

Access and Adequate Utilization of Malaria Control Interventions among Women of Childbearing Age from 15 to 49 years in Badbaado IDPs Settlements, Mogadishu, Somalia

Abdullahi Muse Mohamoud¹, Magda Elhadi Ahmed Yousif¹ & Osman Khalafalla Saeed¹

¹ PHC & HE Center, Faculty of Medicine, University of Gezira, Wad Madani, Sudan

Correspondence: Abdullahi Muse Mohamoud, PhD Student in Community Health, PHC & HE Center, Faculty of Medicine, University of Gezira, Wad Madani, Sudan. E-mail: cabdallamm7@gmail.com

Received: June 20, 2022 Accepted: September 26, 2022 Online Published: September 30, 2022

doi:10.5539/gjhs.v14n10p57

URL: <https://doi.org/10.5539/gjhs.v14n10p57>

Abstract

Background: Although there is limited national data and statistics on the burden of malaria in Somalia, it is considered a major public health problem in the country. children below 5 years, pregnant, lactating women and non-immune migrants carry most of the disease burden. the world malaria report 2020 estimated that there were around 759,000 cases and 1,942 deaths in Somalia in 2019.

Aim of the study: The purpose of this study is to explore the results of a rapid assessment of the extent of current access and adequate utilization of malaria control interventions among women of childbearing age from 15 to 49 years in Badbaado IDPs Settlements, Dharkenley District, Mogadishu, Somalia.

Method: This study applied a non-probability purposive sampling strategy for recruiting study participants. A total of 150 women aged 15 to 49 years old were selected, and semi-structured questionnaires were the main data collection methods. The data was analyzed using SPSS version 23 and used a P-value of 95% to assess associations between variables with ≤ 0.05 regarded as a statistically significant.

Results: The incidence of malaria among respondents was 59 cases (39.3%), of which 39 (66.1%) were mothers followed by 17 cases (28.8%) of children under the age of five years. The vast majority of 51 (63.0%) of the respondents who seek treatment confirmed that the distance from the health facility to their residence is about three kilometers or further. The majority of 39 (66.1%) of the respondents who were infected with malaria did not take the malaria medicine, while non-availability and/or non-affordability of the prescribed medicines in the clinics was the reason for not taking the medicine. Most of the respondents, 140 out of 150 of the study participants (93.3%), confirmed that they did not get any malarial services in their internally displaced persons IDPs settlements. Almost all of the respondents' household members 147 (98%) did not own insecticide-treated bed nets (ITNs), reasoning that due to the lack of distribution of ITNs and the unaffordability of their costs.

Conclusion and Recommendation: The study revealed a high incidence of malaria cases. However, this study recommends the government and other stakeholders should provide funding to establish IDPs settlements clinics and increase mobile teams to provide adequate and accessible public health services to combat malaria in these vulnerable populations.

Keywords: IDPs, Malaria, Badbaado IDPs Settlements Dharkenley

1. Background

Malaria is a major problem in Somalia, with an estimated 759,000 cases and 1,942 deaths in Somalia in 2019 (WHO; 2020). Various control efforts undertaken by the government with the support of WHO and the United Nations Children's Fund UNICEF and sponsored by the Global Fund have led to a 25% reduction in incidence from 2.6 cases per 1000 population in 2014 to 1.8 cases per 1000 population in 2020 (WHO 2021).

Although there is limited national data and statistics on the burden of malaria in Somalia, it is considered a major public health problem in the country. Many studies have previously reported that the burden of malaria is disproportionately high across all population groups in Somalia. Households with a high proportion of people with disabilities or medical conditions, children, the elderly, pregnant and lactating women are among the most vulnerable, and malaria control measures are underutilized (Mohamoud, Ndiema, Kinyiri, & Dalmar, 2017).

As of 2019, malaria was the single most common cause of morbidity reported among refugees (20%), followed by upper and lower respiratory tract infections. Refugees are particularly vulnerable to infections as a consequence of undernutrition, unclean water, poor sanitation, overcrowding and limited access to health care. Control of communicable diseases is especially important in IDPs settlements as these environments may foster the re-emergence of previously controlled diseases, particularly when compounded by poor surveillance, management and response. With the average IDPs settlements operating for more than five years, IDPs settlements management strategies must consider long-term approaches to provide adequate health services, especially prevention and treatment of infectious diseases (UNHCR, 2020).

The disease remains a significant threat to the health of refugee populations, particularly in Sub-Saharan Africa, with nearly two-thirds (63%) of the world's refugees, internally displaced persons IDPs, returnees, and other persons of concern (PoCs) to the United Nations High Commissioner for Refugees UNHCR living in malaria-endemic regions (Connolly et al., 2004).

The majority of refugees are women of reproductive age and children, and they are at the greatest risk of severe malaria and death (Rowland & Nosten, 2001). Migration from regions of low to high malaria endemicity heightens malaria risk in susceptible refugee populations (Bloland & Williams, 2003). Conversely, influxes of refugee populations from regions of high to low endemicity may result in malaria transmission to susceptible host country populations if suitable vectors are present (Bloland & Williams, 2003). Somalia is one of 15 countries designated by the WHO as having a high risk of maternal mortality (WHO, 2021).

Somalia has one of the worst maternal conditions in the world. The Maternal Mortality Ratio (MMR) is 692/100,000 live births, meaning 1 in 20 women will die from pregnancy-related causes during their reproductive lifetime (Newbrander et al., 2014). Four in 100 Somali children die during the first month of life, eight in 100 before their first birthday, and 1 in 8 before they turn five (UNFPA, 2020). According to the WHO, Somalia has a weak healthcare system and is poorly resourced. Due to decades of insecurity and conflict, the country's institutions struggle to provide access to prevention and treatment of malaria to those at risk of contracting the disease, including pregnant women and children. But there was a lot of interventions we have done including distribution of long-lasting insecticide nets to the target population, a malaria mass testing and treatment (MTAT) intervention, especially IDPs (internally displaced persons) and other vulnerable and indoor residual spraying were done in the riverine areas and also case management was going on in all health facilities in the country that was interventions done to reduce cases (voanews.com, 2021; Authorities in Somalia Hail Progress in Malaria Fight report (voanews.com)).

Several organizations, including UN agencies, INGOs and local agencies, run and support mobile teams for IDPs on behalf of the FMOH. They provided various services in the IDPs settlements, but all aid agencies only stayed temporarily, providing free diagnosis, treatment, and ITNs distribution as well as residual spraying (voanews.com, 2021 Authorities in Somalia Hail Progress in Malaria Fight report (voanews.com)). Access to healthcare services is vital to everyone, including host communities, IDPs, and other families relocated to new places. However, when people migrate from one location to another, like from rural to urban settings, for any reason, they always face challenges that can hinder their ability to access health services. Approximately 2.6 million Somalis are currently displaced within their own country. The largest concentrations, around half a million, are in the Somalia capital, Mogadishu. Some families were displaced nearly 30 years ago, whereas others continue to arrive in the city daily due to conflict and natural disasters. Families that moved to these areas live in precarious conditions and are unable to meet basic needs due to inconsistent health service provision or exclusion from accessing humanitarian support due to the conflicts in the city (Yarnell, 2019).

Despite challenges, Somali health authorities and humanitarian partners continue to reach people in need across Somalia to do all that is possible to alleviate suffering and save lives with the established health facilities. There are still thousands of mothers, children and elderly living in settlements for internally displaced people IDPs in the major towns and in remote villages who are unable to reach the health facilities for treatment. A mobile clinic team deals with a number of diseases, such as malaria (ReliefWeb 2021, Somalia Humanitarian Needs Overview report).

As a result, little is known about malaria control intervention access and utilization among women of childbearing age from 15 to 49 years in Badbaado IDPs Settlements, Dharkenley District, Mogadishu. Thus, the purpose of this study is to explore the results of a rapid assessment of the extent and create a better understanding of the existing access and adequate utilization of malaria control interventions among women of childbearing age from 15 to 49 years in Badbaado IDPs Settlements, Dharkenley District, Mogadishu.

1.1 General Objective

To assess the access and adequate utilization of malaria interventions such as insecticide-treated bed nets (ITNs) ownership and use, prompt diagnosis and effective treatment of malaria, indoor residual spraying, and an evaluation of access to and utilization of adequate IPTp-SP among women of childbearing age from 15 to 49 years in Badbaado IDPs Settlements, Dharkenley District, Mogadishu.

2. Methods

2.1 Study Setting

This study was conducted in Dharkenley, a district located in the Benadir Regional Administration (known as Mogadishu or Hamar) that contains 17 districts. There are 2.6 million displaced persons in Somalia, with the Benadir Region hosting the most IDPS communities. The majority of the displaced people live in three districts in Mogadishu: Deyniile, Dharkenley, and Kahda, with Dharkenley being the second district where displaced people live. Approximately 7,874 families are currently displaced in the district while 4,667 families live in Badbaado IDPs settlements (Nutrition cluster information management, 2020), whereas Dharkenley has 7 health facilities/posts where Save the Children, SOS, IRC, and WARDI run most of them (District Health management officer, 2021).

2.2 Study Design

This study employed analytical cross-sectional and quantitative techniques for data collection. Primary data was collected through semi-structured questionnaires.

2.3 Study Participants

The study participants were drawn from a segment of the population that explains access and adequate utilization of malaria interventions among women of childbearing age (WCBA) from 15 to 49 years in Badbaado IDPs Settlements. Participants were selected purposively based on the information they possessed and their relevance to malaria intervention service uses. The participants of the study included “women of childbearing age from 15 to 49 years,” which refers to mothers who were pregnant or lactating during the study period.

2.4 Sampling Technique and Sample Size

A total of 150 women at the childbearing age of 15 to 49 years were selected purposively.

2.5 Methods of Data collection

Data was collected by using semi-structured questionnaires which include socio-demographic characteristics of study participants and questions related to Malaria awareness. An information sheet explaining the purpose of the research and the procedures that will be used was explained to the participants.

2.6 Data Analysis

The data was collected, processed, and transferred to computer coding. A variable's descriptive screening was adopted, which includes percentages and frequency distribution tables using the Statistical Package for Social Sciences (SPSS) version 23 computer program. A p-value of ≤ 0.05 regarded as a statistically significant.

2.7 Ethical Consideration

Ethical approval was obtained from dharkenley district reference number: (MG/GD/DH/01/015/22). All participants provided informed consent before their participation after it was explained to them that their participation was voluntary and that the information obtained would only be used for this research and the publication of anonymised responses. All efforts were made to ensure the confidentiality of their responses.

3. Results

3.1 Socio-Demographics

A total of 150 participants were recruited for the study, 66 (44%) of them were in the age range between 15 to 25 years of age, and 128 (85.3%) of the studied women were married, 88% of the participants were illiterate, while over 66% of the respondents were housewives. About 88.7% of the participants' family income is considered to be low, whereas 110 (73.3%) of the respondents have more than four children under the age of five years. The participants' socio-demographics are provided in Table 1.

Table 1. Socio-demographic characteristics of study participants

Variable	Frequency	Percentage %
Age		
15 – 25	66	44
26 – 35	39	26
36 – 45	20	13.3
Above 46	25	16.7
Total	150	100
Marital Status		
Single	6	4
Married	128	85.3
Divorced	9	6
Widowed	7	4.7
Total	150	100
Education Level		
Illiterate	132	88
Primary	12	8
Secondary	5	3.3
University	1	0.7
Total	150	100
Job Category		
Housewife	99	66
Employed	51	34
Total	150	100
Family Income		
Low income	133	88.7
Middle income	17	11.3
Total	150	100
Number of children under five		
One child	4	2.7
Two children	16	10.7
Three children	14	9.3
More than four	110	73.3
Missing (System)	6	4
Total	150	100

3.2 Malaria Awareness

With regard to malaria awareness shown in Table 2, the vast majority, 95.3% of the participants affirm that they have never received malaria awareness in their IDPs settlements. Nevertheless, of the few respondents who received malaria awareness, only 7 of them (4.7%) had received it from healthcare providers at health centers. 95.3% did not participate in any sessions of malaria awareness in the past three months. Finally, only 10 (6.7%) of the participants confirmed their awareness of the effects of malaria on women of childbearing age. 57.1% had received information from healthcare providers at health centers.

Table 2. Malaria Awareness

Malaria Awareness in IDPs Settlements	Frequency	Percent
Received	7	4.7
Did not receive	143	95.3
Total	150	100
Source of Information	Frequency	Percent
Healthcare providers at health centers	4	57.1
Other sources	3	42.9
Total	7	100
Number of sessions about malaria in last 3 months	Frequency	Percent
Did not participate	7	100
Awareness of Effects of malaria on women of childbearing age	Frequency	Percent
Have Awareness	10	6.7
Have no awareness	140	93.3
Total	150	100
Effects of malaria on women of childbearing age	Frequency	Percent
Can Cause Anemia	9	90
Can Cause Death	1	10
Total	10	100

3.3 Malaria Incidence

The incidence of malaria among respondents was 59 cases (39.3%), of which 39 (66.1%) were the mothers, followed by 17 cases (28.8%) of children under five years, as illustrated in Table 3.

Table 3. Malaria Incidence

Occurrence of Malaria	Frequency	Percent
Yes	59	39.3
No	91	60.7
Total	150	100
Who had got the disease?	Frequency	Percent
Mother	39	66.1
Husband	1	1.7
Children	17	28.8
All of them	2	3.4
Total	59	100

3.4 Preferred Place for Treatment

In Table 4, the results reveal that a total of 81 (54%) respondents seek treatment at health facilities like pharmacies, MCHs and hospitals (31.4%, 15.3% and 7.3%), respectively. On the other hand, 46% of the respondents confirmed the practice of home remedies and religious rituals.

Table 4. Preferred Place for Treatment

Preferred Place for Treatment	Frequency	Percent
Pharmacy	47	31.4
MCH	23	15.3
Hospital	11	7.3
Other (Home remedies and religious rituals)	69	46
Total	150	100

3.5 Distance of Health Facility from IDPs Settlements

In regards to the distance from the health facilities to the IDPs settlements, Table 5 indicates that the majority of 51 (63%) respondents who sought treatment confirmed that the distance from the health facilities to their residence is about three kilometers or further, followed by 30 (37%) who estimated the distance to be as far as 2 kilometers.

Table 5. Distance of Health Facilities from the IDPs Settlements

Distance	Frequency	Percent
2 KMs	30	37
3 KMs and more	51	63
Total	81	100

3.6 Medicine Uptake for Malaria

Table 4.6 shows that the majority 39 (66.1%) of the respondents who were infected with malaria did not take the malaria medicine, while 20 (33.9%) took it.

Table 6. Medicine uptake for Malaria

Have you ever taken medicine for treatment and prevention of malaria?	Frequency	Percent
Yes	20	33.9
No	39	66.1
Total	59	100

3.7 Reasons for not Taking the Medicines

Non-availability of the prescribed medicines in the clinics was the reason for not taking the medicine, as confirmed by 30 (76.9%) of the respondents who did not take the medicine, followed by non-affordability of the medicine 9 (23.1%), as shown in Table 7.

Table 7. Reasons for not taking the medicines

Reasons for not Taking the Medicines	Frequency	Percent
Non-availability of medicine at the clinic	30	76.9
Non-affordability of the medicines	9	23.1
Total	39	100

3.8 Anti-Malarial Services Provided by Public Health Service Providers in the IDPs

All 150 study participants (93.3%) confirmed that they did not get any mobile health services in their IDPs settlements, mass malaria screening and treatment, ITN distribution, indoor insecticide residual spraying or chemoprophylaxis (IPT tab) in the past six months. As shown in Table 8, none of the participating mothers had

previously used IPT tablets.

Table 8. Anti-malarial Services Provided by Public Health Service Providers in the IDPS

Variable	Category	Frequency	Percent
Have you received any mobile health services in your IDPs settlements?	No	140	93.3
	Yes	10	6.6
Have you received mass screening and treatment for malaria in the last 6 months?	No	150	100
	Yes	0	0
Have ITNs been distributed in your IDPs settlements in the last 6 months?	No	150	100
	Yes	0	0
Have any chemoprophylaxis tabs (IPts tablet) been distributed in the last 6 months in your IDPs settlements?	No	150	100
	Yes	0	0
Have you taken IPTs tablets during your last pregnancy?	No	150	100
	Yes	0	0
Have you ever had indoor insecticide residual spraying in your house for mosquito control?	No	150	100
	Yes	0	0

3.9 Practices of Personal Preventive Measures against Malaria

In Table 9, the results revealed that almost all of the respondents' household members 147 (98%) did not own an ITN. With regard to the reasons for not sleeping under mosquito nets, the majority of the mothers 99 (67.3%) stated that the lack of distribution of ITNs was the cause, while 48 (32.7%) referred to the unaffordability of the ITN costs. Moreover, the vast majority of the respondents 130 (86.7%) reported that they did not clean their houses and cover water storage to prevent mosquito breeding.

Table 9. Practices of personal preventive measures against malaria

Variable	Category	Frequency	Percent
Do all family members always sleep under mosquito nets?	No	147	98
	Some of the members	3	2
	Yes	0	0
If you and your family members do not sleep under mosquito nets, mention the reasons.	Not distributed	99	67.3
	I can't afford	48	32.7
	I Feel uncomfortable	0	0
Do you always keep your house clean and cover water storage to prevent mosquitos from breeding?	No	130	86.7
	Yes	20	13.3

3.10 Factors associated with Malaria Treatment Seeking Behavior

The level of education, employment and the number of children were significantly associated with treatment-seeking behavior for malaria. Table 10 shows the association between treatment seeking and socio-demographic characteristics of respondents.

Table 10. Association between certain socio-demographic characteristics of participants with treatment seeking for malaria

Variable	Preferred Place to Go for treatment				P Value
	Pharmacy	MCH	Hospital	Others (Home)	
Age					
15 – 25	17	11	4	34	0.398
26 – 35	16	5	5	13	
36 – 45	4	3	2	11	
Above 46	10	4	0	11	
Marital Status					
Single	4	1	0	1	0.498
Married	38	21	11	58	
Divorced	2	1	0	6	
Widowed	3	0	0	4	
Educational Level					
Illiterate	34	21	10	67	0.034
Primary	8	1	1	2	
Secondary	4	1	0	0	
University	1	0	0	0	
Job Category					
Housewife	20	12	6	61	<0.001
Employed	27	11	5	8	
Family Income					
Low income	43	18	11	61	0.235
Middle income	4	5	0	8	
Number of Children					
One child	4	0	0	0	0.031
Two children	1	5	0	10	
Three children	3	3	1	7	
More than four children	34	15	10	51	

3.11 Factors Associated with the Practice of Personal Preventive Measures against Malaria

As indicated in Table 11, the level of education was significantly associated with family members sleeping under mosquito nets. In addition, the study highlighted that the level of education and family income were statistically associated with the practice of mosquito control through cleaning houses and covering water storage.

Table 11. Chi-square test for factors associated with Practices of Personal Preventive Measures against Malaria

Variable	Family Members Sleeping Under a mosquito net		P value (95%) Sig
	Some members	No	
Age			
15 – 25	1	65	0.787
26 – 35	1	38	
36 – 45	0	20	
Above 46	1	24	
Marital Status			
Single	0	6	0.913
Married	3	125	
Divorced	0	9	
Widowed	0	7	
Educational Level			
Illiterate	1	131	0.002
Primary	2	10	
Secondary	0	5	
University	0	1	
Job Category			
House Wife	1	98	0.228
Employed	2	49	
Family Income			
Low income	3	130	0.532
Middle income	0	17	
Number of Children			
One child	0	4	0.814
Two children	0	16	
Three children	0	14	
More than four children	3	107	
Mosquito Control through Cleaning House and Covering Water Storage			
Variable			P value
	Yes	No	
Age			
15 – 25	12	54	0.330
26 – 35	5	34	
36 – 45	2	18	
Above 46	1	24	
Marital Status			
Single	1	5	0.992
Married	17	111	
Divorced	1	8	
Widowed	1	6	

Educational Level			
Illiterate	14	118	
Primary	1	11	0.000
Secondary	4	1	
University	1	0	
Job Category			
House Wife	11	88	
Employed	9	42	0.265
Family Income			
Low income	15	118	
Middle income	5	12	0.038
Number of Children			
One child	2	2	
Two children	3	13	0.128
Three children	2	12	
More than four children	12	98	

4. Discussion

The purpose of the article is to investigate and determine access and adequate utilization of malaria control interventions among women of childbearing age from 15 to 49 years in Badbaado IDPs Settlements, Dharkenley District, Mogadishu, Somalia. The findings are intended to contribute to the formation and/or application of strategies to prevent and control the study area and other comparable places.

The study found that only 6.7% of the mothers were aware of the effects of malaria on women of childbearing age. This result is in contrast with the findings of previous studies in Sudan (92.2%) (Elmosaad et al., 2021) and Uganda (50%) (Obol, David Lagoro, & Christopher Garimoi, 2011). This result is attributed to the fact that 95.3% of the mothers in this study have never received malaria awareness in their IDPs settlements.

Furthermore, the study revealed 59 cases of malaria (39.3%), of which 66.1% were the mothers. This finding was lower than a study conducted in Uganda, where it was reported that 49% of the respondents had suffered from malaria (Henry, Lagoro, & Orach, 2012). Moreover, this study showed cases of malaria in children under five years old were 28.8%. This result is slightly lower than the result reported by (Anderson et al., 2011), which found 36.2% of the cases were among the under-five children (Anderson et al., 2011). In this study, 54% of the respondents sought treatment for malaria at health facilities. This observation was similar to a study in Tanzania (Mazigo et al., 2010), Uganda (Henry, Lagoro, & Orach, 2012), and Ghana (Ahorlu et al., 1997). Home remedies and religious rituals were also practiced by the study participants for the treatment of malaria. This was congruent with the findings of other studies in Tanzania (Mazigo et al., 2010), Ghana (Ahorlu et al., 1997) and Bangladesh (Ahmed et al., 2009).

Regarding the accessibility of health facilities, the results showed that 63% of the study respondents who sought treatment confirmed that the distance between the health facility and their residence is about 3 kilometers. This was also reported in another study in Mogadishu, Somalia, in which the study participants reported distance as a barrier to accessing healthcare services in IDPS settings (Mohamed et al., 2021). The Somali Malaria Indicator Survey Report (2017) revealed that the majority (69%) of those who visited a health facility for fever treatment took between two and three hours to reach the facility (MoH, WHO, NMCP, UNICEF, 2017). However, the result of this study was slightly lower than the findings of a study conducted in Somalia by Noor et al., where the median distance to health facilities was 6 kilometers (Noor et al., 2009). Additionally, according to the Somalia Malaria Programme Review (2020), "a large proportion of the Somali population is internally displaced (2.1 million) or nomads (3.2 million) and are less likely to have access to malaria interventions." (FMoH, WHO, 2020).

The present study shows that 66.1% of the respondents who were diagnosed with malaria did not take the malaria medicine, reasoning that it was due to the non-availability (76.9%) and non-affordability (23.1%) of the prescribed medicines. Also, this result is similar to a study conducted in Kenya which revealed that the availability of the drug

was low since ACT was not always available at its source (Onyango et al., 2012). Similarly, Anderson et al. have reported that shortages of ACT were experienced at IDPs settlements in Cameroon, Cote d'Ivoire, Kenya, Tanzania, Uganda, and Zimbabwe during the study period (Anderson et al., 2011). With regard to malarial services provided the results showed that most the respondents confirm that they did not receive any anti-malarial services (including: mobile health services, mass screening and treatment, distribution of ITNs, distribution of IPTs and indoor insecticide residual spraying) in the previous six months. This could be attributed to the general weakness of public health services in Somalia.

It was reported in the Somali Malaria Indicator Survey (2017) that only 27% of the surveyed households owned at least one ITN, of which 46.4% of them were bought from private stores (MoH, WHO, NMCP, UNICEF, 2017). In regards to the lack of IRS implementation, the Somali National Malaria Strategic Plan (2017–2020) stated that “For the last two years, IRS is conducted only in areas with an early sign of outbreaks or in response to outbreak” (NMCP, MoH, 2017). The distribution of IPTs was nonexistent. This is similar to Burundi, where the distribution of IPTs was 0.3%, but in contrast with Zambia, where it was 66% (Florey, 2013). With regards to the practice of personal preventive measures, this study revealed that 98% of the respondents did not own any ITNs. This is in contrast with the results of the Somali Malaria Indicator Survey (2017), which reported that 27% of the respondents owned ITNs (MoH, WHO, NMCP, UNICEF, 2017). This could be due to the difference in the populations, as this study was about IDPSs while the report was about resident citizens. Also, this is contrary to the results in Sudan, where the ownership of ITNs was as high as 95.8%, which was freely provided by the NMCP (Elmosaad et al., 2021), as well as Tanzania, where 77% of the study participants owned bed nets (Mazigo et al., 2010). Of those who did not own ITNs, the majority of them reported that it was due to the lack of distribution, whereas 32.7% of them reasoned that it was due to the cost. This is similar to the study in Tanzania (Mazigo et al., 2010).

The results of this study revealed a negative practice of personal preventive measures regarding mosquito control through cleaning houses and covering water storage. In total, only 13.3% of the respondents cleaned their houses and covered their water. This bad practice could make this vulnerable population more prone to the risk of malaria. Furthermore, the results of this study highlighted that level of education, employment and number of children were significantly associated with treatment seeking of malaria. Additionally, the findings revealed that education level and family income were statistically associated with the use of personal protective measures. This is similar to the findings of a study conducted in Sudan (Elmosaad et al., 2021).

5. Conclusion and Recommendation

The study revealed a high prevalence of malaria cases. The majority of them sought treatment at health facilities. However, these health facilities were as far as 3 kilometers from the residences of the infected people. The majority of the people diagnosed with malaria did not take the treatment due to non-availability and/or non-affordability of the medicine. The respondents of this study have collectively reported the lack of malaria services (including mobile health services, mass screening and treatment, distribution of ITNs, distribution of IPTp-SP, and indoor insecticide residual spraying) in the previous six months.

With regard to the practice of personal protective measures, the results show that the vast majority of the respondents did not own bed nets due to lack of distribution and high cost. Furthermore, few of the respondents were reported cleaning their houses and covering their water stores as a means of controlling mosquito breeding sites. The study also highlighted three factors that are statistically associated with the health-seeking behavior of the respondents; those were the level of education, employment, and the number of children, while the level of education and income were associated with the practice of personal protective measures.

Based on the results of the study and the conclusion drawn, the study recommends raising mothers' awareness through health promotion activities. However, the government and other stakeholders should provide funding to establish settlements clinics and increase mobile teams to provide adequate and accessible public health services to combat malaria in these vulnerable populations.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

References

- Ahmed, S. M., Haque, R., Haque, U., & Hossain, A. (2009). Knowledge on the transmission, prevention and treatment of malaria among two endemic populations of Bangladesh and their health-seeking behaviour. *Malaria journal*, 8(1), 1-11. <https://doi.org/10.1186/1475-2875-8-173>
- Ahorlu, C. K., Dunyo, S. K., Afari, E. A., Koram, K. A., & Nkrumah, F. K. (1997). Malaria-related beliefs and

- behaviour in Southern Ghana: Implications for treatment, prevention and control. *Tropical Medicine & International Health*, 2(5), 488-499. <https://doi.org/10.1111/j.1365-3156.1997.tb00172.x>
- Anderson, J., Doocy, S., Haskew, C., Spiegel, P., & Moss, W. J. (2011). The burden of malaria in post-emergency refugee sites: A retrospective study. *Conflict and Health*, 5(1), 1-8. <https://doi.org/10.1186/1752-1505-5-17>
- Authorities in Somalia Hail Progress in Malaria Fight (voanews.com)*, 2021.
- Bloland, P. B., & Williams, H. A. (2003). *Malaria Control During Mass Population Movements and Natural Disasters*. Washington, DC: The National Academies Press; 2003. [Google Scholar]
- Connolly, M. A., Gayer, M., Ryan, M. J., Salama, P., Spiegel, P., & Heymann, D. L. (2004). Communicable diseases in complex emergencies: impact and challenges. *The Lancet*, 364(9449), 1974-1983. [https://doi.org/10.1016/S0140-6736\(04\)17481-3](https://doi.org/10.1016/S0140-6736(04)17481-3)
- District Health management officer*. (2021).
- Elmosaad, Y., Al Rajeh, A., Khan, A., Malik, E., & Mahmud, I. (2021). Malaria Prevention and Mothers: Sudan. *The Scientific Journal of King Faisal University*, 22(1), 2. <https://doi.org/10.37575/b/med/2384>
- Florey, L. (2013). *Preventing malaria during pregnancy in sub-Saharan Africa: determinants of effective IPTp delivery*. ICF International.
- Henry, O. J., Lagoro, K. D., & Orach, C. G. (2012). Prevalence of malaria and treatment seeking behaviours among pregnant women in postconflict internally displaced persons' settlements in Gulu District. *Age*, 14(25), 423. <https://doi.org/10.5402/2012/164935>
- Mazigo, H. D., Obasy, E., Mauka, W., Manyiri, P., Zinga, M., Kweka, E. J., ... & Heukelbach, J. (2010). Knowledge, attitudes, and practices about malaria and its control in rural northwest Tanzania. *Malaria Research and Treatment*, 2010. <https://doi.org/10.4061/2010/794261>
- MoH, WHO, NMCP, UNICEF. (2017). *Somali Malaria Indicator Survey Report*. 54.
- MoH, WHO. (2020). *Somalia Malaria Programme Review 2020*. Mogadishu: Ministry of Health, 37
- Mohamed, A. A., Bocher, T., Magan, M. A., Omar, A., Mutai, O., Mohamoud, S. A., & Omer, M. (2021). Experiences from the Field: A Qualitative Study Exploring Barriers to Maternal and Child Health Service Utilization in IDPS Settings Somalia. *International Journal of Women's Health*, 13, 1147. <https://doi.org/10.2147/IJWH.S330069>
- Mohamoud, M. O., Ndiema, N., Kinyiri, S., & Dalmar, A. A. (2017). *Protecting internally displaced communities in Somalia: Experience from the Benadir region*. International Institute for Environment and Development.
- Newbrander, W., Natiq, K., Shahim, S., Hamid, N., & Skena, N. B. (2014). Barriers to appropriate care for mothers and infants during the perinatal period in rural Afghanistan: a qualitative assessment. *Global Public Health*, 9(sup1), S93-S109. <https://doi.org/10.1080/17441692.2013.827735>
- NMCP, MoH. (2017). *Somalia National Malaria Strategic Plan 2017-2020*. 31.
- Noor, A. M., Rage, I. A., Moonen, B., & Snow, R. W. (2009). Health service providers in Somalia: their readiness to provide malaria case-management. *Malaria Journal*, 8(1), 1-8. <https://doi.org/10.1186/1475-2875-8-100>
- Nutrition cluster information management*. (2020).
- Obol, J., David Lagoro, K., & Christopher Garimoi, O. (2011). Knowledge and misconceptions about Malaria among pregnant women in a post-conflict internally displaced persons' settlements in Gulu District, Northern Uganda. *Malaria research and treatment*, 2011. <https://doi.org/10.4061/2011/107987>
- Onyango, E. O., Ayodo, G., Watsierah, C. A., Were, T., Okumu, W., Anyona, S. B., ... & Ouma, C. (2012). Factors associated with non-adherence to Artemisinin-based combination therapy (ACT) to malaria in a rural population from holoendemic region of western Kenya. *BMC infectious diseases*, 12(1), 1-11. <https://doi.org/10.1186/1471-2334-12-143>
- Rowland, M., & Nosten, F. (2001). Malaria epidemiology and control in refugee settlements and complex emergencies. *Annals of Tropical Medicine & Parasitology*, 95(8), 741-754. <https://doi.org/10.1080/00034980120103405>
- Somalia Humanitarian Needs Overview 2021*. Somalia: ReliefWeb.
- UNFPA. (2020). Somali demographic and health survey. Vol. 1. Report; 2020. Retrieved November 16, 2021, from <https://somalia.unfpa.org/en/publications/somalihealth-and-demographic-survey-july-2019-newsletter>

- UNHCR. (2020). *Annual Public Health Overview – World*. Relief Web.
- WHO Eastern Mediterranean Regional Office (EMRO). *Reaching the zero malaria target: Somalia scales up efforts to eliminate malaria from 6 pilot districts*. News, Somalia site.
- World Health Organization [WHO]. *World malaria report 2020*. Geneva: WHO; 2020.
- World Health Organization [WHO]. (2021). Maternal mortality across countries. Retrieved November 16, 2021, from <https://www.who.int/en/newsroom/fact-sheets/detail/maternal-mortality>
- Yarnell, M. (2019). *Durable solutions in Somalia: moving from policies to practice for IDPs in Mogadishu report; 2019*. Retrieved November 16, 2021, from <https://www.refugeesinternational.org/reports/2019/12/13/durable-solutions-somalia-moving-from-policies-practice-for-IDPs-mogadishu>

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).