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Determinants of Malaria Infection Among Under-Five Children in State Specialist Hospital, Ikere-Ekiti, Ekiti State, Nigeria

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ABSTRACT: *This study investigated the determinants of malaria infection among mothers with under-five children in State Specialist Hospital, Ikere - Ekiti, Ekiti State. The research focused on assessing mothers' knowledge of malaria infection among under-five children, exploring their perceptions of malaria infection in this age group, and examining the determinants contributing to malaria infection in this specific population. A descriptive survey research design was employed, and data were collected from 217 mothers attending the Child Welfare Clinic through convenience sampling. A questionnaire named "Determinants of Malaria Infection Questionnaire" (DMIQ) was used for data collection, which underwent validation and reliability testing. Descriptive statistics were employed for data analysis, including frequency counts, percentages, mean, and standard deviation. The findings revealed varying levels of knowledge and perceptions among mothers regarding malaria in under-five children, highlighting areas for potential improvement in malaria education and awareness campaigns. It was recommended among others that nurses should implement targeted educational programs and awareness campaigns aimed at mothers to improve their knowledge about malaria infection among under-five children. These campaigns should cover topics such as malaria causes, transmission, symptoms, and preventive measures. Special emphasis should be placed on correcting misconceptions, such as the belief that antibiotics can cure malaria.*

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KEYWORDS: Determinant**,** Malaria Infection, Mothers, Under-five children

INTRODUCTION

Malaria ranks among the five leading causes of mortality globally, occupying the second position in Africa, behind HIV/AIDS (World Health Organisation WHO, 2018). The magnitude of the worldwide health impact caused by malaria is substantial. According to the World Malaria Report (WMR) of 2018, there is an estimated annual occurrence of 300-500 million instances of acute sickness caused by malaria globally. Additionally, the report states that malaria-related fatalities range from 1.1-2.7 million per year, with a significant proportion of these deaths occurring among children under the age of five. Approximately 50% of the global population faces the threat of malaria, with a significant concentration residing in regions of sub-Saharan Africa that are endemic to the disease, accounting for approximately 90% of all reported cases.

Malaria is a significant global health threat, with around 50% of the world's population being susceptible to the disease. It is particularly prevalent in Africa, where an estimated 80% of malaria infections and 90% of related fatalities occur among children and pregnant women (Kuniya et al., 2016; Markundi et al., 2017). The combined malaria fatality rates of the Democratic Republic of the Congo and Nigeria exceed 40% of the projected global total. Malaria is an infectious disease that is transmitted by the bites of female Anopheles mosquitoes, which are infected with the genus Plasmodium. According to WHO (2018), this phenomenon is responsible for about one million fatalities annually. The majority of these fatalities, amounting to 90%, transpire inside the Sub-Saharan African region, with around 70% of these cases involving youngsters who are under the age of 5. According to the World Malaria Report of 2014, the frequency at which a youngster succumbs to malaria is around once every 30 seconds.

Malaria is a parasite disease produced by the Plasmodium protozoa, mostly found in tropical regions. It poses a significant risk to human life and is transmitted by the bite of an infective female Anopheles mosquito vector (Zekar & Sharman, 2022). Patients afflicted with malaria often exhibit elevated body temperature and a diverse array of clinical manifestations. There are five distinct species of Plasmodium that have been identified as the causative agents of malaria in humans. These species are *Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, Plasmodium malariae,* and *Plasmodium knowlesi* (Bakken & Iversen, 2021). The prompt detection of the causative organism is of utmost significance due to the potentially life-threatening nature of Plasmodium falciparum infection, which frequently exhibits resistance to conventional chloroquine therapy. According to Bello and Ayede (2019), the majority of new infections can be attributed to *Plasmodium falciparum and Plasmodium vivax*. The differentiation of Plasmodium species is often achieved by the examination of their morphological characteristics on a blood smear. Plasmodium falciparum may be differentiated from other plasmodia based on its elevated *parasitemia* and the characteristic banana-shaped morphology of its gametocytes (Bello & Ayede,

2019). Within the population of individuals afflicted with malaria, it has been shown that a notable proportion, ranging from 5% to 7%, is concurrently infected with many species of the Plasmodium parasite. Bauserman et al., (2019) have also documented the occurrence of co-infection with distinct Plasmodium species in the mosquito vectors of these parasites.

According to the World Health Organisation (WHO, 2021), a significant portion, around 75%, of Nigeria's landmass is susceptible to malaria infection. Furthermore, it is noteworthy that more than 48% of the country's population resides in the southern region of Nigeria. The majority of malaria infections in Africa, namely in the Southern Sahara region, are attributed to Plasmodium falciparum, which is recognised as the most severe and potentially fatal variant of the illness (Adera, 2015). The prevalence of inadequate malaria preventative behaviours among children under the age of five has been observed to be typically low throughout all six geo-political zones in Nigeria. The results of the national malaria situation survey revealed that there is a low prevalence of bed-net usage among the population, as shown by the fact that only 10% of the respondents reported using bed nets (David, et al., 2016). According to the Nigeria Demographics and Health survey conducted in 2018, it was found that a significant portion of the respondents employed various preventative methods. These measures included the use of window/door nets, which accounted for 32.6% of the respondents. Additionally, 33.8% of the respondents reported using insecticide aerosols, while 22.7% utilised repellents. Furthermore, 23.0% of the respondents reported using herbs as a preventive strategy against the targeted issue.

Malaria has the potential to cause serious and life-threatening consequences in children under the age of five, since their immune systems are still in the process of development and so more susceptible (David et al., 2016). The aforementioned difficulties encompass the presence of severe anaemia, a condition that results in the debilitation of the kid and possesses the potential to pose a threat to their lives if not swiftly addressed. Cerebral malaria is a pathological condition characterised by its impact on the brain, resulting in manifestations such as seizures, altered states of consciousness, and coma (Oladipo & Akinkunle, 2023). Prompt medical intervention is imperative in managing this condition. Respiratory distress may manifest as compromised respiration, possibly culminating in the development of acute respiratory distress syndrome (ARDS). Multi-organ failure poses an additional risk, impacting crucial organs such as the liver and kidneys. Hemoglobinuria, characterised by the excretion of haemoglobin in urine as a result of the breakdown of red blood cells, is a worrisome indication (Peters & Naidoo, 2022). In addition to its primary effects, malaria has the potential to induce hypoglycemia, resulting in convulsions and a state of unconsciousness. The condition of having an enlarged spleen and liver might potentially lead to the rupture of these organs, resulting in the occurrence of significant internal haemorrhaging. Dehydration frequently occurs as a result of fever, emesis, and diarrhoea. A compromised immune system might result in the development of secondary diseases such as pneumonia. The occurrence of several bouts of malaria can impede the physical and cognitive development of a child, leading to enduring impairments (Bakken & Iversen 2021). The

implementation of timely preventive measures, such as the use of bed nets and administration of antimalarial medications, in addition to early detection and treatment, has a crucial role in mitigating the likelihood of severe complications in children under the age of five, particularly in areas where malaria is prevalent (Bakken & Iversen, 2021).

Children under the age of five are more susceptible to experiencing severe consequences as a result of malaria infection due to their limited development of naturally acquired immunity. Consequently, it is possible for a youngster to succumb to the illness within a matter of hours (Sunday and Iwaola, 2017; World Malaria Report, 2018). The incidence of malaria in Nigeria is significantly elevated, rendering it the primary contributor to mortality among children under the age of five. Malaria is responsible for over 7% of mortality among children under the age of five in the year 2020, making it a significant global public health concern. This issue not only results in substantial suffering and trauma but also contributes to a considerable number of school absences, impeding the advancement of educational systems and undermining governmental initiatives aimed at enhancing literacy rates (World Health Organisation, 2021).

There are several determinants that contribute to the heightened frequency of malaria infection among children under the age of five. The factors encompassed in this study consist of environmental determinants, dietary determinants, socio-demographic determinants, genetic determinants, acquired immunity, and behavioural determinants (Abah & Temple, 2018). Environmental factors have a crucial influence in shaping outcomes. The interplay between climate and geography can give rise to circumstances that are conducive to the proliferation of malaria-transmitting mosquitoes, hence increasing the vulnerability of youngsters residing in areas characterised by high temperatures and ample precipitation. Moreover, the scarcity of clean water might lead to the practise of storing water in containers, which can serve as breeding grounds for mosquitoes that transmit the malaria parasite (Eisele, 2021; Bello & Ayede, 2019).

Dietary determinants provide an additional crucial factor. Children who suffer from malnutrition frequently experience compromised immune systems, rendering them more vulnerable to malaria and its related problems. Sufficient nutrition has a crucial role in the development of immune defences against diseases (Bhalla, et al., 2019). The malaria load in this age range is also influenced by socio-demographic variables. Families residing in impoverished conditions may have a dearth of resources necessary for implementing preventive measures such as bed nets or pesticide spraying, hence augmenting their susceptibility. Insufficient knowledge on malaria prevention and treatment might contribute to insufficient adoption of preventative measures and delayed healthcare seeking, so compounding the adverse effects of the disease on young children (Mafwele & Lee, 2022).

Genetic factors can contribute to the phenomenon. Certain genetic features might increase or decrease an individual's susceptibility to malaria. The aforementioned characteristics are

hereditary in nature, originating from parental genetic material, and possess the potential to impact a child's capacity to exhibit resistance to the disease. Acquired immunity constitutes an additional aspect that warrants consideration (Mlugu, et al., 2020). Children who have experienced prior occurrences of malaria may acquire a certain degree of immunity, but not necessarily comprehensive. Subsequent infections may still manifest, but with perhaps reduced severity. The role of behavioural factors is of utmost importance in the prevention of malaria. The impact of sleeping habits on a child's risk, for instance, may be observed (Peters & Naidoo, 2022). Malaria vectors according to Bauserman et al., (2019), which are responsible for transmitting the disease, exhibit heightened activity during nocturnal hours. Consequently, children who fail to utilise insecticide-treated bed nets or reside in inadequately safeguarded environments have an elevated susceptibility to mosquito bites. Engaging in outdoor activities during periods of heightened mosquito activity might further augment the probability of encountering mosquito bites (Shah, et al., 2020).

Comprehending these factors is crucial for the formulation of efficacious treatments aimed at preventing and managing malaria in children below the age of five (Markundi et al., 2017). Potential options for addressing the issue at hand including enhancing healthcare and educational opportunities, delivering bed nets, advocating for adequate nutrition, and implementing malaria knowledge initiatives within vulnerable populations. By thoroughly considering and examining these diverse elements, we may strive towards mitigating the impact of malaria in this susceptible age cohort and enhancing their overall health and welfare (Oladimeji, et al., 2019).

According to the World Malaria Report of 2018, the effective management of these variables might lead to a significant reduction, if not complete elimination, of the widespread disease known as malaria. Malaria infection today represents the primary cause of illness and death among children in Nigeria. This is the reason why the condition has constantly been classified as one of the top five leading causes of death in children. In view of the above, the study examined the determinants of malaria infection among Mothers with under-five children in State Specialist Hospital, Ikere - Ekiti, Ekiti State. The study specifically:

1. explored determinants of malaria infection among mothers with under-five children in State Specialist Hospital, Ikere - Ekiti, Ekiti State;
2. examined the level of mothers' knowledge of malaria infection among under-five children; and
3. determined the perception of mothers on malaria infection among under five children.

Research Questions

1. What are the determinants of malaria infection among mothers with under-five children?
2. What is the level of mothers' knowledge of malaria infection among under-five children?
3. What is the perception of mothers on malaria infection among under-five children?

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METHODOLOGY

The descriptive survey research was adopted in this study. All Mothers with under-5 year old infants, attending Child Welfare Clinic in State Hospital Ikere - Ekiti, who met the inclusion criteria were allowed to take part in the study. The sample size for the study was 217 which were selected through convenience sampling technique.

One research instrument tagged "Determinants of Malaria Infection Questionnaire" (DMIQ) was used to collect data for the study. DMIQ is of four sections namely Section A, B, C, and D. The instrument was validated by experts of Nursing Science and experts in Tests and Measurement, for both the face and content validity. The reliability of the instrument was carried out using the test re-test method. The instrument was administered on 30 women in a specialist hospital that was not included in the sampled location. The instrument was administered twice within a period of two weeks. The scores from both administrations were analysed using Pearson's Product Moment Correlation statistics which yielded reliability coefficient value of 0.89. This was considered high enough for reliability.

The data collected through the instruments were analysed using descriptive statistics. The research questions were answered using descriptive statistics. The descriptive statistics used included frequency counts, percentages, mean, and standard deviation.

RESULTS

Research Question 1: What are the determinants of malaria infection among mothers with under-five children?

Table 1: Descriptive analysis of determinants of malaria infection among mothers with under-five children

SN	Items	SA (%)	A (%)	D (%)	SD (%)	Mean	SD
	Environmental Determinants						
1.	Environmental factors like stagnant water increase the risk of malaria transmission	54 (24.9)	153 (70.5)	1 (0.5)	9 (4.1)	3.16	0.63
2.	Adequate housing with mosquito screens can protect against malaria	10 (4.6)	105 (48.4)	90 (41.5)	12 (5.5)	2.52	0.67
3.	Access to clean water sources reduces the likelihood of malaria.	13 (6.0)	107 (49.3)	79 (36.4)	18 (8.3)	2.53	0.73
4.	Mosquitoes are more active during certain seasons, making	50 (23.0)	149 (68.7)	0 (0)	18 (8.3)	3.06	0.75

	malaria more prevalent during those times						
	Dietary Determinants						
5	Proper nutrition for mothers can help prevent malaria in under-five children	10 (4.6)	113 (52.1)	82 (37.3)	12 (5.5)	2.56	0.67
6.	A balanced diet rich in vitamins and minerals can strengthen a child's immunity against malaria	60 (27.6)	133 (61.3)	0 (0)	24 (11.1)	3.06	0.85
	Socio-demographic Determinants						
7.	Socioeconomic status plays a significant role in the vulnerability of under-five children to malaria	50 (23.0)	132 (60.8)	0 (0)	35 (16.1)	2.90	0.93
8.	Education level affects a mother's knowledge of malaria prevention	10 (4.6)	119 (54.8)	88 (40.6)	0 (0)	2.64	0.57
9.	Access to healthcare facilities influences a mother's ability to protect her child from malaria.	8 (3.7)	81 (37.3)	113 (52.1)	15 (6.9)	2.38	0.67
	Genetic Determinant						
10.	Genetic factors within families can affect the susceptibility of under-five children to malaria	10 (4.6)	118 (54.4)	85 (39.2)	4 (1.8)	2.62	0.61
	Acquired Immunity						
11.	A previous malaria infection in a child can provide partial immunity against future infections	49 (22.6)	156 (71.9)	3 (1.4)	9 (4.1)	3.13	0.63
	Behavioural Determinants						
12.	Using insecticide-treated bed nets regularly can effectively prevent malaria.	10 (4.6)	104 (47.9)	91 (41.9)	12 (5.5)	2.52	0.67
13.	Timely seeking medical care for a child with malaria symptoms is crucial for recovery.	15 (6.9)	109 (50.2)	76 (35.0)	17 (7.8)	2.56	0.74
14.	I am confident in my ability to recognize the early signs of malaria in my child.	45 (20.7)	155 (71.4)	0 (0)	17 (7.8)	3.05	0.72
15.	Behavior like allowing children to play outdoors during peak mosquito activity increases the risk of malaria	10 (4.6)	115 (53.0)	80 (36.9)	12 (5.5)	2.57	0.67
16.	Cultural beliefs can influence a mother's approach to preventing malaria in her child.	55 (25.3)	138 (63.6)	0 (0)	24 (11.1)	3.03	0.84

17.	Adequate sanitation practices at home can help reduce the risk of malaria	45 (20.7)	136 (62.7)	0 (0)	36 (16.6)	2.88	0.93
18.	I believe that regular use of mosquito repellent is an effective way to protect my child from malaria	10 (4.6)	121 (55.8)	86 (39.6)	0 (0)	2.65	0.57
19.	I am aware of the importance of keeping my child's sleeping area clean and mosquito-free.	9 (4.1)	80 (36.9)	112 (51.6)	16 (7.4)	2.38	0.68
20.	Education programs in our community have been effective in raising awareness about malaria prevention.	10 (4.6)	116 (53.5)	86 (39.6)	5 (2.3)	2.60	0.62

Mean Cut-Off: 2.50

Table 1 provides a descriptive analysis of various determinants related to malaria infection among mothers with under-five children, with a mean cut-off set at 2.50.

On environmental determinants, respondents generally agreed that environmental factors like stagnant water increase the risk of malaria transmission, with a mean score of 3.16, indicating a relatively strong perception in this regard. However, perceptions regarding the protective role of adequate housing with mosquito screens (mean = 2.52) and access to clean water sources (mean = 2.53) fell around the mean cut-off, suggesting that these aspects may be viewed as less significant contributors to malaria risk. Additionally, the belief that mosquitoes are more active during certain seasons, potentially leading to increased malaria prevalence during those times, received a mean score of 3.06, indicating a relatively strong perception regarding seasonal variations in malaria transmission.

On dietary determinants, participants expressed a moderate belief (mean = 2.56) in the role of proper nutrition for mothers in preventing malaria in under-five children. On the other hand, the perception that a balanced diet rich in vitamins and minerals can strengthen a child's immunity against malaria received a relatively higher mean score of 3.06, suggesting a stronger belief in the importance of children's dietary habits.

Respondents acknowledged the role of socio-economic status in malaria vulnerability, with a mean score of 2.90. This indicates that many consider economic factors as influential in malaria risk. Education level's effect on a mother's knowledge of malaria prevention received a mean score of 2.64, highlighting its perceived importance. Access to healthcare facilities, with a mean score of 2.38, indicated a perception that healthcare access plays a less significant role in malaria risk. The perception that genetic factors within families can affect the susceptibility of under-five children to malaria received a mean score of 2.62, suggesting that genetic influences are moderately

recognized. Respondents generally agreed that a previous malaria infection in a child can provide partial immunity against future infections, as indicated by the mean score of 3.13.

On behavioral determinants, the importance of using insecticide-treated bed nets regularly received a mean score of 2.52, suggesting moderate recognition of this preventive behavior. The perception regarding timely seeking of medical care for a child with malaria symptoms received a mean score of 2.56, indicating a moderate belief in its significance. Maternal confidence in recognizing early signs of malaria in their child received a relatively high mean score of 3.05, highlighting the perceived importance of maternal awareness. Other behavioral factors, such as cultural beliefs, sanitation practices, and the use of mosquito repellent, received varying mean scores, indicating mixed perceptions.

In summary, Table 1 reflects the diversity of perceptions among mothers regarding the determinants of malaria infection in under-five children. While some determinants, such as environmental factors and acquired immunity, are generally well-recognized, others, like dietary factors and access to healthcare facilities, exhibit varying levels of awareness and importance. These perceptions can guide public health interventions aimed at improving knowledge and practices related to malaria prevention among this target group

Research Question 2: What is the level of mothers' knowledge of malaria infection among under-five children?

Table 2: Descriptive analysis of mothers' knowledge of malaria infection among under-five children

SN	Items	Correct (%)	Wrong (%)	Mean	SD
1.	Malaria is caused by bacteria	171 (78.8)	46 (21.2)	0.79	0.41
2.	Malaria is primarily transmitted through the bite of infected mosquitoes	164 (75.6)	53 (24.4)	0.76	0.43
3.	All under-five children with malaria show symptoms like high fever and chills	180 (82.9)	37 (17.1)	0.82	0.38
4.	Malaria can lead to severe anemia in young children	193 (88.9)	24 (11.1)	0.89	0.31
5	Bed nets treated with insecticide are an effective way to prevent malaria	156 (71.9)	61 (28.1)	0.72	0.45
6.	Children who have had malaria before are immune to future infections	197 (90.8)	20 (9.2)	0.91	0.29
7.	Malaria can cause brain-related complications in children	209 (96.3)	8 (3.7)	0.96	0.19
8.	Taking antibiotics can cure malaria	187 (86.2)	30 (13.8)	0.86	0.35
9.	Malaria is more common in areas with stagnant water.	182 (83.9)	35 (16.1)	0.84	0.37
10.	It is safe to give aspirin to a child with malaria to reduce fever	197 (90.8)	20 (9.2)	0.91	0.29

Mean Cut-Off: 0.50

The data presented in Table 2 provides a detailed analysis of mothers' responses to various questions related to malaria. These questions cover a range of important aspects, from the causes of malaria to its prevention and treatment. The findings from this analysis shed light on the extent to which mothers are informed about malaria and its impact on young children.

Starting with the first question, which inquired whether mothers believed malaria was caused by bacteria, nearly 79% of respondents answered correctly. This indicates a substantial understanding of the cause of malaria among this group. Similarly, when asked about the primary mode of transmission, approximately 76% correctly identified that malaria is primarily transmitted through mosquito bites. Moving on to the symptoms of malaria in under-five children, around 83% of mothers recognized that high fever and chills are common signs of the disease. This suggests that there is a relatively strong awareness of malaria's clinical presentation among the surveyed mothers. Furthermore, an overwhelming majority, almost 89%, correctly acknowledged that malaria can lead to severe anemia in young children, highlighting an understanding of its potential severity.

However, when it comes to preventive measures, the data show some variability. While a significant proportion, about 72%, correctly identified insecticide-treated bed nets as an effective means of preventing malaria, this percentage is lower than in some other areas of knowledge. This implies that there may be room for improvement in educating mothers about the importance of bed nets in malaria prevention. On a positive note, respondents demonstrated a high level of awareness regarding the immunity gained from past malaria infections. Approximately 91% correctly understood that children who have had malaria before are not immune to future infections, emphasizing a key point in malaria education.

Moreover, mothers showed an impressive awareness of the potential complications of malaria in children. A vast majority, almost 96%, recognized that malaria can lead to brain-related complications in children, highlighting the seriousness of the disease. However, there were some misconceptions that need addressing. For instance, about 86% believed that antibiotics could cure malaria, which is not the case. This suggests that there may be a need for targeted education to correct this misconception.

Lastly, the data revealed that roughly 84% of respondents correctly associated malaria with areas with stagnant water, emphasizing the importance of environmental factors in malaria transmission. Additionally, a high percentage, 91%, knew that it is not safe to give aspirin to a child with malaria to reduce fever.

In conclusion, this descriptive analysis of mothers' knowledge of malaria infection among under-five children provides valuable insights into their understanding of various aspects of the disease.

Overall, the data indicate a good level of knowledge among mothers, with some areas for improvement, particularly in clarifying misconceptions about malaria treatment and reinforcing the importance of bed nets in prevention. These findings can guide targeted educational efforts to enhance mothers' knowledge and, in turn, contribute to better malaria management for under-five children.

Research Question 3: What is the perception of mothers on malaria infection among under-five children?

Table 3: Descriptive analysis of perception of mothers on malaria infection among under-five children

SN	Items	SA (%)	A (%)	D (%)	SD (%)	Mean	SD
1.	Malaria is a common health concern for under-five children in our community	122 (56.2)	37 (17.1)	48 (22.1)	10 (4.6)	3.25	0.95
2.	I believe that using insecticide-treated bed nets can effectively prevent malaria in young children	8 (3.7)	35 (16.1)	78 (35.9)	96 (44.2)	1.79	0.84
3.	Seeking prompt medical treatment is crucial when a child shows symptoms of malaria	5 (2.3)	12 (5.5)	91 (41.9)	109 (50.2)	1.59	0.70
4.	I am confident in recognizing the early signs of malaria in my child	4 (1.8)	42 (19.4)	126 (58.1)	45 (20.7)	2.02	0.69
5	I feel that malaria is a serious threat to the health and well-being of under-five children	9 (4.1)	8 (3.7)	114 (52.5)	86 (39.6)	1.72	0.72
6.	I believe that environmental factors like stagnant water contribute to the spread of malaria	25 (11.5)	61 (28.1)	106 (48.8)	25 (11.5)	2.39	0.84
7.	I think that the local healthcare facilities provide adequate information and support for preventing malaria in children.	42 (19.4)	93 (42.9)	77 (35.5)	5 (2.3)	2.79	0.77
8.	I am aware of the importance of keeping my child's sleeping area clean and free from mosquitoes	12 (5.5)	40 (18.4)	115 (53.0)	50 (23.0)	2.06	0.79
9.	I believe that children who have had malaria before are less likely to get it again	20 (9.2)	50 (23.0)	115 (53.0)	32 (14.7)	2.27	0.82
10.	I am confident that proper nutrition can help strengthen a child's immunity against malaria	5 (2.3)	24 (11.1)	132 (60.8)	56 (25.8)	1.89	0.67

Mean Cut-Off: 2.50

Table 3 presents a descriptive analysis of mothers' perceptions regarding malaria infection among under-five children. One notable finding is that the majority of mothers, approximately 56.2%, perceive malaria as a common health concern for under-five children in their community. This perception is crucial because recognizing malaria as a prevalent health issue can lead to increased vigilance and proactive measures in preventing and managing the disease in young children. However, it's worth noting that a significant proportion also expressed ambivalence or disagreement with this statement, indicating that there may be variation in how malaria is perceived across different segments of the community. Regarding the belief in the effectiveness of insecticide-treated bed nets in preventing malaria in young children, the data reveal a notable contrast. A mere 3.7% of mothers strongly believe in their efficacy, while a substantial 44.2% hold a contrary opinion. This finding underscores the need for targeted education and awareness campaigns to convey the importance of bed nets as a preventive measure, especially among those who harbor doubts or lack confidence in their effectiveness.

Perceptions concerning the prompt seeking of medical treatment when a child shows malaria symptoms was not encouraging, as most of the mothers do not prioritize prompt treatment, indicating a potential area for intervention and education. The perception of maternal confidence in recognizing early signs of malaria in their children reveals that approximately 58.1% believe they cannot do so.

Furthermore, the perception that malaria is a serious threat to the health and well-being of under-five children is shared by 7.8% of mothers. A notable 52.5% and 39.6% do not perceive malaria as a significant threat. This discrepancy underscores the importance of raising awareness about the severity of malaria in young children to motivate appropriate preventive actions. The belief that environmental factors, such as stagnant water, contribute to malaria's spread is held by a substantial 39.6% of mothers.

However, 62.3% of respondents feel strongly confident that local healthcare facilities provide adequate information and support for preventing malaria in children. Regarding the awareness of the importance of keeping a child's sleeping area clean and free from mosquitoes, about 23.9% acknowledge this, but a significant portion, 76%, do not. Concerning the belief that children who have had malaria before are less likely to get it again, approximately 32.2% hold this perception. This reflects some understanding of acquired immunity but also indicates a need for further education on the nuances of malaria and immunity. Lastly, only 13.4% of mothers strongly believe that proper nutrition can help strengthen a child's immunity against malaria.

In conclusion, the data from Table 3 highlight both encouraging perceptions and areas for improvement in mothers' understanding and beliefs related to malaria infection in under-five children.

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DISCUSSION

Table 1 provides valuable insights into the determinants of malaria infection among mothers with under-five children. Environmental determinants emerge as a significant factor in respondents' perceptions, with a strong consensus on the role of stagnant water as a contributor to malaria risk. This aligns with existing literature, which highlights the importance of stagnant water as a breeding ground for malaria-transmitting mosquitoes (Fillinger, 2021). Additionally, the recognition of seasonal variations in mosquito activity and malaria prevalence resonates with research demonstrating the seasonality of malaria transmission (Komen, 2020). However, the relatively lower scores for the protective role of adequate housing with mosquito screens and access to clean water sources suggest some variation in perceptions regarding these preventive measures.

Dietary determinants also play a notable role, with a moderate belief in the importance of proper nutrition for mothers in preventing malaria. The perception that a balanced diet rich in vitamins and minerals can strengthen a child's immunity against malaria is even stronger. While the literature often emphasizes the link between nutrition and immunity (Komen, 2020), the differences in perception between maternal and child nutrition underscore the need for targeted education on the significance of both aspects in malaria prevention.

Socio-demographic determinants, such as socioeconomic status and education level, are perceived as influential, aligning with research demonstrating the impact of poverty and education on malaria vulnerability (Tusting, 2019). The recognition of genetic factors and acquired immunity further highlights the multifaceted nature of malaria determinants.

Behavioral determinants encompass a range of perceptions, with moderate recognition of the importance of using insecticide-treated bed nets and seeking timely medical care for children with malaria symptoms. Maternal confidence in recognizing early signs of malaria in their child is relatively high, indicating the potential for active maternal involvement in malaria prevention. Mixed perceptions on cultural beliefs, sanitation practices, and the use of mosquito repellent underscore the diversity of factors influencing behavioral determinants.

The findings of this study assessing mothers' knowledge of malaria infection among under-five children align with existing literature on maternal knowledge and its impact on child health outcomes. Correct identification of the cause of malaria, awareness about its primary mode of transmission, recognition of severe consequences, and the understanding of environmental risk factors resonate with established knowledge in the field (Smith, 2020; Fillinger, 2021; Oladipo & Akinkunle 2023). These aspects of maternal knowledge are critical for effective disease prevention and timely treatment, emphasizing their positive influence on child health outcomes (Mafwele & Lee 2022).

However, the study also reveals areas of concern, such as misconceptions about malaria treatment, particularly the belief that antibiotics can cure malaria. Such misconceptions are consistent with prior research (Ismail, 2021) and underscore the need for targeted educational interventions to correct these beliefs and promote accurate treatment-seeking behaviors. Additionally, the findings highlight room for improvement in educating mothers about the importance of bed nets as a preventive measure, considering their well-documented effectiveness in reducing malaria transmission, especially among vulnerable populations like under-five children (Smith, 2020). These findings underscore the significance of enhancing maternal knowledge through tailored health education programs to further improve malaria management for under-five children and reduce the burden of this preventable disease(Peters & Naidoo 2022).

The findings from Table 3 provide valuable insights into mothers' perceptions regarding malaria infection among under-five children. Notably, a significant proportion of mothers (56.2%) perceive malaria as a common health concern for young children in their community. This perception aligns with the existing literature, which emphasizes the importance of community awareness in malaria control efforts (Hill, 2022). Recognizing malaria as a prevalent health issue can lead to increased vigilance and proactive measures in preventing and managing the disease (Mlugu et al., 2020). However, the study also reveals that a considerable portion of mothers hold differing views, indicating the presence of variations in how malaria is perceived within the community. This highlights the need for targeted community engagement and education to foster a shared understanding of the malaria threat and motivate collective preventive actions.

One of the striking findings is the lack of belief in the effectiveness of insecticide-treated bed nets, with only 3.7% of mothers strongly believing in their efficacy. This stark contrast with the significant proportion (44.2%) who hold contrary opinions underscores the urgent need for tailored education and awareness campaigns. This finding is consistent with previous research highlighting the importance of addressing misconceptions and doubts about preventive measures like bed nets to achieve their full impact (Eisele, 2021). It also emphasizes the critical role of community health education in conveying the evidence-based effectiveness of bed nets in preventing malaria among young children.

Furthermore, the study reveals concerning perceptions regarding the prompt seeking of medical treatment when a child shows malaria symptoms, as most mothers do not prioritize prompt treatment. Timely medical intervention is crucial in preventing severe complications in children with malaria (Eisele, 2021). This finding underscores the need for targeted educational interventions and community health programs to emphasize the importance of early diagnosis and treatment for improved child health outcomes. Overall, the data underscore the significance of community-based health education initiatives to address misconceptions, build confidence in preventive measures, and promote timely healthcare-seeking behaviors among mothers, contributing to enhanced malaria management for under-five children.

CONCLUSION

In conclusion, this study sheds light on the determinants, knowledge, and perceptions of malaria infection among mothers with under-five children in State Specialist Hospital, Ikere - Ekiti, Ekiti State. The study identified multiple determinants, including environmental, dietary, socio-economic, and behavioral factors, contributing to malaria infection in this population. The findings suggest that while mothers generally possess a good understanding of certain aspects of malaria, such as its causes and symptoms, there are areas in need of targeted education, particularly regarding malaria prevention methods like insecticide-treated bed nets. Additionally, perceptions regarding the seriousness of malaria and the importance of prompt treatment varied among respondents, indicating the necessity for awareness campaigns emphasizing the severity of malaria in young children. These findings can inform healthcare interventions and educational efforts aimed at reducing malaria transmission and improving the health of under-five children in the study area.

Recommendations

1. Nurses should implement targeted educational programs and awareness campaigns aimed at mothers to improve their knowledge about malaria infection among under-five children. These campaigns should cover topics such as malaria causes, transmission, symptoms, and preventive measures. Special emphasis should be placed on correcting misconceptions, such as the belief that antibiotics can cure malaria.
2. The government should launch comprehensive campaigns to promote the use of insecticide-treated bed nets among mothers and their under-five children. Emphasize the effectiveness of bed nets in preventing malaria transmission and the importance of consistent use, especially in malaria-endemic areas.
3. The ministry of health through orientation agency should encourage mothers to prioritize prompt medical treatment when their children exhibit malaria symptoms. Health facilities should be easily accessible and equipped to provide timely diagnosis and treatment. Health workers should also educate mothers on recognizing early signs of malaria.

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