to cross check therelevant of results and provide detailed discussions and justification of the findings.

3.7 Instruments of Data collection

The study used structured questionnaire and interview guides as instruments of data collection. Questionnaire and interview guides consisted questions addressing study objectives.

3.7.1 Questionnaire

The questionnaire was structured and constructed from close ended questions. It was used to collect quantitative data regarding their statuses of IPTp-SP use and associated predictors of dose usage from women who were pregnant and thereafter delivered live births in 2016.Womenfilled the questionnaires under assistance of 2 research assistants who have trained on how to administer research instruments to the respondents. For those who will not be able to fill the data collection tools, they allowed to choose assistants who is a family member or colleague whom they trust.

3.7.2 Interview guides

The researcher conducted face-to-face interview to two medical doctors in charge each one at a time. The interview was governed by interview guides structured according to the research questions. The researcher took notes on the notebook when the interviewee was providing detailed responses regarding a series of questions asked directly by the researcher.

3.8 Types of Data

The study collected primary and secondary data from respondents and printable materials respectively. Primary data were collected directly from respondents (i.e. women and medical doctorsin charge). Secondary data were collected from printable materials such as published and unpublished reports including journal articles, and records of women’s use of IPTpSP doses for preventive treatment of malaria from 2014 to 2017 available at health facilities.

2.9 Data Analysis

The raw data from questionnaires were sorted, coded in SPSS version 16 and analysed to generate descriptive (such as frequencies, percentages, mean and standard deviations) and inferential statistics. The inferential analysis was done by running binary logistic regression in order to reveal predictors for woman's uptake of IPTpSP2+ of malaria. WHO (2012) and National Malaria Control Program recommends a pregnant woman to administer at least 2 doses of SP provided at ANC as DOT for preventive treatment of malaria in pregnancy.Information provided by key informants (medical doctors in charge)through interview was analysed by using content analysis to generate themes and views regardingpregnant women's uptake of IPTpSP provided as DOT during antenatal visits.

The logistic regression which used to analyse predictors of woman's uptake of IPTpSP2+ is presented as equation 1 below.

$$Y=\beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + \beta 7X7 + \beta 8X8 + \beta 9X9 + \beta 10X10 + \beta 11X11 + \beta 12X12 + \varepsilon_i \quad \text{.....equation1}$$

$$Y= \frac{\text{Odds}}{\text{1-Odds}} = \frac{\exp(\beta)}{1 - \exp(\beta)}$$

Y = dependent variable (woman's uptake of IPTpSP2+). Y=1 if woman was at least used IPTp-SP2+doses in pregency, Y=0 if otherwise.

Odds=exp(β) is a chance for a pregnant woman to use IPTpSP2+ doses (second or third dose) in pregnancy as directly observed therapy at antenatal visits.

X1,X2,X3,X4,X5,X6,X7,X8,X9,X10 + X11 and X12 are independent variables (possible predictors of IPTp-SP2+) shown in Tables 2 and 3.

β1, β2, β3, β4, β5, β6, β7, β8, β9, β10,β11and β12 are coefficients of Xs (independent variables).

β0 = constant term

ε_i= error term

3.10 Validity and Reliability

In making sure that the data collection tool is reliable as it maintains consistence of information, pre-testing of data collection tool wasdone. The findings from the pre-test assisted to address shortcomings which might occur when using data collection tool before starting data collection exercise. Therefore, author hopes that if this study is carried out again, the same results will appear because the methodology used was appropriate in terms of collecting trustworthy data from respondents.

On the other hand, the researcher was thoroughly surveying the literature to ensure that what is studied remain valid by adapting other researchers' methodologies as well as cross-checking variables used by the study if other related studies (e.g. Florey, 2013; WHO, 2012; Olukemi et al., 2009; Hurley et al., 2016; Kobuti et al., 2015; Anders et al., 2008) have also been used similar variables in other study areas. Moreover, regular consultations with supervisor and creative comments which were provided by him enhance the validity of the study.

3.11 Ethical Issues

In order to obey ethics, the study maintained confidentiality of the respondents when they were providing information. Also, respondents given a free decision to attempt the kind of question they like to answer. In addition to that, the researcherwas provided a letter of permission from the university as an introductory document to the respondents. This helped to clear any kind of mistrust which was existed from some respondents against the researcher.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Pregnant Women's Uptake of SP Dose as Intermittent Preventive Treatment of Malaria in Kigoma District

The study assessed the uptake of SP dose among pregnant women since they are required to use at least 2 doses as DOT during antenatal clinic as a preventive treatment of malaria. Basing on WHO (2012) recommendations, at least two SP doses are required to be administered by pregnant woman as DOT during antenatal visit in order to comply with preventive treatment of malaria in pregnancy. Based on WHO (2012) directives, this study assessed the number of women who administered at least 2 doses of SP as DOT during antenatal visits against total number of deliveries in the period of four years from 2014 to 2017, and results are shown in Table 4.

In identifying the number of women used at least 2 doses of SP in pregnancy as intermittent preventive treatment from 2014 to 2017 against the total number of deliveries in the same period, the study found that there is low response of pregnant women's uptake of IPTpSP2+ in Kigoma District based on three selected public facilities of Maweni Referral Hospital, Ujiji Health Centre and Baptist Health Centre as shown in Table 4.Maweni Referral hospital was at level of health centre up to 2016 before upgraded to referral hospital in 2017. Since Maweni become a referral hospital, it ceased to deal with primary intervention such as making follow ups of IPTpSP compliance, instead, it deals with referral treatment cases. That's why in 2017 Maweni Referral Hospital didn't record any use of IPTpSP among pregnant women (Table 4).

Table 4: Incidence of women's uptake of IPTpSP of malaria in Kigoma District from the year of 2014 to 2017

Name of Public Health Facility	**Status of women's uptake of IPTpSP doses**	**2014**	**2015**	**2016**	**2017**
Maweni Referral Hospital	Number of women used at least 2 doses of SP for intermittent preventive treatment of malaria in pregnancy.	529	298	72	0
	Total number of deliveries	2426	2596	2854	2338
Ujiji Health Centre	Number of women used at least 2 doses of SP for intermittent preventive treatment of malaria in pregnancy.	959	1108	634	849
	Total number of deliveries	1795	1795	1695	1987
Baptist Health Centre	Number of women used at least 2 doses of SP for intermittent preventive treatment of malaria in pregnancy.	337	588	490	393
	Total number of deliveries	1669	1688	2065	2666

The total number of delivered women obtained fromantenatal clinic records of 2014, 2015, 2016 and 2017 of three selected public health facilities including Ujiji Health Centre, Maweni Referral Hospital and Baptist Health Centre was 5890, 6079, 6614 and 6991 respectively. During this period of four years of malaria control intervention using SP doses in pregnancy,

there was low women's uptake of at least 2 doses of SP which is recommended as a current intermittent preventive treatment of malaria (Figure 4).

Congruent to the survey findings, the interview done to Doctors in-charge of Ujiji Health Centre and Maweni Referral Hospital demonstrated that health facilities adhere with DOT since pregnant women have been provided SP dose by clinicians as intermittent preventive treatment of malaria when they attend antenatal clinics. However, most pregnant women used to administer SP dose during the first antenatal visits but the number reduces in the next antenatal visits. For instance during interview, doctor in-charge of Ujiji Health Centre said that;

> *"SP uptake among pregnant women varies significantly with the ANC visit. Many women are enrolled in the first ANC Visit but the number usually reduces subsequently to the 4th ANC Visit".*

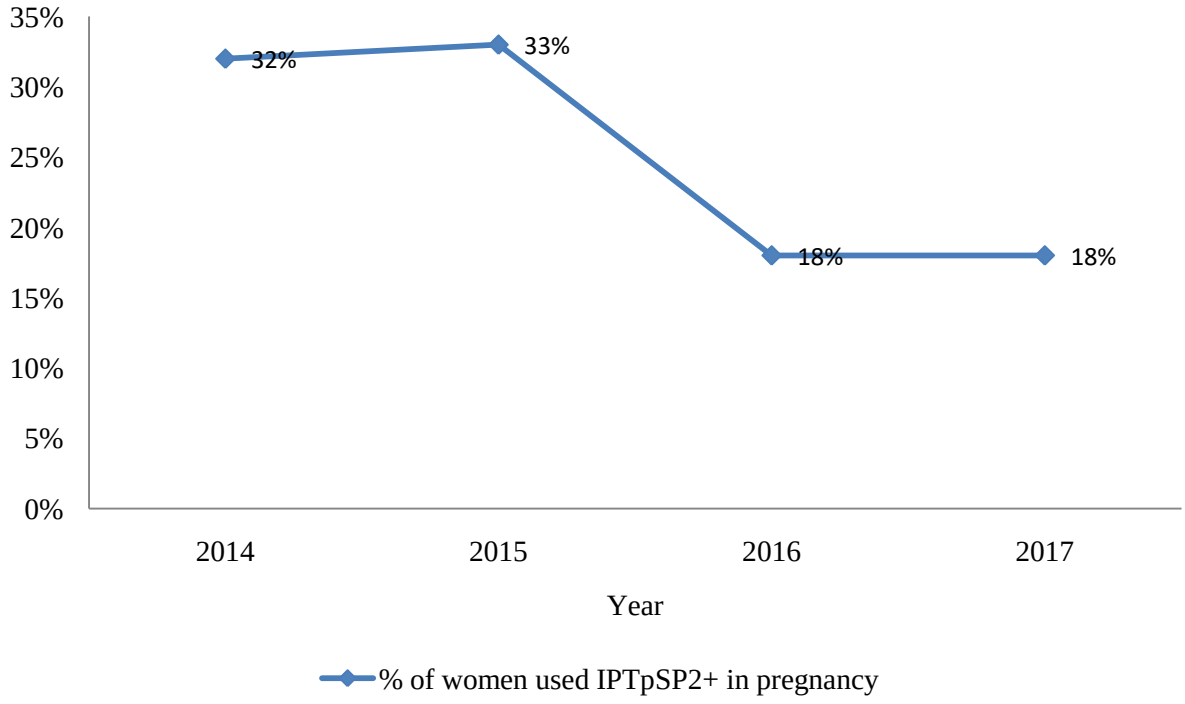


Figure 4: Percentage of pregnant women used IPTpSP2+ of malaria as DOT in public antenatal centres in Kigoma District from the year of 2014 to 2017

Results shown in Figure 4 reveal that the uptake of IPTpSP2+ was slightly higher in 2014 (32%) and 2014 (33%). However, the SP uptake was tremendously dropped to 18% in 2016 and remained unchanged in the followed year of 2017. The percentage average of pregnant women administered at least 2 doses of SP as IPTp from four years was 25%. Such a trend of SP dose uptake among pregnant women attending public health facilities provides an indication that pregnant women and infants are vulnerable to malaria attacks since most of pregnant women do not comply with amount of SP dose recommended as intermittent preventive treatment of malaria provided during antenatal visits as DOT.

More findings revealed by One-way ANOVA show that there is significant variation in women's uptake of IPTpSP2+ among surveyed three public health facilities which are Ujiji Health Centre, Maweni Referral Hospital and Baptist Health Centre (F statistics=13.56, p=0.003) at 5% significance level as shown in Table 5 Such variation demonstrates that rates of SP2+ uptake of pregnant women as intermittent preventive treatment of malaria varied significantly between and within selected public health facilities during the intervention period from 2014 to 2017. Therefore, SP2+ uptake rate for women differs between public health centres and also differs within implementation period of intermittent preventive treatment of malaria.

Table 5: ANOVA showing variation of women's uptake of IPTpSP2+ of malaria in selected public health facilities in Kigoma District

	Sum of Squares	df	Mean Square	F statistics	Sig.
Between Groups	2567.012	2	1283.506	13.56**	0.003
Within Groups	757.237	8	94.655		
Total	3324.249	10			

**Significant at p<0.01

4.2 Analysis of Social and Institutional Predictors of Pregnant Women's Uptake of Intermittent Preventive Treatment of Malaria in Kigoma District

The analysis of social and institutional predictors of pregnant women's uptake of IPTpSP was done descriptively and through logistic regression analysis. However, logistic regression was applied to examine social and institutional predictors of SP dose uptake as intermittent preventive treatment of malaria among pregnant women who administered at least 2 doses of SP as DOT during antenatal visits in selected public health facilities.

a) Descriptive statistics of social predictors

The social predictors for IPTpSP uptake among women examined descriptively include age, education, occupation, marital status, colleagues' motivation, spouse agreement and frequency of live births. Descriptive statistics have presented in form of frequencies and percentages as shown below.

i) Age

The study found that women who participated in the survey were distributed in different age groups. In addition to that majority of respondents (56.2%) had age ranged from 25 to 34 years. Other respondents were belonging within the age groups of 35-44years (26.4%) and 15-24 years (17.4%) as shown in Table 6.

Table 6: Age distribution of respondents

Age group	Frequency	Percent
15-24	64	17.4
25-34	206	56.2
35-44	97	26.4
Total	**367**	**100**

ii) Level of education

The survey found that among the 367 women participated, 93 women (23.3%) had never attended formal education (Table 7). In particular, 39% of participants had primary education, 19.1% had secondary education and 16.4% had tertiary education obtained from colleges. Based on education levels, most of women participated in the survey are literate and therefore, can easily make decision of using recommended intermittent preventive treatment of malaria if get some sort of related training.

Table 7: Distribution of respondents based on levels of education

Education	Frequency	Percent
Non formal education	93	23.3
Primary education	143	39
Secondary education	70	19.1
Tertiary education	61	16.6
Total	**367**	**100**

iii) Occupation

Women participated in the survey were realized to belong in various kinds of occupation. Most of respondents (33.5%) comprised housewives, whose main duties are about domestic activities such as laundry, cooking and caring children at home (Table 8). Other survey participants comprised farmers (27.5%), business dealers (20.7%) and office workers (18.3%) as shown in Table 8.

Table 8: Distribution of respondents according to category of occupation

Type of occupation	Frequency	Percent
Farmer	101	27.5
Office worker	67	18.3
Business	76	20.7
Housewife	123	33.5
Total	**367**	**100**

iv) Marital status, colleagues' motivation and spouse agreement

According to the survey, 52% of women participated in the survey comprised married women. Moreover, 43.6% of participants decided to use IPTpSP dose because of motivation from their colleagues such as friends, neighbours and co-workers (Table 9). Also, 49.3% of women used SP dose as intermittent preventive treatment of malaria during gestation following agreement with their spouses (Table 9).

Table 9: Descriptive statistics of women regarding women's marital status, colleagues' motivation to IPTpSP use and spouse agreement on utilizing IPTpSP

Factor statement	Frequency	Percent of response
Married women	191	52
Women motivated by their colleagues to use SP dose as intermittent preventive treatment of malaria	160	43.6
Women's use of SP as malaria preventive treatment in gestation was agreed by spouse	181	49.3

Based on status of live births history of women, the survey revealed that most of respondents (66.5%) had 1 to 3 live births, followed by women who had 4 to 6 live births (Table 10). a few women who participated in the survey had 6 to 8 live births. However, frequency of live births of women has no relationship with woman's decision of using IPTpSP during gestation (Table 12).

Table 10: Respondent's frequency of live births

Live births	Number women	Percent
1-3	244	66.5
4-6	116	31.6
6-8	**7**	1.9
Total	**367**	**100**

b) Descriptive statistics of institutional predictors

The descriptive statistics which have analysed include women access to training, availability of SP doses at antenatal clinic, period of starting antenatal visit during gestation, SP adverse effect and perception on alternative interventions of intermittent preventive treatment of malaria. The findings are shown in Table 11.

Table 11: Descriptive analysis of institutional predictors related to women's decision on using IPTpSP of malaria

Description of institutional factor	Frequency	Percent of response
Women attended training related to utilization of IPTpSp.	136	37.1
SP medicines are most of time available at antenatal clinic.	242	65.9
Far distance from home to antenatal clinic.	173	47.1
Women started attending antenatal clinic within the first 3 months of gestation.	116	31.6
Perceived adverse effect among women after using IPTpSP.	123	33.5
Women perceived insecticidal treated net as more effective than SP doses when utilized as intermittent preventive treatment of malaria for pregnant women.	277	75.5

The study revealed that only 37.1 women who were involved ever attended a kind of training related to intermittent preventive treatment of malaria using SP dose (Table 11). Such findings justify that women attended a kind of training related to IPTpSP of malaria are most likely to use SP during the firth 3 months of pregnancy since they have more knowledge compared to those who never attend the training. During interview, medical in charge from one of the surveyed public health facilities put forward that different strategically training approaches are

used to make pregnant women aware of and become motivated to comply with IPTpSP2+ which are provided as DOT during antental visit. Some of the main training approaches used by health facilities include; community based strategies which use community health workers(CHWs) to to provide education to pregnancy women within the society about the importance of using IPTpSP2+ and linking with Traditional Birth Attendants who can assist motivating pregnant women attend antenatal clinic.

Moreover, the interview with doctors in charge revealed that public health facilities have been applying facility based approaches to create awareness to pregnant women whereby health education is provided during antenatal clinics including importance of women's uptake of SP doses as intermittent preventive treatment of malaria in pregnancy and disseminate information and communication materials such as posters and leaflets.

Moreover, majority of survey participants (65.9%) responded that SP medication for pregnant women's prevention of malaria is most of the time available in antenatal clinics and provided as DOT.Similar findings were revealed by doctors in charge of Ujiji and Maweni public health facilities who agreed that SP medicines for intermittent preventive treatment of malaria in pregnancy are always available since the government has started tracking this indicator on the SCORE card.

Another findings show that 47.1% of respondents perceived a far distance from home to antenatal clinic but there was no observed relationship with women's uptake of IPTpSP. Base on the duration of starting attending antenatal clinic, the study found that only 31.6% of women visited antenatal clinic within the first 3 months of gestation (Table 11). When pregnant woman starts antenatal visit within the first 3 months of pregnancy, there is possibility for her to uptake at least 2 doses of SP.

In order to understand whether women perceive the adverse effect of SP doses provided during antenatal visit for preventive treatment of malaria during gestation, the survey conducted found that some women (33.5%) said that there is adverse effect from using IPTpSP of malaria such as skin rashes, nausea and sometimes vomiting. Moreover, most of

women participated in the survey prefer mostly alternative intermittent preventive treatment of malaria using insecticidal treated net as they perceive that it is more effective in preventing malaria for pregnant women (Table 11).

c) Logistic regression analysis

The study used binary logistic regression to examine social and institutional factors influencing women's uptake of SP doses as intermittent preventive treatment of malaria during antenatal visit. Social factors examined include age of a woman, marital status, education, colleagues' motivation, spouse agreement and frequency of live births. The institutional factors examined include access to training, availability of SP at antenatal clinic, home-to-health care distance, first 3 antenatal care, adverse effect and alternative malaria control using insecticidal treated nets. The influence of each factor on woman's uptake of IPTpSP2+ was presented in Table 12.

Table 12: Logistic regression analysis of social and institutional predictors of pregnant women's uptake of intermittent preventive treatment of malaria in Kigoma District

Factor	β	S.E.	Wald	Sig.	Exp(β)	95% C.I. for Exp(β)	
						Lower	Upper
(Constant)	-1.543	0.883	3.054	0.081	0.214		
Age	-0.014	0.031	0.211	0.646	0.986	0.929	1.047
Marital status	-0.594	0.305	3.790	0.052	0.552	0.303	1.004
Education	0.803*	0.359	4.998	0.025	2.232	1.104	4.512
Colleagues' motivation	1.693***	0.285	35.193	0.000	5.436	3.107	9.512
Spouse agreement	1.242***	0.307	16.396	0.000	3.462	1.898	6.315
Live births	0.144	0.354	0.166	0.684	1.155	0.577	2.309
User knowledge	1.022***	0.299	11.672	0.001	2.778	1.546	4.991
SP availability	0.035	0.142	0.062	0.803	1.036	0.785	1.367
Distance	-0.155	0.128	1.458	0.227	0.856	0.666	1.101
First 3months ANC visit	0.764*	0.310	6.089	0.014	2.147	1.170	3.938
Adverse effect	-0.421	0.307	1.882	0.170	0.656	0.360	1.198
Alternativecontrol	-0.080	0.176	0.205	0.651	0.923	0.653	1.304

*Significant at $p<0.05$, ***Significant at $p<0.001$

4.3.1 Social predictors of pregnant women's uptake of intermittent preventive treatment of malaria in Kigoma District

From logistic regression analysis in Table 12, among the six social predictors examined, three of them have significant influence on women's uptake of IPTpSP2+ doses. These social predictors include education, colleagues' motivation and spouse agreement as explained below.

According to the findings, education of a woman has positive influence on woman's uptake of at least two doses of SP (i.e. IPTpSP2+) as recommended by Tanzania's health sector ministry and World Health Organization ($\beta3=0.803$. $p=0.025$) with a likelihood of SP dose uptake measured by exp ($\beta3$)=2.232 (Table 12). The study found a lower confidence interval of 1.104 and an upper confidence interval of 4.512 at 95% confidence level for education to influence woman's uptake of IPTp2+. The strength of relationship revealed by Wald statistics was found to be 4.998. The influence of education on woman's uptake of IPTpSP2+ justifies that in comparison to women who never attend school, women who have formal education are likely to complete administering at least 2 SP doses as preventive treatment of malaria during antenatal visit in public health facilities.

Colleagues' motivation was another social factor which demonstrated has positive significant influence on woman decision to use SP2+ doses as intermittent preventive treatment of malaria when they attend antenatal care in health centres ($\beta4=1.693$, $p<0.001$) (Table 12). The likelihood of SP2+ doses uptake for a woman during pregnancy as DOT at antenatal clinic measured by exp ($\beta4$) is 5.436. The strength of relationship between colleagues' motivation and woman's uptake of SP2+ doses measured by Wald statistics is 35.193 while the lower and upper confidence interval was 3.107 and 9.512 respectively at 95% confidence level. Therefore, motivation from the woman from colleagues on importance of using SP doses for malaria preventive treatment increases the chances for pregnant woman to uptake at least 2 doses of SP as DOT during antenatal clinics.

Furthermore, the study revealed that agreement among spouses has significant influence and positive relation with women's uptake of SP2+ during gestation as intermittent preventive treatment of malaria ($\beta5=1.242$, $p<0.001$) with a likelihood of exp ($\beta5$) = 3.462 of leading such influence (Table 12). The strength of relationship between spouse agreement and woman's uptake of IPTpSP2+ measured by Wald statistics was 16.396. The lower confidence interval of the influence was 1.898 and the upper confidence interval was 6.315 at 95% confidence level.

4.3.2 Institutional predictors of pregnant women's uptake of intermittent preventive treatment of malaria in Kigoma District

There were six institutional predictors examined by using logistic regression in order to identify if they have effect on IPTpSP2+ uptake for a woman during gestation. These include user knowledge, availability of SP medication, home-to-health centre distance, first 3 months antenatal care, adverse effect of SP medication and alternative intermittent preventive of malaria. Among the six institutional factors, two of them including user knowledge and first 3 months antenatal care were found to have significant influence on woman's uptake of IPTpSP2+ doses provided as DOT during antenatal care.

The study revealed that acquired knowledge for a woman about usefulness of SP medication during pregnancy provided by health workers and other ways of communication such as radio programs and printable materials have positive significant influence on woman's uptake of IPTpSP2+ in gestation ($\beta7=1.022$, $p<0.001$) (Table 12). The likelihoods for 1 unit increase in user knowledge to influence woman's IPTpSP2+ measured by exp ($\beta7$) was 2.778. The strength of relationship between user knowledge and woman's uptake of IPTpSP2+ measured by Wald statistics was 11.672. The lower confidence interval was 1.546 and upper confidence interval was 4.991 at 95% confidence level. The findings justify that there is higher possibility for woman attended training regarding intermittent preventive treatment to administer at least 2 doses of SP at antenatal care during pregnancy.

In order to complete at least 2 doses of SP as intermittent preventive treatment, pregnant woman is required to start attending antenatal care from the first 3 months of gestation. The analysis revealed that starting antenatal visit within the first 3 months of pregnancy has positive influence on woman's uptake of IPTpSP2+ provided as DOT at health centres ($\beta 10=0.764$, $p=0.014$) (Table 12). one unit increase in woman's antenatal care visit during the first 3 months of pregnancy has likelihoods of leading an uptake of IPTpSP2+ of exp ($\beta 10$)=2.147. The Wald statistics of 6.089 revealed strength of relationship between first 3 antenatal care visit and woman's uptake of IPTpSP2+. The lower confidence interval was 1.17 and upper confidence interval was 3.938 measured at 95% confidence level. The findings demonstrate that there is possibility for a woman to administer at least 2 SP doses as intermittent preventive treatment when she starts attending antenatal care within the first 3 months of gestation.

CHAPTER FIVE

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The study assessed predictors of pregnant women's uptake of intermittent preventive treatment of malaria using SP dose in public health facilities in Kigoma District Tanzania. The specific objectives were evaluating pregnant women's uptake of SP dose as intermittent preventive treatment of malaria; assessing social predictors of pregnant women's uptake of SP dose as intermittent preventive treatment of malaria; and examining institutional predictors of pregnant women's uptake of SP dose as intermittent preventive treatment of malaria.

The study revealed that there is low rate (25%) of pregnant women's uptake of IPTpSP2+ dose of malaria since during the four years of implementation of IPTpSP intervention of 2014, 2015, 2016 and 2017 only 32%, 33%, 18% and 18% respectively of pregnant women who delivered in surveyed health facilities including Ujiji Health Centre, Maweni Referral Hospital and Baptist Health Centre administered at least 2 doses of SP provided as DOT at antenatal clinics which is minimum amount of SP doses recommended by World Health Organisation and government. Other pregnant women are either administered a single SP dose as DOT or never taken a dose of SP in gestation as DOT during antenatal visits.

Logistic regression revealed that both social and institutional predictors have influence on pregnant women's uptake of at least 2 doses of SP administered as DOT at antenatal clinics. Social predictors of pregnant women's uptake of at least 2 doses of SP of malaria as IPTp include motivation from colleagues ($\beta4=1.693$, $p<0.001$), education ($\beta3=0.803$, $p=0.025$) and agreement between spouses ($\beta5=1.242$, $p<0.001$). Institutional predictors of pregnant women's uptake of 2 doses of SP of malaria as IPTp were knowledge from training ($\beta7=1.022$, $p<0.001$) and first 3 months antenatal care ($\beta10=0.764$, $p=0.014$).

5.2 Conclusion

Kigoma District experience a low rate of pregnant women's uptake of intermittent preventive treatment of malaria using SP doses as DOT provided at antenatal clinics which is currently recommended by WHO and National Malaria Control Program.The low intake of SP doses among pregnant women is partly influenced by social and institutional predictors.

Motivation from colleagues, user education and agreement between spouses are significant social predictors of pregnant women's uptake of SP doses provided as DOT at antenatal clinics for preventive treatment of malaria. Institutional predictors of pregnant women's uptake of SP doses as DOT for preventive treatment of malaria include user knowledge from training and first 3 months antenatal care.

5.3 Recommendations

This study provides the following recommendations which can assist planning, policy making and implementation of intermittent preventive treatment of malaria interventions for pregnant women using SP doses as DOT in public health facilities:

i. The public health facilities in collaboration with other health stakeholders such as CSOs, Faith Based Organizations (FBOs) and private investors of health facilities should allocate adequate number of Community Health Workers (CHWs) so as toreach more women and men in the society with education about recommended strategy of intermittent preventive treatment ofmalaria. This can motivate many pregnant women to attend antenatal clinics from the early trimestersand administer SP doses for preventive treatment of malaria.

ii. Public health facilities should collaborate with Traditional Birth Attendants(TBAs)to enhance motivation of women to attend antenatal care centres where they can be provided SP doses as DOT for preventive treatment of malaria. Such collaboration and its positive impact on pregnant women's motivation in using SP doses during antenatal visits may help to save the life of mothers and infants.

iii. Village meetings should be used by health workers to create awareness to the society about importance of using recommended SP doses when a woman attends antenatal care centres for preventive treatment of malaria. Such a strategy may help knowledge to reach many pregnant women, colleagues and spouses who thereafter, can promote the utilization of recommended SP doses among pregnant women to save the life of mothers and infants.

iv. Public Health Facilities through trained health providers are advised to regularly conduct health education during antenatal clinics on different health talks including malaria in pregnancy, its outcomes and recommended intermittent preventive strategies especially the current strategy of using SP doses for pregnant women as DOT.

v. Pregnant women attending antenatal care centres should be provided Information, Education and Communication (IEC) materials carrying messages of importance of SP doses when used as intermittent preventive treatment of malaria in pregnancy. Such information may influence spouses to agree with women's utilization of SP doses provided as DOT in pregnancy during antenatal visits.

5.4 Recommended Area of Further Study

The study could be more vigilant if covered large sample size from larger number of public health facilities than few selected public health facilities used in the current study. Therefore, similar study which will use larger sample size from many other public health facilities and covers assessment of economic predictors in addition to social and institutional predictors is highly recommended for the study to be more vigilant.

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APPENDICES

Appendix 1: Questionnaire for women who delivered live births in 2016

Part 1: Introduction

Dear respondent,

My name is **CHIDZAO, Nyiro Benedict,** a student at Muhimbili University of Health and Allied Sciences pursuing Master of Public Health. I conduct a research titled ***"Predictors for Pregnant Women's Uptake of Intermittent Preventive Treatment of Malaria in Public Health Facilities in Kigoma District Tanzania".*** My research is only for academic purpose that will help me to accomplish my master degree. I request you to fill this questionnaire while assuring you that the information you are going to provide will remain confidential.

Part 2: Questions related to research objectives

1. Name of health centre where you attended antenatal clinic in 2016……

2. Age of respondent …….years

3. Marital status of respondent

a) Married b) Single 3) Widow 4) Divorce/divorcee ( )

4. Type of occupation of respondent

a) Farmer b) Office worker c) Business people

d) Student d) Housewife Other (specify)…….( )

5. Education level of respondent

a) No formal education b) Primary education

c) Secondary education d) Tertiary education ( )

6. Did you use SP dose given at antenatal clinic for malaria prevention and treatment when you were pregnant?

a) Yes b) No ( )

7. If the answer in Qn 6 is (a), how many doses of SP you were provided at antenatal clinicduring pregnancy in interval and you administered under directly observation of a health worker?

a) No SP dose provided b) I ended up with first dose c) I ended up with second dose

d) I ended up with third dose ( )

8. Did you become motivated by your colleagues in using SP dose during pregnancy in order to prevent and treat malaria?

a) Yes b) No ( )

9. Did you reach agreement with your spouse for you to use SP dose during pregnancy for malaria prevention and treatment?

a) Yes b) No ( )

10. How many live births do you have? ……..

11. Did you ever attend a kind of training related to SP usage in pregnant women for malaria prevention and treatment?

a) Yes b) No ( )

12. Sp doses for pregnant women's prevention and treatment of malaria are sufficiently available and provided at antenatal clinics?

a) Strongly disagree b) Disagree c) Neutral d) Agree e) Strongly agree ( )

13. How far from home to antenatal clinic where you mostly used to attend when you were pregnancy?

a) Very far b) Far c) Moderate d) Near e) Very near ( )

14. Number of antenatal visit you attended during the last pregnancy ……

15. When did you start attending antenatal clinic during your last pregnant?

a) Within the first three months of pregnancy b) within the period of three to six months after being pregnant c) After the period of six months of pregnancy ( )

16. Was there adverse effect caused by SP dose given at antenatal clinic you encountered during the last gestation?

a) Noadverse effect b) Moderate adverse effect c) High adverse effect ( )

17. Do you think other alternative malaria control interventions such as insecticidal treated nets are more effective than SP doses used for malaria prevention and treatment in pregnant women?

a) Strongly disagrees b) Disagree c) Neutral d) Agree e) Strongly agree ( )

END OF QUESTIONS

THANK YOU FOR YOUR RESPONSE

Appendix 2: Interview guides for medical doctor in charge forMaweni and Ujiji public health facilities

1) What is the level of compliance to IPTp-SP2+ dose uptake among pregnant women at your health centre?
2) What is the availability of SP medicines for intermittent preventive treatment of malaria in your health center?
3) What are strategies your health centre undertaking to make sure that women are aware of and respond on SP doses provided during pregnancy when they attend antenatal clinic?
4) What are socio-economic factors influencing IPTp-SP dose uptake among pregnant women for preventive treatment of malaria?
5) What are institutional factors influencing IPTp-SP2+ dose uptake among pregnant women for preventive treatment of malaria?
6) How effective the IPTp-SP doses have as intermittent preventive treatment of malaria in pregnant women as comparedto other alternative interventions such as use of insecticidal treated nets?

Appendix 3: Status of pregnant women's SP uptake for preventive treatment of malaria from the year of 2014 to 2017 in MaweniReferral Hospital or Ujiji Health Centre

Status of IPTp-SP use among pregnant women	Response			
	2014	2015	2016	2017
Number of women who delivered live births but didn't use any dose of SP for malaria preventive treatment when pregnant.				
Number of women who delivered live births but used a single SP dose for malaria preventive treatment when pregnant.				
Number of women who delivered live births but used two to three SP doses (IPTp-SP2+) for malaria preventive treatment when pregnant.				