



ASSESSMENT OF CAREGIVERS' PERCEPTION AND ACCEPTANCE OF INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN UNDER-FIVE CHILDREN BASED ON THE HEALTH BELIEF MODEL IN OBIO-AKPOR LOCAL GOVERNMENT AREA, RIVERS STATE

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ABSTRACT

Malaria is an acute febrile illness caused by Plasmodium parasites, which are spread to people through the bites of infected female Anopheles mosquitoes. The aim of the study was to assess caregivers' perception and acceptance of intermittent preventive treatment of malaria in under five children based on the health belief model in Obio-Akpor Local Government Area. The study was carried out among caregivers of under-five children in Obio-Akpor Local Government Area, Rivers State. A descriptive cross-sectional study design was adopted. Multi-stage sampling method was employed. The study population included all caregivers of under-five children in Obio-Akpor Local Government Area, Rivers State. Multi-stage sampling method was used to recruit

participants of a sample size of 359. The structured questionnaire was pre-tested among randomly sampled of under-five caregivers in Port Harcourt LGA, Rivers State. The data was analysed using IBM Statistical Package for Social Sciences (SPSS) version 25. The result of the study indicated that (37.3%) of the participants believe that malaria can be severe in their children. Most of the participants (91.4%) believe that their children are susceptible to malaria, (86.6%) believe that their children are vulnerable to malaria. Majority of the participants (93.3%) were willing to accept IPTi, (7.2%) were willing to adhere to IPTi Also, (34.8%) had high perception of Malaria (severity/susceptibility/vulnerability) while majority of the participants 234(65.2%) had low perception of Malaria (severity/susceptibility/vulnerability). The study thus recommended that health workers should carry out regular health education in hospitals during ante-natal visits, and in communities to create more awareness and knowledge on the IPTi.

Keywords: Malaria, Intermittent Preventive Treatment, Under five Children, Obio-Akpor LGA, Rivers State.

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1.1 Background to the Study

Globally, malaria has remained a public health problem despite concerted efforts towards complete eradication. World Health Organization reported that in 2020, there were an estimated 241 million cases of malaria worldwide. The estimated number of malaria deaths stood at 627 000 in 2020. The WHO African Region carries a disproportionately high share of the global malaria burden. There is high prevalence 95% of malaria cases and 96% of malaria deaths of malaria in Africa (WHO, 2021). Under 5 Children accounted for an estimated 80% of all malaria deaths in the Region. Thirty countries in Sub-Saharan Africa account for 90% of global malaria deaths. Nigeria, Democratic Republic of Congo (DRC), Ethiopia, and Uganda

account for nearly 50% of the global malaria deaths (Nigeria Malaria Fact Sheet United States Embassy in Nigeria, 2011).

Malaria is a mosquito borne disease caused by a parasite. People with malaria often experience fever, chills, and flu-like illness (WHO, 2021). Malaria is an acute febrile illness caused by Plasmodium parasites, which are spread to people through the bites of infected female Anopheles mosquitoes (WHO, 2021). There are 5 parasite species that cause malaria in humans, and 2 of these species. *P. falciparum* and *P. vivax* pose the greatest threat. *P. falciparum* is the deadliest malaria parasite and the most prevalent on the African continent. *P. vivax* is the dominant malaria parasite in most countries outside of sub-Saharan Africa ((WHO, 2021). In 2020, there were an estimated 241 million cases of malaria worldwide (WHO, 2021). The estimated number of malaria deaths stood at 627 000 in 2020. The WHO African Region carries a disproportionately high share of the global malaria burden.

Malaria is the second leading cause of death from infectious diseases in Africa, after HIV/AIDS. Almost 1 out of 5 deaths of children under 5 in Africa is due to malaria (Nigeria Malaria Fact Sheet United States Embassy in Nigeria, 2011). However, malaria incidence rates fell by 21% and mortality rate was estimated to be 29% globally, and 31% mortality rates in African region between 2010 and 2015, (WHO Fact Sheet, 2016). Statistics for these deaths resulting from malaria followed this trend; African Region (92%), the south-east Asia region (6%) and the eastern Mediterranean region (2%). In the year 2016, it was estimated that 216 million cases of malaria occurred in different states in 91 countries, (WHO, 2016).

In Nigeria, malaria is a common disease, a life-threatening disease, which is transmitted through the bite of an infected Anopheles mosquito. Malaria is seen as an endemic disease in Nigeria since over 95% are at risk, (Bassey, 2017). According to Elechi et al., (2015) the prevalence of malaria parasitaemia in under five children in University of Maiduguri Teaching Hospital, Maiduguri was 27.7%, while West, & Okari, (2018) reported that a prevalence of malaria in febrile under five children in Braithwaite Memorial Specialist Hospital in Port Harcourt was 61.7%.

Malaria is also transmitted through blood transfusion, an organ transplant, and use of shared needles or syringes. Malaria is usually found in tropical and subtropical region where the parasites live or survive. Most times, malaria patients present with non-specific symptoms, such as fever, rigors, and chills. Severe malaria develops mainly among children and may manifest as extreme weakness, impaired consciousness, severe anaemia, respiratory distress, convulsions, and hypoglycaemia. etc., (Mishra & Newton, 2009). There have been report of occurrence of long-term neurological sequelae from severe malaria, subtle developmental and

cognitive impairments resulting from both severe and uncomplicated episodes in children. Also, anaemia has been known as one of the complications of malaria infections and it plays a substantial role in its morbidity and mortality in under five children (Morakinyo et al., 2018).

Individuals between the age of birth and puberty are referred to as children or persons at the period of human development from infancy to puberty (Mosby, 2013). Children are known to be plagued with several diseases. From general cause, about 12.6 million under-five infants died worldwide in 1990, which declined to 6.6 million in 2012. In 2012, there was a drop in infant mortality rate from 90 deaths per 1,000 live births in 1990, to 48 per 1000 live births. The highest average infant mortality rates are in sub-Saharan Africa, at 98 deaths per 1,000 live births over double the world's average (UNICEF, 2013).

However, in the past five decades, under-five children have been faced with malaria burden, infection and death, claiming the life of 1 child every 2 minutes (WHO Fact Sheet, 2016; Shittu et al., 2018). In Nigeria, malaria has continuously been a major public health concern with more cases and deaths than any other country in the world, (Shittu et al., 2018). Malaria is often present with a variety of syndromes, but anaemia being the most common haematological manifestation, (Erhabor et al., 2010). Although, anaemia can be caused by poor nutrition, deficiencies of iron and other micronutrients, hookworm disease and schistosomiasis, malaria is considered to be the major cause of severe anemia in at least half of the number of people living in endemic regions, (Jasbir, 2009).

Most of under-five children with fever, vomiting, body temperature exceeding 37.5 oC with the asexual forms of *Plasmodium falciparum* detected on the peripheral blood film and other symptoms suggestive of malaria, was defined to have malaria (Idoh, 2013). Although, malaria can be preventable and treatable, it has continued to plague under-five children in communities in Niger Delta and Nigeria as a whole. The increased morbidity from malaria especially among under-five children may be linked to resource-poor and setting deteriorated environment impacted by crude oil exploration and exploitation, poor waste management, poor health facilities and unhealthy health practices (Iloh et al., 2013).

Many interventions have been used aimed at reducing the morbidity and mortality from malaria. Such interventions like Malaria Chemoprevention which includes intermittent preventive treatment of pregnant women (IPTp), intermittent preventive treatment of infants (IPTi), and seasonal malaria chemoprevention (SMC). All of these aim at inhibiting the malarial sickness by sustaining the level of therapeutic drug in the blood throughout the period of maximum risk (WHO, 2019).

In this study, caregivers' perception of IPTi is reviewed based on the health belief model which is a psychological health behavioral change model developed to explain and predict health related behavior particularly in regard to the uptake of health services. A behavioral intention is needed in other to have the behavioral change required as IPTi is yet to be introduced as a policy in Nigeria.

It accounts for about one million deaths in Africa and 9 out of 10 cases of malaria worldwide occur in Africa, south of the Sahara. As a major cause of ill health in Africa, malaria is responsible for over 10% of the overall African disease burden. Malaria is also the reason for outpatient hospital attendance in 7 out of every 10 patients seen in Nigerian hospitals and occurs in younger children up to 3 to 4 times a year and is responsible for 25% of infant

2.1 Overview of Malaria

Malaria is a life-threatening infectious disease caused by parasites of the genus *Plasmodium* and transmitted through the bites of infected female *Anopheles* mosquitoes. Sottas, et al, (2019) stated that malaria remains a leading cause of ill health, causing an estimated 225 million cases of clinical malaria and 781 000 deaths. More than 85% of malaria cases and 90% of malaria deaths occur in Africa south of Sahara. In Africa, the vast majority of cases and deaths occur in young children. Malaria in infants could be prevented by intermittent preventive treatment (IPT) (Sottas, et al, 2019).

The infected mosquitoes carry the *Plasmodium* parasite. The *Plasmodium* parasite is responsible for the malaria disease when released into the bloodstream of humans. Once the parasites are inside the body, it travels to the liver, where they mature. After several days, the mature parasites enter the bloodstream and begin to infect red blood cells. The parasites inside the red blood cells multiply within 48 to 72 hours, causing the infected cells to burst open. The parasites continue to infect red blood cells, which result in symptoms that occur in cycles and lasting two to three days. However, there are four kinds of malaria parasites that can infect humans; *Plasmodium vivax*, *P. ovale*, *P. malariae*, and *P. falciparum*. *P. falciparum* causes a more severe form of the disease and those who contract this form of malaria have a higher risk of death. An infected mother can pass the disease to her baby at birth, which is referred to as congenital malaria (Morakinyo et al., 2018).

2.1.1 Malaria Chemo-Prevention

Preventive chemotherapies are vital components of the complete package of malaria prevention and control procedures endorsed by WHO. The preventive therapies recommended by WHO are; the intermittent preventive treatment of pregnant women (IPTp), intermittent preventive treatment of infants (IPTi), and seasonal malaria chemoprevention (SMC). The aim of these interventions is to inhibit malarial sickness by sustaining the level of therapeutic drug in the blood throughout the period of maximum malarial risk (WHO, 2019).

Seasonal malaria chemoprevention (SMC) is an extremely effective intervention to prevent malaria in those most vulnerable to the disease's effects. It involves administering monthly doses of anti-malarial drugs to children aged 3-59 months during peak malaria transmission season. Seasonal malaria chemoprevention is referred to as the irregular administration of full treatment courses of an anti-malarial medicine to children in areas of highly seasonal transmission during the malaria season (WHO, 2019). Sulfadoxine-pyrimethamine + amodiaquine are recommended by WHO in areas with highly seasonal malaria transmission in the Sahel sub-region of sub-Saharan Africa, where *P. falciparum* is profound to both anti-malarial medicines (WHO, 2019).

Around sub-region of Sahel most childhood malarial illness and deaths occur during the rainy season, which is generally short (3-4 months). Giving effective anti-malarial treatment at monthly intervals during this period has been shown to be 75% protective against uncomplicated and severe malaria in children under-5 years of age. SMC is cost-effective and safe and can be administered by community-health workers. In areas where SMC is implemented, intermittent preventive treatment in infants (IPTi) should not be deployed. In 2012, WHO issued its endorsed SMC, prior to that, SMC was referred to in the research literature as Intermittent Preventive Treatment in children, or IPTc. In 2013, WHO released an implementation guide to help countries adopt and implement this new intervention (WHO, 2019).

The major interventions presently endorsed by WHO for the control of malaria are the use of insecticidal treated nets (ITNs) or indoor residual spraying (IRS) for vector control, and prompt access to diagnosis and treatment of clinical malaria. Intermittent Preventive Treatment in pregnancy (IPTp) is also endorsed for pregnant women, a high-risk group in areas of high malaria transmission.

WHO is now recommending a new intervention against *Plasmodium falciparum* malaria: Intermittent Preventive Treatment for infants (IPTi) with sulphadoxine-

pyrimethamine (IPTi-SP) is the administration of a full therapeutic course of SP delivered through the Expanded Programme on Immunization (EPI) at specific intervals consistent to routine vaccination schedules usually at 10 weeks, 14 weeks, and ~9 months of age, to infants at risk of malaria.

2.1.2 Caregivers' Perception on Malaria

Perception is referred to as human recognition and interpretation of sensory information. Perception also involves how we respond to the information. Perception is a process by which individuals take in sensory information from our environment and use of that information in order to interact with our surroundings. It allows caregivers to take the sensory information in and make it into something meaningful. Perception is not only the passive receipt of these signals, but it is also shaped by the recipients learning, memory, expectation, and attention. The process that follows connects a person's concepts and expectations (or knowledge), restorative and selective mechanisms (such as attention) that influence perception.

According to a study conducted by Mitiku & Assefa, (2017), caregivers' perception of malaria and treatment-seeking behaviour for under-five children in Mandura District, about, 56.2% of caregivers had low perception about susceptibility to malaria infection and 51.1% had low perception about severity of the disease. Nearly 63.7% of caregivers had low perceived barrier to seek treatment for under-five children. However, 51.3% of caregivers had low perception of the benefits of seeking treatment. More than 60% of respondents had low cue to action and 58.7% had low self-efficacy (Mitiku & Assefa, 2017).

2.2 Theoretical Review

2.2.1 The Health Belief Model (HBM)

A psychological health behavior change model developed to explain and predict health-related behaviors, particularly in regard to the uptake of health services is "health belief model (HBM)" (Siddiqui et al., 2016). According to Glanz & Bishop, (2010) health belief model was developed in the 1950s by social psychologists at the U.S. Public Health Service. It remains one of the best known and most widely used theories in health behavior research (Glanz & Bishop, 2010). The health belief model proposes that people's beliefs about health problems such as malaria in their under-five children and perceived benefits of action are barriers to accepting and adhering to IPTi in health-promoting behavior (Rosenstock, 1974). A stimulus, or cue to action, must also be present in order to trigger the health-promoting behavior (Janz & Marshall, 1984). In 1966, the Health Belief Model (HBM) was used to predict health-promoting behavior and has been used in patients with wide variety of disease. The HBM has also been

used to inform the development of interventions to improve health behaviours. Several reviews have documented the HBM's performance in predicting behavior (Jones & Llewellyn, 2014).

The HBM is a socio-cognitive approach that proposes that people are likely to engage in a given health-related behavior when they believe the problem could have serious consequences for daily living activities, when they believe the intervention will be effective, and when they perceive few barriers to taking action. However, when applied to malaria, this model provides a structure for developing and evaluating programs designed to increase awareness of malaria and appropriate utilization of preventive measures to control malaria in under-five (Henshaw, & Freedman-Doan, 2009).

According to the Champion's HBM Scale (CHBMS), malaria can be used with the six concepts: perceptions about susceptibility to Malaria; severity of the malaria; perceived benefits for the presumed action; perceived barriers for the presumed action; confidence in one's ability; and health motivation (Parsa et al., 2008). The concept of perceived threat is a combination of perceived susceptibility and severity in the HBM which is of great importance for numerous health-related behaviors. According to Champion's HBM, caregiver with perceived seriousness and susceptibility to malaria are more likely to accept to use intermittent preventive treatment of malaria in under-five children. More so, caregiver must perceive benefits to IPTi and perceive few barriers (Parsa et al., 2008).

According to Glanz & Bishop, (2010) HBM consists of the following dimensions:, perceived severity, perceived susceptibility, perceived benefits, perceived barriers, modifying variables, self-efficacy and cues to action; Perceived severity is the subjective assessment of the severity of a health problem and its potential consequences, (Glanz, 2008). The health belief model proposes that individuals who perceive a given health problem such as malaria, as serious are more likely to engage in behaviors to prevent malaria (or reduce its severity). Perceived seriousness involves beliefs about the health condition (malaria) as well as broader impacts of the disease on functioning in work and social roles, (Glanz, 2008). For instance, a caregiver may perceive that malaria is not serious disease, but if he or she perceives that there would be serious financial consequences treating the disease by buying drugs, then he or she may perceive malaria to be a particularly serious disease. The process of medical education may enhance development of defense mechanisms that make it difficult to ask for help.

2.3 Empirical Review

A study carried out by Ingabire et al., (2015) on factors impeding the acceptability and use of malaria preventive measures: implications for malaria elimination in eastern Rwanda,

the result of the study revealed that more than (50%) of the participants perceived malaria as a serious threat to their lives and the quality of their life. As frequently mentioned, malaria affects the whole family including parents and children with repeated malaria episodes among school children reported to lead to low school attendance, thus negatively impacting school performance. In addition, reduced productive days for parents who were sick lead to a high family expenditure and may negatively impact household social economic status. Malaria attack in a parent was associated with major consequences for the family; children became caregivers and missed classes as a result.

Romay-Barja et al., (2015) carried out a study on “Rural-Urban Differences in Household Treatment Seeking Behaviour for Suspected Malaria in Children at Bata District, Equatorial Guinea”. The result of the study showed treatment-seeking behaviours of caretakers for children with reported malaria in rural and urban areas, respectively. Overall, the three steps taken were significantly different between urban and rural respondents (all $p < 0.05$). Treatment at home was the first option most mentioned for both urban and rural caretakers of a child with reported malaria. The rural caretakers were more likely than urban caretakers to opt for home treatment (rural 74.0% vs. urban 68.6%). Also, rural children received treatment only at home (28.1%) more frequently than urban children (14.9%). Caretakers reported that, among the children treated only at home, 97.2% and 88.5% recovered in rural and urban areas, respectively.

Abdulkadir & Ajayi (2015) conducted a study on willingness to accept malaria vaccine among caregivers of under-5 children in Ibadan North Local Government Area, Nigeria. The result of the study revealed that, only 20.1% of the respondents had ever heard of malaria vaccine; 87.0% showed willingness to accept a malaria vaccine. Reasons stated for not willing included ‘husband did not want immunization’ (73.6%), ‘felt it might be expensive’ (47.2%) and ‘felt it might paralyze children’ (24.5%). Nearly half (48.7%) of the respondents said that if vaccine is not given orally like polio vaccine it might not be accepted. Influence of community health workers was found to predict willingness to accept a malaria vaccine (OR: 0.316, 95% CI: 0.142-0.705). IDI participants were favourably disposed to introduction of a vaccine against malaria, although they had concerns about the formulation of the vaccine and possible adverse events.

A study carried out by Chatio et al., (2019) on community acceptability of Seasonal Malaria Chemoprevention of morbidity and mortality in young children: A qualitative study in the Upper West Region of Ghana. The result of the study revealed that study participants perceived that the introduction of the SMC intervention in the area had helped to reduce the

prevalence of malaria among children less than five years of age. Parents held the view that the drug was very good in preventing malaria. The results also showed high acceptability of the SMC intervention by parents and other community members. Parents reported that they were willing to allow their children to receive the drug and wished the intervention could continue in the district for children to continue to benefit. Nonetheless, negative attitude on the part of few parents made them not to allow their children to receive the drug.

Chukwuocha et al., (2018) carried out a study on awareness, perceptions and intent to comply or adhere with the prospective malaria vaccine in parts of South Eastern Nigeria. The result showed that respondents who would be willing to pay for the vaccine are only 40.6%, of which 64% indicated that they will be willing to do so to enable the vaccine to be readily available. On the other hand, among those who may not be willing to pay for the vaccine, the majority (45.1%) were of the view that the cost of the vaccine is not likely to be affordable by households, 25% responded that the vaccine will not be accessible while 20.9% stated that it may have adverse effect on children.

In a study conducted by Yakubu, & Schutte, (2018) on caregiver attributes and socio-demographic determinants of care-giving burden in selected low-income communities in Cape Town, South Africa. The results of the study showed that a large proportion of caregivers (49.5%) were in the age group of 50–59 years. The majority of the respondents were in care tasks as a full time job, providing more than 40 h of care per week. Statistical significant associations were found between the socio-demographic characteristics of female caregivers (such as age, education, and population group and income status) and the physical health status of the care recipients. Further, physical health of care recipients and social grants showed strong, statistically significant positive correlations with caregiver burden.

A study conducted by Mitiku, & Assefa, (2017) on caregivers' perception of malaria and treatment-seeking behaviour for under five children in Mandura District, West Ethiopia. The result of the study revealed that, the determinants of treatment-seeking include place of residence (rural/urban) (AOR 2.80, 95% CI 1.01–7.70), caregivers age (AOR 3.40, 95% CI 1.27–9.10), knowledge of malaria (AOR 4.65, 95% CI 1.38–15.64), perceived susceptibility to malaria (AOR 3.63, 95% CI 1.21–10.88), and perceived barrier to seek treatment (AOR 0.18, 95% CI 0.06–0.52).

According to a study carried out by Mohammed, (2020) on linking insecticide-treated mosquito nets to malaria: The roles of malaria Knowledge and household-income in Ethiopia. The findings suggest that malaria knowledge contributes to improving the relationship between

insecticide-treated mosquito nets and malaria prevalence. The results revealed a positively significant indirect effect ($\beta = 0.47$, $p = 0.003$) as well as a positively significant direct effect ($\beta = 0.28$, $p = 0.001$). Further, the study showed a positive impact of household-income in strengthening the relationship between insecticide-treated mosquito nets and malaria through knowledge, with a considerable value ($\beta = 0.13$, $p = 0.000$).

In a study carried out by (Olugbade et al., 2019) on socio-demographic and regional disparities in utilization of intermittent preventive treatment for malaria in pregnancy - Nigeria demographic health survey. The result of the study revealed that more of the women higher economic class (10.1%) accepted IPTp than the (4.0%) of women in the poorer wealth index. They reported that bivariate analysis showed age > 30years, employment status, having at least secondary school education, marital status, higher level of education of a spouse, skilled employment, urban residence and higher wealth index were associated with higher odds of accepting two or more doses of IPTp-SP.

According to a study carried out by (Tobin-West & Kanu, 2016) on factors influencing the use of malaria prevention methods among women of reproductive age in peri-urban communities of Port Harcourt city, Nigeria. The result of the study showed that malaria knowledge, ITNs ownership and female education were not significantly associated with ITN and IPTp usage. Married women had 3 times higher odds of ITN usage than the unmarried, (odds ratio [OR] = 2.69, 95% confidence interval [95% CI] = 1.56-4.62), and women with children had 2 times higher odds of usage than those without (OR = 2.42, 95% CI = 1.42-4.12).

3.1 METHODOLOGY

A descriptive cross-sectional study design was adopted. This study design was used for this study because data collected provided insight on the research questions under study. Cross-sectional studies are observational in design, the investigator does not intervene in anyway but simply records the health behaviour and lifestyle choice of the study participants (Sedgwick, 2015). The study was carried out among caregivers of under-five children in Obio-Akpor Local Government Area, Rivers State. The study population included all caregivers of under-five children in Obio-Akpor Local Government Area, Rivers State.

Caregivers of children 0-59 months residing permanently or have lived for at least 6 months in Obio-Akpor Local Government Area. The study used primary data collected through questionnaire. The study questionnaires were administered to all those that meet the criteria.

The data was analysed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics such as frequency distributions, percentages and means and median were performed for the socio-demographic characteristics. Frequency distributions and percentages of variables in each objectives will be performed. Continuous variables was expressed as means \pm standard deviation while categorical variables were expressed as absolute frequencies. Also, inferential statistics (such as chi-square and logistic regression) were performed to determine the relationship and association between two variables such socio-demographic characteristics and willingness to accept IPTi. Hence, p-value ≤ 0.05 will be considered statistically significant. Results from analyzed data were presented in tables.

Sample Size Determination

The sample size was determined using sample size determination formula,

$$n = \frac{Z^2 p(1-p)}{e^2} \text{ (Scott, 2013).}$$

Where;

n = desired sample size.

Z = standard normal deviate (1.96), corresponding to 95% confidence.

p = 37.3%, proportion of caregivers who had negative perception (negative intent to comply with the malaria intervention (vaccine) (Chukwuocha et al., 2018).

$$Q = (1-p)$$

e = Margin of error (5%).

$$\text{Sample size (n)} = \frac{1.96^2(37.3(100-37.3))}{5^2}$$

$$n = \frac{3.8416(37.3(62.7))}{25}$$

$$n = \frac{8984.39}{25}$$

$$n = 359.4 = 359 \text{ approximate.}$$

10% non-response:

$$\frac{10 \times 359}{100}$$

$$\frac{3590}{100} = 35.9 = 36$$

$$\text{Total sample size (n)} = 359 + 36 = 395 \quad n = 395.$$

A total of 395 under-five caregivers were recruited into this study.

4.1 Result

4.1.1 Response Rate/ Completeness of Data

A total of 370 questionnaires were administered to caregivers in hospital, 359 properly filled questionnaires were used for this analysis. This gave a response rate of 97%.

Also, there was no missing data because only completely filled questionnaires were selected and used for this analysis, hence giving 100% completeness of data.

4.1.2: Socio-Demographic Characteristics: This is a distribution of sex, age, marital status, place of residence, zone, and occupation of the caregivers.

Table 4.1.2a: Socio-demographic Characteristics of Respondents

Variables	Frequencies (n=359)	Percentage (%)
Sex		
Male	22	6.1
Female	337	93.9
Age		
19-28	107	29.8
29-38	195	54.3
≥39	57	15.9
Mean Age= 31.23±0.07		
Marital status		
Single	47	13.1
Married	251	69.9
Separated/divorced	18	5.0
Widow/widower	18	5.0
Cohabiting	25	7.0
Zones		
North-Central	28	7.8
North-West	10	2.8
North-East	2	0.6
South-South	176	49.0
South-East	106	29.5
South-West	37	10.3
Place of residence		
Port Harcourt Metropolis	359	100.0
Occupation		
Unemployed	93	25.9
Skilled	55	15.3
Unskilled	144	40.1
Civil servants	63	17.5
Professional	4	1.1

Table 4.1.2a shows that majority of the respondents 337(93.9%) were female, most of the respondents 195 (54.3%) were in the age range of 29-38 years, majority of the participants 251(69.9%) were married. The table also indicated that more of the participants 176(49.0%) were of the South-South zone of Nigeria, while all of the participants 359(100%) reside in Obio-Akpor LGA and more of the respondents 144(40.1%) unskilled.

Table 4.1.2b: Socio-demographic Characteristics of Respondents

Variables	Frequencies (N=359)	Percentage (%)
Religion		
Christianity	319	88.9
Islamic	36	10.0
Traditional belief	4	1.1
Highest level of education		
None	8	2.2
Primary	22	6.1
Junior secondary	16	4.5
Senior secondary	185	51.5
Tertiary	128	35.7
Income		
None	99	27.6
≤20,000	98	27.3
20,001 - 40,000	51	14.2
40,001 - 60,000	51	14.2
60,001 - 80,000	38	10.6
≥80,000	22	6.1

Table 4.1.2b showed that most of the participants 319(88.9%) were Christians, majority of the participants 185(51.5%) had senior secondary as highest level of education while more of the participants 99(27.6%) had no income.

4.1.3: Study Findings

Table 4.1.3a: Perception of Malaria Severity

Variables	Frequencies (n=359)	Percentage (%)
Thought of malaria in my child scares me		
Strongly disagree	77	21.4
Disagree	147	40.9
Neutral	45	12.5
Agree	65	18.1

Strongly agree	25	7.0
Malaria in my child, my heart beats fast		
Strongly disagree	179	49.9
Disagree	122	34.0
Neutral	25	7.0
Agree	22	6.1
Strongly agree	11	3.1
Afraid to think about malaria in my child		
Strongly disagree	141	39.3
Disagree	119	33.1
Neutral	24	6.7
Agree	66	18.4
Strongly agree	9	2.5
Experience with malaria in my child would last a long time		
Strongly disagree	9	2.5
Disagree	61	17.0
Neutral	57	15.9
Agree	204	56.8
Strongly agree	28	7.8

Table 4.1.3a indicated that greater number of the participants 147(40.9%) disagreed that having thought of malaria scares them and more of them 179(49.9%) strongly disagreed that when they think about malaria in child makes the heart beat fast. The table also showed that more of the participants 141(39.3%) strongly disagreed to being afraid to think about malaria in child, while majority of the respondents 204(56.8%) agreed that the experience with malaria in child would last a long time.

Table 4.1.3b: Assessment of Level of Perception of Malaria Severity

Variables	Frequencies (n=359)	Percentage (%)
Level of Perception		
High	225	62.7
Low	134	37.3

Table 4.1.3b shows that most of the participants 225(62.7%) had the perception that malaria is not severe in their children while one-quarter of the participants 134(37.3%) believe that malaria can be severe in their children.

Table 4.1.3c: Perception of Susceptibility

Variables	Frequencies (n=359)	Percentage (%)
It is likely that my child will get malaria		
Strongly disagree	5	1.4
Disagree	5	1.4
Neutral	11	3.1
Agree	242	67.4
Strongly agree	96	26.7
My child is more likely to get malaria than the older siblings		
Strongly disagree	13	3.6
Disagree	31	8.6
Neutral	104	29.0
Agree	154	42.9
Strongly agree	57	15.9

Table 4.1.3c shows most of the respondents 242(67.4%) agreed that their child will likely get malaria, majority of the participants and more of the participants 154(42.9%) agreed that their child is more likely to get malaria than the older siblings.

Table 4.1.3d: Assessment of Level of Perception of Susceptibility

Variables	Frequencies (n=359)	Percentage (%)
Level of Perception		
High	31	8.6
Low	328	91.4

Table 4.1.3d shows that most of the participants 328(91.4%) believe that their children are susceptible to malaria while very few participants believe that their under five children are not susceptible to malaria.

Table 4.1.3e: Perception of Vulnerability

Variables	Frequencies (N=359)	Percentage (%)
Chances of getting malaria are great		

Strongly disagree	3	0.8
Disagree	21	5.8
Neutral	72	20.1
Agree	153	42.6
Strongly agree	110	30.6
My child will get malaria in the 2 years		
Strongly disagree	7	1.9
Disagree	9	2.5
Neutral	38	10.6
Agree	174	48.5
Strongly agree	131	36.5
My child will get malaria in the future		
Strongly disagree	2	06
Disagree	8	2.2
Neutral	8	2.2
Agree	232	64.6
Strongly Agree	109	30.4

Table 4.1.3e shows that more of the participants 153(42.6%) agreed to the chances of their child getting malaria are great, more than half of the participants 232(64.6%) responded that they feel that their child will get malaria in the future, while more of the participants and nearly half of the respondents 174(48.5%) reported that there is high possibility of their child getting malaria in the next two years.

Table 4.1.3f: Assessment of Level of Perception of Vulnerability

Variables	Frequencies (n=359)	Percentage (%)
Level of Perception		
High	48	13.4
Low	311	86.6

Table 4.1.3f shows that most of the participants 311(86.6%) believe that their children are vulnerable to malaria while very few participants believe that their under five children are not vulnerable to malaria.

Table 4.1.3h: Overall Assessment of Perception of severity/susceptibility/vulnerability

Variables	Frequencies (n=359)	Percentage (%)
Level of Perception		

Assessment of Caregivers' Perception and Acceptance of Intermittent Preventive Treatment of Malaria in Under-Five Children Based on the Health Belief Model in Obio-Akpor Local Government Area, Rivers State

High	125	34.8
Low	234	65.2

Table 4.1.3h showed that one-quarter of the respondents 125(34.8%) had high perception on severity/susceptibility/vulnerability while majority of the participants 234(65.2%) had low perception on severity/susceptibility/vulnerability

Table 4.1.4a: Willingness to Accept IPTi

Variables	Frequency (n=359)	Percentage (%)
Maintaining my child's health is extremely important		
Strongly disagree	0	0.0
Disagree	0	0.0
Neutral	0	0.0
Agree	200	55.7
Strongly agree	159	44.3
New information to improve my child's health		
Strongly disagree	9	2.5
Disagree	76	21.2
Neutral	3	0.8
Agree	158	44.0
Strongly agree	113	31.5
It is important to carry out activities that will improve my child's health		
Strongly disagree	0	0.0
Disagree	2	0.6
Neutral	0	0.0
Agree	207	57.7
Strongly agree	150	41.8
If my child has malaria, his/her whole life would change		
Strongly disagree	24	6.7
Disagree	85	23.7
Neutral	60	16.7
Agree	109	30.4
Strongly agree	81	22.6
IPTi will be embarrassing to me		
Strongly disagree	23	6.4

Disagree	6	1.7
Neutral	42	11.7
Agree	156	43.5
Strongly agree	132	36.8

Table 4.1.4a showed that most of the respondent 200(55.7%) agreed that maintaining child's health is extremely important, while more of the respondents 158(44.0%) reported to agree to search for new information to improve their child's health. While most participants 207(57.7%) agreed that it is important to carry out activities that will improve their child's health, more of the participants 109(30.4%) agreed that if their child has malaria, his/her whole life would change. Finally, more of the participants 156(43.5%) agreed that IPTi will be embarrassing to them.

Table 4.1.4b: Willingness to Accept IPTi

Variables	Frequency (n=359)	Percentage (%)
When I do IPTi I feel good about myself		
Strongly disagree	4	1.1
Disagree	10	2.8
Neutral	18	5.0
Agree	285	79.4
Strongly agree	42	11.7
If I do IPTi, it will help me treat malaria before my child comes down with malaria		
Strongly disagree	8	2.2
Disagree	202	56.3
Neutral	140	39.0
Agree	8	2.2
Strongly agree	3	0.8
I will bring my child to the clinic for immunization		
Strongly disagree	0	0.0
Disagree	3	0.8
Neutral	0	0.0
Agree	167	46.5
Strongly agree	189	52.6
I will accept IPTi for my child		
Strongly disagree	22	6.1

Assessment of Caregivers' Perception and Acceptance of Intermittent Preventive Treatment of Malaria in Under-Five Children Based on the Health Belief Model in Obio-Akpor Local Government Area, Rivers State

Disagree	169	47.1
Neutral	30	8.4
Agree	129	35.9
Strongly agree	9	2.5
I believe I have the ability to accept and adhere to IPTi		
Strongly disagree	0	0.0
Disagree	254	70.8
Neutral	4	1.1
Agree	93	25.9
Strongly agree	8	2.2

Table 4.1.4b showed that most participants 285(79.4%) agreed to when they partake in IPTi they would feel good about themselves. More of the respondents 202(56.3%) agreed that participating in IPTi will help treat malaria before their child comes down with malaria, more of the participants 189(52.6%) strongly agreed to bring their child to the clinic for immunization. Also 169 (47.1%) disagreed to that they accept IPTi for their child and more of the participants 254(70.8%) disagreed that they have the ability to accept and adhere to IPTi.

Table 4.1.4c: Assessment of Willingness to Accept IPTi

Variables	Frequencies (n=359)	Percentage (%)
Level of Willingness to Accept IPTi		
Willing	335	93.3
Not willing	24	6.7

Table 4.1.3c: showed that majority of the respondents 335 (93.3%) were willing to accept IPTi, while few of the participants 24 (6.7%) were not willing to accept IPTi.

Table 4.1.5a: Willingness to Adhere to IPTi

Variables	Frequency (n=359)	Percentage (%)
I won't worry much about malaria in my child		
Strongly disagree	0	0.0
Disagree	11	3.1
Neutral	8	2.2
Agree	262	73.0
Strongly agree	78	21.7

Will decrease my child's chance of dying from malaria		
Strongly disagree	0	0.0
Disagree	3	0.8
Neutral	10	2.8
Agree	172	47.9
Strongly agree	174	48.5
Will decrease my child's chances of getting admitted because of malaria		
Strongly disagree	0	0.0
Disagree	10	2.8
Neutral	6	1.7
Agree	142	39.6
Strongly agree	201	56.0
I am confident that I can complete the doses of IPTi for my child		
Strongly disagree	5	1.4
Disagree	196	54.6
Neutral	10	2.8
Agree	142	39.6
Strongly agree	6	1.7

Table 4.1.5a indicated that more of the of the respondents 262(73.0%) agreed not to worry much about malaria in their child, more of the respondents 174(48.5%) agreed that to complete IPTi will decrease child's chance of dying from malaria and more of the participants 201(56.0%) strongly agreed that IPTi will decrease child's chances of getting admitted because of malaria. More of the participants 196(54.6%) disagreed being confident to complete the doses of IPTi for their child.

Table 4.1.5b: Assessment of Willingness to Adhere IPTi

Variables	Frequencies (n=359)	Percentage (%)
Level of Willingness to Adhere to IPTi		
Willing	26	7.2
Not Willing	333	92.8

Table 4.1.5b showed that very few of the respondents 26 (7.2%) were willing to adhere to IPTi, while most of the participants 333 (92.8%) were not willing to adhere to IPTi.

Table 4.1.5c: Overall perception severity/susceptibility/vulnerability on the willingness to accept and adhere to IPTi by the respondents

Variables	Frequencies (n=359)	Percentage (%)
Level of Willingness to Accept IPTi		
Willing (Good)	125	34.8
Not Willing (Poor)	234	65.2

Table 4.1.5c shows that one-quarter of the respondents 125(34.8%) had high (good) perception of Malaria (severity/susceptibility/vulnerability) while majority of the participants 234(65.2%) had low (poor) perception of Malaria (severity/susceptibility/vulnerability)

Table 4.1.6: Association between Socio-demographic Characteristics and Overall Perception of Severity/Susceptibility/Vulnerability

Variables	Overall Perception			df	χ^2 (p-value)
	High n (%)	Low n (%)	Total		
Sex					
Male	8(2.2)	14(3.9)	22(6.1)	1	0.025 (0.875)
Female	85(23.7)	220(61.3)	337(93.9)		
Total	125(34.8)	234(65.2)	359(100)		
Age (years)					
19-30	40(11.1)	67 (18.7)	107(29.8)	1	0.442 (0.506)
≥31	230(64.1)	167(46.5)	252(70.2)		
Total	125(34.8)	234(65.2)	359(100)		
Marital status					
Single	47(13.1)	61(17.0)	108(30.1)	1	5.151 (0.023)*
Married	78(21.7)	173(48.2)	251(69.9)		
Total	125(34.8)	234(65.2)	359(100)		
Religion					
Christianity	110(31.5)	209(59.9)	319(91.4)	1	0.016 (0.899)
Others	10(2.9)	20(5.7)	30(8.6)		
Total	125(34.8)	234(65.2)	359(100)		
Highest level of education completed					
Below tertiary	77(21.4)	154(42.9)	231 (64.3)	1	0.630 (0.427)
Tertiary	48(13.4)	80(22.3)	128 (35.7)		
Total	125(34.8)	234(65.2)	359(100)		
Occupation					
Employed	26(7.2)	67(18.7)	93 (25.9)	1	2.604 (0.107)
Unemployed	99(27.6)	167(46.5)	266 (74.1)		
Total	125(34.8)	234(65.2)	359(100)		
Income					

≤N 60,000	101(28.1)	198(55.2)	299 (83.3)	1	0.852 (0.356)
≥ N 60,001	24(6.7)	36(10.0)	60 (16.7)		
Total	125(34.8)	234(65.2)	359(100)		

$P \leq 0.05$ (statistically significant)

Table 4.1.6 showed a significant association between marital status ($p=0.023$) and overall perception of severity, susceptibility and vulnerability. There was no statistical significant associations between sex ($p=0.875$), age ($p=0.506$), highest level of education completed ($p=0.427$), occupation ($p=0.107$) religion ($p=0.899$), income of the respondents ($p=0.356$) and overall perception of severity, susceptibility and vulnerability.

Table 4.1.7: Association between Overall Perception Severity/Susceptibility/Vulnerability and Level of Willingness to Accept and Adhere

Variable	Willingness to Accept				
	Low n (%)	High n (%)	Total	df	χ^2 (p-value)
Overall Perception					
Good	18(5.0)	107(29.8)	125(34.8)	1	18.296 (0.000)*
Poor	6(1.7)	228(63.5)	234(65.2)		
Total	24(6.7)	335(93.3%)	359(100)		
	Willingness to Adhere				
	Low n (%)	High n (%)	Total	df	χ^2 (p-value)
Overall Perception					
Good	106(29.5)	19 (5.3)	125(34.8)	1	18.077 (0.000)*
Poor	227(63.2)	7(1.9)	234(65.2)		
Total	24(6.7)	335(93.3%)	359(100)		

$P \leq 0.05$ (statistically significant)

Table 4.1.7 showed a significant association was observed between overall perception and willingness to accept ($p=0.000$) and willingness to adhere with ($p=0.000$).

Table 4.1.8: Association between Socio-demographic Characteristics and Caregivers' Willingness to Accept IPTi

Variables	Willingness to Accept IPTi			Df	χ^2 (p-value)
	Willing n (%)	Not Willing n (%)	Total		
Sex					
Male	22(6.1)	0(0.0)	22(6.1)	1	Fishers Exact (1.679)
Female	313(87.2)	24(6.7)	337(93.9)		
Total	24(6.7)	335(93.3)	359(100)		
Age (years)					
19-30	105(29.2)	2 (0.6)	107(29.8)	1	5.668 (0.017)*
≥31	230(64.1)	22(6.1)	252(70.2)		
Total	24(6.7)	335(93.3)	359(100)		
Marital status					
Single	206 (29.5)	2(0.6)	108(30.1)	1	5.785 (0.016)*
Married	229(63.8)	22(6.1)	251(69.9)		
Total	24(6.7)	335(93.3)	359(100)		
Religion					
Christianity	295(84.5)	24(6.9)	319(91.4)	1	2.424 (0.120)
Others	30(8.6)	0.(0.0)	30(8.6)		
Total	24(6.7)	335(93.3)	359(100)		
Highest level of education completed					
Below tertiary	207 (57.7)	24(6.7)	231 (64.3)	1	14.251 (0.000)*
Tertiary	0(0.0)	333(92.8)	128 (35.7)		
Total	24(6.7)	335(93.3)	359(100)		
Occupation					
Employed	89(24.2)	6(1.7)	93 (25.9)	1	0.011 (0.917)
Unemployed	248(69.1)	18(5.0)	266 (74.1)		
Total	24(6.7)	335(93.3)	359(100)		
Income					
≤ N 60,000	275 (76.6)	24(6.7)	299 (83.3)	1	5.161 (0.023) *
≥ N 60,001	60(16.7)	0(0.0)	60 (16.7)		
Total	24(6.7)	335(93.3)	359(100)		

$P \leq 0.05$ (statistically significant)

Table 4.1.8 showed that there was no significant association observed between sex ($p=1.679$), occupation ($p=0.917$) religion ($p=0.120$), and caregivers' willingness to accept IPTi.

On the other hand, there was statistical significant associations between age (p=0.017), marital status (p=0.016), highest level of education completed (p=0.0001), income of the respondents (p=0.023) and caregivers' willingness to accept IPTi.

Table 4.1.9: Association between Socio-demographic Characteristics and Willingness to Adhere to IPTi

Variables	Willingness to Adhere to IPTi				
	Willing n (%)	Not Willing n (%)	Total	Df	χ^2 (p-value)
Sex					
Male	0(0.0)	22(6.1)	22(6.1)	1	Fishers Exact (0.176)
Female	26(7.2)	311(86.6)	337(93.9)		
Total	26(7.2)	333(92.8)	359(100)		
Age (years)					
19-30	4 (1.1)	103 (28.7)	107(29.8)	1	2.786 (0.095)
≥31	107(28.1)	230(64.1)	252(70.2)		
Total	26(7.2)	333(92.8)	359(100)		
Marital status					
Single	6 (1.7)	102(28.4)	108(30.1)	1	0.654 (0.419)
Married	20(5.6)	231(64.3)	251(69.9)		
Total	26(7.2)	333(92.8)	359(100)		
Religion					
Christianity	22 (6.3)	297(85.1)	319(91.4)	1	1.648 (0.199)
Others	4(1.1)	26(7.4)	30(8.6)		
Total	26(7.2)	333(92.8)	359(100)		
Highest level of education Completed					
Below tertiary	18 (5.0)	213(59.3)	231 (64.3)	1	0.292 (0.589)
Tertiary	26(7.2)	333(92.8)	128 (35.7)		
Total	26(7.2)	333(92.8)	359(100)		
Occupation					
Employed	5 (1.4)	88(24.5)	93 (25.9)	1	0.651 (0.420)
Unemployed	21(5.8)	245(68.2)	266 (74.1)		
Total	26(7.2)	333(92.8)	359(100)		
Income					
≤N 60,000	18 (5.0)	281(78.3)	299 (83.3)	1	3.979(0.046)*
≥ N 60,001	8(2.2)	52(14.5)	60 (16.7)		
Total	26(7.2)	333(92.8)	359(100)		

P≤0.05 (statistically significant)

Table 4.1.9 showed that there was no significant association observed between sex (p=0.176), age (p=0.095), marital status (p=0.419), religion (p=0.199), highest level of education completed (p=0.589), occupation of respondents (p=0.420), and caregivers'

willingness to adhere to IPTi. On the other hand, there was statistical significant associations between income of the respondents ($p=0.046$), and caregivers' willingness to accept IPTi.

4.2 Discussion of Findings

4.2.1 Caregivers' perception of severity and susceptibility of malaria in under-five children

Findings in this study revealed that greater number of the participants reported that thought of malaria do not scare them, about of the respondents reported that thinking of malaria in child makes do not make their heart beat fast. One-quarter of the participants were not afraid malaria in child, while more than half of the respondents reported that their experience with malaria in child would last a long time. The study found that two-third of the respondents had the perception that malaria is not severe in their children while one-quarter of the participants believed that malaria can be severe in their children. The finding in this study is not exactly similar to the finding by Beer et al., (2012) who found that malaria is perceived as severe but easily curable and uncommon. This study is in keeping with finding by Ingabire et al., (2015) who reported that more than (50%) of the participants perceived malaria as a serious threat or severe to their lives and the quality of their life.

Similarly, Abdullahi et al., (2013) found that malaria was perceived as a serious health problem and a threat to the children by the majority of the respondents. Findings in this study is line with finding by Do et al., (2018) who found a high level of perceived severity or perceived susceptibility (58.6%). They reported that in Madagascar, more than half of women had a high perceived severity of malaria, while almost three-quarters reported having high self-efficacy. Based on the findings in this study, it is implied that majority of the respondents see malaria as not being severe in their children.

This study found that two-third of the participants (67.4%) reported that their child were likely get malaria and less than half of the participants said that their child were more likely to get malaria than the older siblings. Also, this study found that most (91.4%) of the participants think that their children are susceptible to malaria while very few participants believe that their under five children are not susceptible to malaria. This findings is consistent with finding by Nagasa et al., (2015) who reported that there was high perceived susceptibility for malaria and which was independently associated with treatment seeking behavior. On the basis of these findings, it can be deduced that majority of the participants believe that their children are susceptible to malaria.

Findings in this study show about one-quarter of the participants said that there is a great chances of their child getting malaria, more than half of the participants (64.6%) responded that they feel that their child will get malaria in the future, while more half of the respondents reported that there is high possibility of their child getting malaria in the next two years. More than two-third of the participants (86.6%) believe that their under five children are vulnerable to malaria. The implication of these findings in the present study is that most of the participants believe that their children are vulnerable to malaria. Generally, this study found that, more than half of the participants had poor perception on severity, susceptibility and vulnerability of malaria.

4.2.2 Health Behavioural Intent (willingness to accept and adhere)

Findings in this study indicated that more than half of the participants said that maintaining child's health is extremely important, while less than half of the participants searched for new information to improve their child's health. The study found that greater half of the participants to carry out activities that will improve their child's health, one-quarter of the respondents said that if their child has malaria, his/her whole life would change, and that IPTi is embarrassing to them. This present study found that more than two-third of the said when they partake in IPTi, they would feel good about themselves, about half reported that participating in IPTi will help treat malaria before their child comes down with malaria, another half believe that their child. Findings revealed that one-third of the participants rejected to accept IPTi for their child and more two-third of the participants (70.8%) do not accept and adhere to IPTi.

This study also found that more than two-third of the participants (73.0%) do not worry much about malaria in their child, less than half said that to complete IPTi will decrease child's chance of dying from malaria and more than half of the participants believe that IPTi will decrease their child's chances of getting admitted because of malaria, while about half of the respondents do not think they will be confident to complete the doses of IPTi for their child. Finally, most of the participants (93.3%) were willing to accept IPTi. This finding is in line with findings by Watanabe et al., (2014), who found (93%) of the participants was willing to accept ITNs which is also in keeping with Gysels et al., (2009) who reported that IPTi was widely acceptable. This study found that most of the participants were not willing to adhere to IPTi.

The findings in this study is not exactly the same to the findings by Gysels et al., (2009), who reported that few of the mothers (16%) did think that their child would no longer get malaria as a result of having received IPTi. They found that few of the respondents reported

seeking less treatment (less willingness to accept and adhere to treatment) for febrile illness in their infants while they were receiving IPTi compared to prior to IPTi. Abdulkadir and Ajayi, (2015) found that majority of the respondents were willingness to accept a malaria vaccine. Findings by is not consistent with finding by Dembo (2012), who reported that ITNs were not generally accepted by respondents because of the beliefs that (ITNs) is the cause of infertility among married couples. The finding in this was not in line with findings with findings by Pell et al., (2010) and Williams, & Jones, (2004). The dissimilarity of the findings in this study and some other studies may be due to different study setting and some socio-demographic features. However, based on the findings, it can be deduced that most of the participants were willing to accept IPTi, while a great number of the participants were not willing to adhere to IPTi.

4.2.3 Influence of Perception of Malaria on Willingness of Caregivers to Accept IPTi

Findings in this study revealed that overall perception of severity, susceptibility and vulnerability significantly influenced the willingness of the respondents to accept IPTi ($p=0.000$). Similarly, Watanabe et al., (2014) found that perceived risk or severity of the malaria made them to accept the IPTi. This finding is in some aspect similar with the finding by (Pell et al., 2010), who reported that accepted IPTi was influenced by perceived complete prevention from malaria and believe that their children would not get malaria. They found that over three-quarters of participant mothers reported using bed nets as a means of malaria prevention. This finding is not exactly the same with the findings by (Gysels et al., 2009), who found that perceived benefit influenced the level of acceptability of IPTi. Also, (Gysels et al., 2009) reported that the perceived side effects were greatly influenced the level of acceptability.

Present findings does not support findings by Pool et al., (2008), they found that IPTi was accepted because it was perceived as a way of socializing. Findings in this study is not consistent with findings by Chatio et al., (2019), who found that the high acceptability of the SMC intervention by parents was because the respondents perceived that the intervention helped to reduce the prevalence of malaria among children. This present findings is not in keeping with the findings by Ingabire et al., (2015), who found that all the participants agreed on the effectiveness of LLIN when used correctly every night. They reported that LLIN were perceived to prevent malaria and reduce mosquito-biting frequency, provide warmth during rainy seasons, and prevent snakebites. From the findings in this study, it can be implied that perception that malaria is severe, their child being susceptible and vulnerable to malaria greatly influenced the willingness of the participants to accept IPTi.

4.2.4 Influence of Perception of Malaria on Willingness of Caregivers to Adhere to IPTi

Findings in this study revealed that overall perception of severity, susceptibility and vulnerability significantly influenced the willingness of the respondents to adhere to IPTi ($p=0.000$). Similarly, (Chukwuocha et al., 2018), found a significant association between caregivers perception and willingness to adhere with the malaria vaccine such as IPTi ($\chi^2 = 144.52$; $p < 0.0001$). They reported that majority of the respondents (60.2%) were willing to adhere because they believe malaria affect their children and that the vaccine would prevent malaria in their children.

Findings in this study is not in keeping with findings by Pool et al., (2008), who found that non-adherence to IPTi was majorly due to practical, social and structural factors and disliked ways in which tablets were administered. Based on this findings, it can be implied that perception that malaria is severe, their child being susceptible and vulnerable to malaria greatly influenced the willingness of the participants to adhere IPTi.

4.2.5 Association between Socio-Demographic Factors and Caregivers Willingness to Accept IPTi and Adhere to IPTi

This study found that no significant relationship between sex, occupation, religion, and caregivers' willingness to accept IPTi, while age, marital status, highest level of education completed and income significantly influenced the caregivers' willingness to accept IPTi. Findings in this study also indicated that there was significant relationship between sex, age, marital status, religion, highest level of education completed, occupation of respondents and caregivers' willingness to adhere to IPTi, while income significantly affected with caregivers' willingness to adhere to IPTi.

Findings in this study is in some aspect similar with the findings by Dako-Gyeke., & Kofie, (2015), who found that religious beliefs of participants, income earning and employment did not significantly influenced their willingness to accept and adhere to IPTi, while ethnicity and other socio-cultural conditions were significantly associated with willingness to accept and adhere to IPTi. A similar finding was reported by Olugbade et al., (2019), who found that age > 30 years, employment status, secondary school education level, marital status, higher level of education of a spouse, skilled employment, urban residence and higher economic level were influenced the level of willingness to accept IPTp.

This findings support the finding by Nyarko, & Cobblah, (2014) found that region of residence, age of child, and ownership of mosquito net were the main factors affecting malaria vaccine. Similarly, Mohammed, (2020) found that household-income influenced that acceptability and adherence of IPTi. There is consistency in the findings in this study and

findings by Tobin-West & Kanu, (2016), who found that being married had 3 times higher odds of ITN willingness to accept and adhere than the unmarried, (odds ratio [OR] = 2.69, 95% confidence interval [95% CI] = 1.56-4.62), and women with children had 2 times higher odds of willingness to accept and adhere than those without (OR = 2.42, 95% CI = 1.42-4.12). They reported that malaria knowledge, ITNs ownership and female education were not significantly associated with ITN and IPTp acceptance and adherence.

Findings in this study is not totally the same with the findings by Mitiku, & Assefa, (2017), who found that place of residence (rural/urban), caregivers age knowledge of malaria, perceived susceptibility to malaria and perceived barrier to seek treatment were factors affected the acceptability and adherence of malaria vaccine (IPTi). Finding in the present is not exactly the same with findings by Dembo, (2012) and (Pell et al., 2010). Dembo, (2012) found that barriers and challenges to effective implementation of malaria interventions were beliefs and traditions, beliefs about insecticide-treated nets (ITNs), side effects cause of infertility among married couples, beliefs about alternative uses of ITNs, and lack of understanding about selective susceptibility to malaria, while Pell et al., (2010), found that more than 50% of the mothers, reported their husbands prevented them from participating in the IPTi trial. The implication of this finding is that socio-demographic features (such as age, marital status, highest level of education completed and income) significantly influenced the caregivers' willingness to accept IPTi and adhere to IPTi.

5.1 Conclusions

Most of the under-five caregivers in this study perceived that effect of malaria is less severe in their children but their children are susceptible and vulnerable to malaria. Many of them were willing to accept IPTi, while a greater number of the participants were not willing to adhere to IPTi. Finally, some of the socio-demographic characteristics were found to affect their willingness to accept IPTi and adhere to IPTi.

5.2 Recommendations

To improve the willingness to accept IPTi and adhere to IPTi, the following are recommended;

5.3 Hospitals and Public health Workers

The health workers should carry out regular health education in hospitals during ante-natal visits, and in communities to create more awareness and knowledge on the IPTi. This would improve the willingness to accept IPTi and adhere to IPTi among caregivers and other populations.

5.4 Caregivers

Caregivers should avail themselves the opportunity of health education on IPTi, hence accept and adhere to IPTi.

References

- [1] Abdulkadir, I. B., & Ajayi, O.I (2015). Willingness to accept malaria vaccine among caregivers of under-5 children in Ibadan North Local Government Area, Nigeria. *MWJ2*, 6, Pg 2.
- [2] Abdullahi, A.A., Van- Zyl-Schalekamp, C., & Anton Senek. (2013). Perceived Threat of Malaria and the Use of Insecticide Treated Bed Nets in Nigeria. *African Sociological Review* Vol. 17 1 25
- [3] Abolfotouh, M. A., BaniMustafa, A. A., Mahfouz, A. A., Al-Assiri, M. H., Al-Juhani, A. F., & Alaskar, A. S. (2015). Using the health belief model to predict breast self-examination among Saudi women. *BMC public health*, Vol 15: pg. 1163.
- [4] Adeolu, J. O., Yussuf, O. B., & Popoola, O. A. (2016). Prevalence and Correlates of Job Stress among Junior Doctors in the University College Hospital, Ibadan. *Annals of Ibadan postgraduate medicine*, Vol14(2): pg. 92–98.
- [5] All Answers Ltd. (2018). Assessment of the Structural Quality of Primary Health Care Centres in Obio-Akpor. Retrieved from <https://ukdiss.com/proposal/quality-of-primary-health-care-centres.php?vref=1>
- [6] Bassey, S.E., & Izah, S.C. (2017). Some determinant factors of Malaria Prevalence in Nigeria, *Journal of Mosquito Research*, 7(7): 48-58 (doi: 10.5376/jmr.2017.07.0007)

- [7] Beer, N., Ali, A.S., Eskilsson, H., Jansson, A., Abdul-Kadir, F.M., Rotllant-Estelrich, G....Källander, K. (2012). A qualitative study on caretakers' perceived need of bed-nets after reduced malaria transmission in Zanzibar, Tanzania. *BMC Public Health*; 12:606. DOI: 10.1186/1471-2458-12-606.
- [8] Carpenter, C. J. (2010). A meta-analysis of the effectiveness of health belief model variables in predicting behavior". *Health Communication*. 25 (8): 661–669. doi:10.1080/10410236.2010.521906
- [10] Chatio, S., Ansah, N.A., Awuni, A.D., Oduro, A., & Ansah, O.P. (2019). Community acceptability of Seasonal Malaria Chemoprevention of morbidity and mortality in young children: A qualitative study in the Upper West Region of Ghana. *PLoS ONE* 14(5): e0216486. <https://doi.org/10.1371/journal.pone.0216486>
- [11] Champion, V.L. (1993). Instrument refinement for breast cancer screening behaviors. *Nurs Res*; 42(3):139–43. doi: 10.1097/00006199-199305000-00003.
- [12] Chigozie, N., & Ibidabo, A. (2018). Risky Sexual Behaviours among Youths in Selected Communities in Obio-Akpor and Ikwerre Local Government Areas of Rivers State, Nigeria. *Journal of Advances in Medical and Pharmaceutical Sciences*, 19(1), 1-9. <https://doi.org/10.9734/JAMPS/2018/45341>
- [13] "Children and Young Persons Act" (2017). Singapore Statutes Online. Retrieved 20 October 2017.
- [14] Chukwuocha, U.M., Okorie, P.C., Iwuoha, G.N., Ibe, N.S., Dozie, N. I&Nwoke, E.B. (2018). Awareness, perceptions and intent to comply with the prospective malaria vaccine in parts of South Eastern Nigeria. *Malar J* 17, 187 (2018). <https://doi.org/10.1186/s12936-018-2335-0>
- [15] "Convention on the Rights of the Child" (2010). The Policy Press, Office of the United Nations High Commissioner for Human Rights. Archived from the original (PDF) on 31 October 2010.

- [16] Dako-Gyeke, D., & Kofie, M.H (2015). Factors Influencing Prevention and Control of Malaria among Pregnant Women Resident in Urban Slums, Southern Ghana. *African Journal of Reproductive Health*; 19 (1): 44
- [17] Dembo, E. (2012). Community health workers' perceptions of barriers to utilisation of malaria interventions in Lilongwe, Malawi: A qualitative study. *MWJ* 2012, 3:11
- [18] Do, M., Babalola, S., Awantang, G., Toso, M., Lewicky, N., & Tompsett, A. (2018). Associations between malaria-related ideational factors and care-seeking behavior for fever among children under five in Mali, Nigeria, and Madagascar. *PLoS ONE* 13(1): e0191079. <https://doi.org/10.1371/journal.pone.0191079>
- [19] Elechi, H.A., Rabasa, A.I., Muhammad, F.B., Garba, M.A., Abubakar, G.F., & Umoru, M.A., (2015). Prevalence and pattern of malaria parasitaemia among under-five febrile children attending paediatric out-patient clinic at University of Maiduguri Teaching Hospital, Maiduguri. *Niger J Paed*; 42 (4): 319 - 324 DOI:<http://dx.doi.org/10.4314/njp.v42i4.7>
- [20] Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.
- [21] Glanz, K., Barbara K., Rimer, K., Viswanath. (2008). *Health behavior and health education: theory, research, and practice* (PDF) (4th ed.). San Francisco, CA: Jossey-Bas
- [22] Griswold Home Care (2020). All Rights Reserved, Privacy Policy, Terms of Use, Site Map
- [23] Gysels, M., Pell, C., Mathanga, D.P., Adongo, P., Odhiambo, F., Gosling, R.... Pool R. (2009). Community response to intermittent preventive treatment of malaria in infants (IPTi) delivered through the expanded programme of immunization in five African settings. *Malaria Journal*. 2009; 8:191. DOI: 10.1186/1475-2875-8-191.
- [24] Hansen, K. S., Pedrazzoli, D., Mbonye, A., Clarke, S., Cundill, B., Magnussen, P., & Yeung, S. (2013). Willingness-to-pay for a rapid malaria diagnostic test and artemisinin-based combination therapy from private drug shops in Mukono District, Uganda. *Health policy and planning*, 28(2), 185–196. <https://doi.org/10.1093/heapol/czs048>

- [25] Henshaw, Erin., & Freedman-Doan, C. (2009). Conceptualizing Mental Health Care Utilization Using the Health Belief Model; *Clinical Psychology: Science and Practice* VL - 16; DO - 10.1111/j.1468-2850.2009.01181
- [26] Health Communication Capacity Collaborative. (2016). Social and Behavior Change Communication. Retrieved 2016-06-17.
- [27] <https://healthresearchfunding.org/icek-ajzens-theory-of-planned-behavior-explained/>
- [28] Ingabire, C.M., Rulisa, A., Van Kempen, L., Muvunyi, C., Koenraadt, J.M.C., Van Vugt, M., Mutesa, L., & Alaii, J. (2015). Factors impeding the acceptability and use of malaria preventive measures: implications for malaria elimination in eastern Rwanda. *Malar J* 14, 136 (2015). <https://doi.org/10.1186/s12936-015-0659-6>
- [29] Iyigun, E., Tastan, S., Ayhan, H., Kose, G., & Acikel, C. Validity and reliability analysis of the planned behavior theory scale related to the testicular self-examination in a Turkish context. *Postgrad Med*; 128 (5):496-501. doi: 10.1080/00325481.2016.1182872. Epub 2016 May 10. PMID: 27130481.
- [30] Jamison, D.T., Breman, J.G., Measham, A.R., Alleyne, G., Claeson, M., Evans, B.D., ... Musgrove, P., (2006). *Disease Control Priorities in Developing Countries*. 2nd edition: Intervention Cost-Effectiveness Retrieved February 2015.
- [31] Janz, N.K & Marshall, H.B. (1984). "The Health Belief Model: A Decade Later". *Health Education & Behavior*. 11 (1): 1-47. doi:10.1177/109019818401100101. PMID 6392204.
- [32] Jones, C.J, Smith, H & Llewellyn, C. (2014). Evaluating the effectiveness of health belief model interventions in improving adherence: a systematic review; *Health Psychol Rev*.
- [33] Nagasa, D., Birhanu, D., & Amene, A. (2015). Treatment Seeking Behavior and Associated Factors Among Malaria Suspected Patients in Bale Zone, Southeast Ethiopia: Institution-Based Cross-sectional Study *J Fam Med*.; 2(1): 5.

- [34] Meremikwu, M. M., Donegan, S., Sinclair, D., Esu, E., & Oringanje, C. (2012). Intermittent preventive treatment for malaria in children living in areas with seasonal transmission. *Cochrane database of systematic reviews*, (2).
- [35] Mitiku, I., & Assefa, A. (2017). Caregivers' perception of malaria and treatment-seeking behaviour for under five children in Mandura District, West Ethiopia: a cross-sectional study. *Malar J*; 16: 144. doi: 10.1186/s12936-017-1798-8 PMID: PMC5385040
- [36] Mishra, S.K, & Newton, C.R. (2009). Diagnosis and management of the neurological complications of falciparum malaria. *Nat Rev Neurol.*; 5:189–198. doi: 10.1038/nrneurol.2009.23.
- [37] Mohammed, A. M. (2020). Linking insecticide-treated mosquito nets to malaria: The roles of malaria Knowledge and household-income. DOI: <https://doi.org/10.21203/rs.2.19380/v2>
- [38] Mosby, Inc. (2013). *Mosby's Dictionary of Medicine, Nursing & Health Professions*. Elsevier Health Sciences. p. 345. ISBN 0323074030
- [39] Nigeria Malaria Fact Sheet United States Embassy in Nigeria. (2011). Economic Section, United States Embassy in Nigeria Plot 1075, Diplomatic Drive Central Area Abuja, FCT, Nigeria Website: <http://nigeria.usembassy.gov>
- [40] Nigeria: Administrative Division. City Population. Retrieved 28 November 2014.
- [41] Ogbonna, D. N., Amangabara, G. T., & Ekere, T. O. (2007). Urban solid waste generation in Port Harcourt metropolis and its implications for waste management", *Management of Environmental Quality: An International Journal*, 18(1).
- [42] Olugbade, O. T., Ilesanmi, O. S., Gubio, A. B., Ajayi, I., Nguku, P. M., & Ajumobi, O. (2019). Socio-demographic and regional disparities in utilization of intermittent preventive treatment for malaria in pregnancy - Nigeria demographic health survey. *The Pan African medical journal*, Vol 32: pg 13.
- [43] O'Meara, W. P., Breman, J. G., & McKenzie, F. E. (2005). The promise and potential challenges of intermittent preventive treatment for malaria in infants (IPTi). *Malaria journal*, 4(1), 33.

- [44] Parsa, P., Kandiah, M., Mohd, N.M.T., Hejar, A.R., Nor, A. M.Z. (2008). Reliability and validity of Champion's Health Belief Model Scale for breast cancer screening among Malaysian women. *Singapore Med J*; 49 (11): 897
- [45] Pell, C., Straus, L., Phuanukoonnon, S., Lupiwa, S., Mueller, I., Senn, N., & Pool, R. (2010). Community response to intermittent preventive treatment of malaria in infants (IPTi) in Papua New Guinea. *Malaria Journal* volume. *Malar J* **9**, 369. <https://doi.org/10.1186/1475-2875-9-369>
- [46] Pool, R., Mushi, A., Schellenberg, A.J., Mrisho, M., Alonso, P., Montgomery, C., Schellenberg, D. (2008). The acceptability of intermittent preventive treatment of malaria in infants (IPTi) delivered through the expanded programme of immunization in southern Tanzania. *Malaria Journal*, 7:213 doi: 10.1186/1475-2875-7-213
- [47] Rathus, S.A. (2013). *Childhood and Adolescence: Voyages in Development*. Cengage Learning. p. 48. ISBN 978-1285677590.
- [48] Romay-Barja, M., Jarrin, I., Ncogo, P., Nseng, G., Sagrado, M.J., Santana-Morales, M.A., Benito, A. (2015). Rural-Urban Differences in Household Treatment Seeking Behaviour for Suspected Malaria in Children at Bata District, Equatorial Guinea. *PLoS ONE* 10(8): e0135887. doi:10.1371/journal.pone.0135887
- [49] Rosenstock, Irwin (1974). "Historical Origins of the Health Belief Model". *Health Education & Behavior*. 2 (4): 328–335. doi:10.1177/109019817400200403
- [50] Sedgwick, P. (2015). Bias in observational study designs: Cross sectional studies. *BMJ*; 351:h4155 doi: 10.1136/bmj.h4155
- [51] Sathiya, N., Ruwaidha, R., Nusrath, F.S., Fathima, F., Gomathy, T., Shailendra, H.K. (2016) Perceived Stress Levels And its Sources Among Doctors and Nurses Working In A Tertiary Care Teaching Hospital, Kancheepuram, Tamil Nadu. *Ntl J Community Med*; 7(7):603-608.
- [52] Tobin-West, C.I., & Kanu, E.N. (2016). Factors influencing the use of malaria prevention methods among women of reproductive age in peri-urban communities of

- Port harcourt city, Nigeria. Niger Postgrad Med J [23:6-11. Available from: <https://www.npmj.org/text.asp?2016/23/1/6/180114>
- [53] Schattner, L. P., & Coman, J. G. (1998). The Stress of Metropolitan General Practice, *MJA*; 169: 133-137
- [54] Siddiqui, T.R., Ghazal, S., Bibi, Safia. Ahmed, W., Sajjad, S. F. (2016). "Use of the Health Belief Model for the Assessment of Public Knowledge and Household Preventive Practices in Karachi, Pakistan, a Dengue-Endemic City". *PLOS Neglected Tropical Diseases*. 10 (11): e0005129.
- [55] Sottas, O., Guidi, M., Thieffry, B., Schneider, M., Décosterd, L., Mueller, I. ...&Senn, N. (2019). Adherence to intermittent preventive treatment for malaria in Papua New Guinean infants: A pharmacological study alongside the randomized controlled trial. *PloS one*, 14(2).
- [56] Udezi, W.A., Usifoh, C.O.,& Ihimekpen, O.O. (2010). Willingness to pay for three hypothetical malaria vaccines in Nigeria. *Clin Ther.*;32(8):1533-44. doi: 10.1016/j.clinthera.2010.07.018. PMID: 20728765.
- [57] UNICEF (2020). Situation of women and children in Nigeria. Challenges faced by women and children in Nigeria
- [58] US Center for Disease Control and Prevention. (2015). "National Prevention Strategy". Retrieved February 2015.
- [59] Watanabe, N., Kaneko, A., Yamar, S., Leodoro, H., Taleo, G., Tanihata, T., Lum, J. K., & Larson, S. P. (2014). Determinants of the use of insecticide-treated bed nets on islands of pre- and post-malaria elimination: an application of the health belief model in Vanuatu. *Malar J* 13, 441. <https://doi.org/10.1186/1475-2875-13-441>
- [60] West, B.A., & Okari, T.G. (2018). Prevalence of Malaria in Febrile Under Five Children in Port Harcourt, Nigeria. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 17, Issue 12 Ver. 8, PP 46-51 www.iosrjournals.or

- [61] WHO. (2002). "World Health Report 2002 – Reducing Risks, Promoting Healthy Life". Retrieved February 2015.
- [62] World Health Organization (2011). Intermittent preventive treatment for infants using sulfadoxine- pyrimethamine (SP-IPTi) for malaria control in Africa: Implementation field guide.
- [63] World Health Organization (2019). World malaria report 2019
- [64] WHO. Fact Sheet: World Malaria Report. (2016). Geneva: 2016 13th December, 2016. Report.
- [65] World Health Organization. (2019). Primary health care. who.int › Newsroom › Fact sheets.
- [66] World Health Organization (2021). World malaria report 2021
- [67] Yakubu, Y.A., Schutte, D.W. (2018). Caregiver attributes and socio-demographic determinants of caregiving burden in selected low-income communities in Cape Town, South Africa. J of Compassionate Health Care 5: pg 3.

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