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Prevalence of Malaria and Associated Factors among Children Below the Age of 5 Years in Fort Portal Town Kabarole District, Uganda

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ABSTRACT

Globally, it was noted that over 92 countries and territories have ongoing malaria transmission with an estimated 3.2 billion people who were at risk of getting infected. The WHO indicates that 207 million people are infected with malaria worldwide and of these 627,000 cases result in deaths. Children below five years are the most susceptible to malaria illness which accounts for estimated deaths of 303,000 before reaching age five globally and 292,000 occur in the Africa region. The general objective of the study was to determine the prevalence of malaria and the associated factors among children below 5 years in Fort Portal Town, kabarole district. The study also aimed at determining the socio-economic demographic, caretaker, household, and environment associated with malaria prevalence within the defined age group. The study employed quantitative and qualitative research designs where questionnaires and interview guides were used to collect data from the field. All data was grouped and analyzed in a statistical way where data was presented in tables showing frequencies and percentages. The prevalence of malaria was high 204 (53%) and the factors that were significant with malaria prevalence included; household sources of light and environmental factors about the presence of garbage heaps. The prevalence of malaria was high and it was influenced by the household source of light and garbage heaps around the homes. This study recommended that caretakers should not stop knowing malaria prevention transmission, but should have a positive attitude toward implementing the preventive measures. Health unit workers, community health workers, and VHTs together with stakeholders should put in more effort to ensure that information about malaria is communicated to the caretakers in languages best understood and should mainly target the vulnerable households in the community. The town council authorities and local leaders must work with the community to ensure proper garbage disposal.

Keywords: Malaria, Children below five years, Deaths, Garbage Heaps, Caretakers.

INTRODUCTION

Globally, malaria is the most prevalent vector-borne disease that claims endemicity in over 92 countries and territories [1–3]. It is one of the world's most vital and significant public health challenges compromising development in poverty-stricken countries and accounting for up to approximately 207 million cases and overwhelming 627,000 deaths per annum with most of the cases, 80.0% and deaths, 90.0% occurring in Sub-Saharan Africa [3, 4]. In Sub-Saharan Africa, it remains one of the biggest threats to human lives, especially among the weak and vulnerable populations (children 0–5, pregnant women, and immune-compromised individuals), despite all the efforts put in by the various countries to control and eradicate the disease in these areas [5, 6]. According to the World Health Organization, more than 3 billion people (~40%) reside in areas of the world where malaria is prevalent. As such, the disease is largely responsible for the poor economic growth of these areas, which further contributes to more cases of malaria [1, 7]. In the 2014 World Malaria Report, Sub-Saharan Africa (SSA) where malaria is endemic, a substantial burden associated with morbidity and mortality shows an estimated 90% of those who contract malaria in Africa, die from it [8]. While children 0–5 years and other vulnerable populations are disproportionately affected by malaria, every 45 seconds, a child dies because of malaria [9]. Recent reports showed that preventive and control measures have significantly reduced childhood malarial morbidity and mortality in most parts of sub-Saharan Africa [10]. However,

the rural areas remain uncontrolled with a subsequent increase in infections among children 0–5 years [11, 12]. Malaria is a complicated, life-threatening disease caused by infection through the bite of a female Anopheles mosquito. Children below 5 years of age have low immunity which makes them susceptible to malaria transmission with associated outcomes such as severe anaemia, cerebral malaria, and hypoglycemia /low glucose level [13]. Climatic conditions such as rainfall patterns, temperature and humidity affect the number and survival of mosquitoes and in many places, transmission is seasonal and high during and after rainy [14–16] The knowledge of and access to malaria preventive tools and the healthcare services distribution also significantly determine malaria transmission among the vulnerable population [17, 18]. In East Africa, Uganda has the highest malaria incidence with a rate of 478 cases per 1,000 populations per year[19]. Malaria is a major public health problem associated with slow economic development and poverty and is also the most frequently reported disease at both public and private health facilities in the country. It is the leading cause of morbidity with 90 -95% of the population at risk and contributing approximately 13% of the under-five mortality [20, 21]. It accounts not only for 30 - 50% of the outpatient visits at health facilities and 15 -20% of in-patients or hospital admissions but also for 27.7% of deaths amongst children under the age of five [19].Children under five years are most vulnerable to malaria infection as their immunity is not yet developed enough to fight any disease [22]. Though different strategies and programs like the Malaria Control Program aimed at total eradication of malaria in all the endemic areas of the country were initiated involving education of individuals and families to sleep under insecticide-treated nets (that are distributed free of charge), vector control through spraying (IRS), eliminating breeding places, and reducing infections through prophylaxis and treatment with ACTs, malaria transmission is still very high[23]. Furthermore, in efforts to accelerate the reduction of child mortality. The government has also through the years 2009 -2015 conducted several programs including integrated community case management (ICCM), integrated management of childhood illness (IMCI) and training of VHTs to offer curative malaria treatment at community level [24, 25]. Despite all these efforts, malaria cases continue to remain high, especially in remote areas among children below 5 years and one of the leading causes of ill health and deaths in Uganda. This implied that carrying out this research could help to offer a direction for improving preventive strategies.

Methodology

Study design

The study employed a descriptive cross-sectional study design which involved the use of both qualitative and quantitative methods, with the help of both questionnaires and an interview guide to collect data. This helped the researcher to obtain information on variables in different contexts and at the same time.

Area of Study

The study was conducted in Fort Portal Town, Kabarole district. The district is located in Western Uganda at coordinates 00°32'30"S30°11'16"E/0.54167°S30.18778°E and it is approximately 297 kilometres (185 mi) by road, west of Kampala, Uganda's capital and largest city, on all-weather tarmac highway. The altitude of the town is 1,651m above sea level.

Study Population

The target population was all the caretakers plus children under five years in Fort Portal town, Kabarole district. The accessible population included children under the age of five years and their caretakers who attended the OPD of Buhinga Regional Referral Hospital. The study population included caregivers and children under the age of five years who met the inclusion criteria.

Sample size determination

The sample size was determined by calculations using the Kish and Leslie formula[26]

$n = z^2p\,(1\text{-}p) / E^2$

Where n = Estimated minimum sample size required

P= Proportion of a characteristic in a sample (32.0%]

Z=1.96 (for 95% Confidence Interval)

e = Margin of error set at 5%

$$n = 1.96^2 \times \frac{0.32\,(1 - 0.32)}{0.05^2}$$

n =384

Sampling Technique

The study employed a simple random sampling technique to determine 384 Mothers/caretakers with their children below 5 years of age in Fort Portal town so that each individual would have an equal and independent chance of being selected, and also save the researcher's time.

Data Collection

The study employed individual interview guides and structured questionnaires to gather the study findings. Questionnaire administration: Data was collected using interviewer-administered questionnaires, developed according to the research questions and objectives of the study. Structured questionnaires with some open-ended questions were used to give the respondents opportunities to give further opinions by qualifying or substantiating their answers. This method was used because of was cheap and it would collect responses with minimum errors and a high level of confidentiality. Individual interviews: The interview guide was used in this study because some of the sample size representatives of the population were expected to have more knowledge that cannot be fully captured using questionnaires.

Data collection procedure

The researcher obtained a letter of introduction from the Faculty of Clinical Medicine and Dentistry of Kampala International University-Western Campus which was presented to the relevant authorities/ in-charge of Buhinga Regional Referral Hospital district and the community at large where the study was to be conducted.

Study Variables

The study variables included dependent and independent variables.

Dependent variable

The prevalence of malaria among children under five years old attending the Outpatient department at Buhinga Regional Referral Hospital, Kabalore district was the dependent variable.

Independent variables

- Caregiver factors which included, the age of the caregiver, health-seeking behaviours, knowledge about the disease, education level, marital status, occupation, attitude and practice.
- Environmental factors included; drainage system, bushy surroundings, garbage heaps, climate and altitude.
- Household factors included the number of household members, type of house, social economic status, sleeping patterns, place of residence, and use of ITNs.

Data Processing and analysis

Study findings were systematically organized into tables and figures and subsequently subjected to statistical analysis using Microsoft Excel 2008 version 23. Descriptive statistics using frequencies and percentages were used to summarize the data collected.

Quality control

An ape visit was done and research instruments were tested. They were then fully developed before the actual study was conducted. A person who understands Lunyankole assisted the researcher since it's the most widely used language in Fort Portal thereby preventing language barriers and hence proper relay of information.

Ethical consideration

An introductory letter was obtained from the office of the Dean of faculty of clinical medicine and dentistry and endorsed by the IREC of Kampala International University Western Campus which was presented to the relevant authorities/ in- charge of the Outpatient department, Buhinga Regional Referral Hospital, Kabarole district. Consent was sought from all participants after explaining to them the relevant aspects and purpose of the study.

RESULTS

Socio-economic demographic data of the respondents

Table 1: Socio-economic demographic data of the respondents

Variable	Category	Total	Malaria Prevalence		
		Frequency (N=384)	Percentage (%)	Frequency (N=204)	Percentage (%)
Age	Below 20	68	17.7	30	07.8
	20- 29	258	67.2	90	23.4
	30-39	42	11.0	60	15.6
	Above 40	16	04.1	24	6.3
Gender	Male	44	11.5	28	7.3
	Female	290	88.5	176	45.7
Marital status	Single	32	08.3	30	07.8
	Married	318	82.9	130	33.9
	Widowed	04	01.0	20	5.2
	Others	30	07.8	24	6.1
Educational level	None	42	10.9	15	3.9
	Primary	112	29.2	39	10.1
	Secondary	182	47.4	120	31.2
	Attended any institution	48	12.5	30	07.8
Religion	Christian	260	67.7	164	42.7
	Non-Christian	124	32.3	40	10.3
Employment status	Full time	74	19.3	34	08.9
	Part time	220	57.3	100	26.0
	Unemployed	90	23.4	70	18.1
Number of children	1-3	214	55.7	140	36.5
	Above 3	170	44.3	64	16.5
Sex of the child	Male	152	39.6	92	24.0
	Female	**232**	**60.4**	**112**	**29.0**

Table 1 presents results of the socio-economic demographic characteristics of the parents with their children, who were surveyed. 384 respondents were interviewed, of which 258 (67.2%) were aged between 20-29 years, followed by 68 (17.7%) below 20 years, 42 (11.0%) between 30-39 years, and 16 (04.1%) above 40years (Table 1). The study findings in Table 1 indicate that 290 (88.5%) of the respondents are females while 44 (11.5%) are males. In terms of marital status, 318 (82.9%) of the respondents were married, followed by 32 (08.3%) who were single, 30 (7.8%) cited others and 04 (01.0%) were widowed (Table 1).182 (47.4%) of the respondents had completed secondary education, 112 (29.2%) attained primary education, 48 (12.5%) attained tertiary education, and 42 (10.9%) had never attended any formal education (Table 1). The study findings in Table 1 further revealed that 260 (67.7%) of the respondents were Christians while 124 (32.3%) were non-Christians (Table 1). 220 (57.3%) of the respondents reported being employed on a part-time basis, 90 (23.4%) were unemployed and 74 (19.3%) employed on a full-time basis (Table 1). In terms of the number of children owned, 214 (55.7%) reported having between 1 and 3 children, and 170 (44.3%) had above 3 children according to the findings indicated in Table 1.Finally, out of the 384 respondents interviewed, 232 (60.4%) had female children while 152 (39.6%) had male children (Table 1).Prevalence of malaria among children below 5 years.

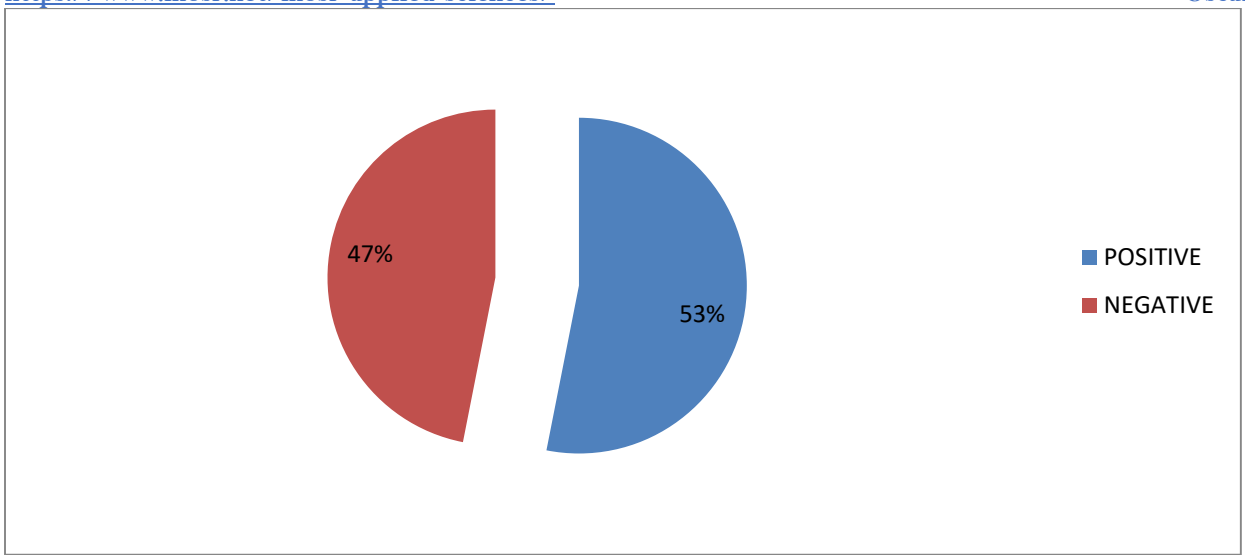

Figure 1: Prevalence of malaria among 384 children below age 5 years

A total of 384 children below the age of 5 years who attended Buhinga Regional Referral Hospital coming from different locations of Fort Portal town were subjected to malaria diagnostic tests using both mRDT and microscopy. Of the 384 children, 180 (47%) tested negative and 204 (53%) positive as shown in Figure 1.

Caretaker factors influencing the prevalence of malaria among children below 5 years

Caretaker factors (attitudes) influencing the prevalence of malaria among children below 5 years

The study findings in Figure 2 indicate that the majority of the respondents (80%) believe that malaria is a serious and threatening disease unlike the rest (20%).

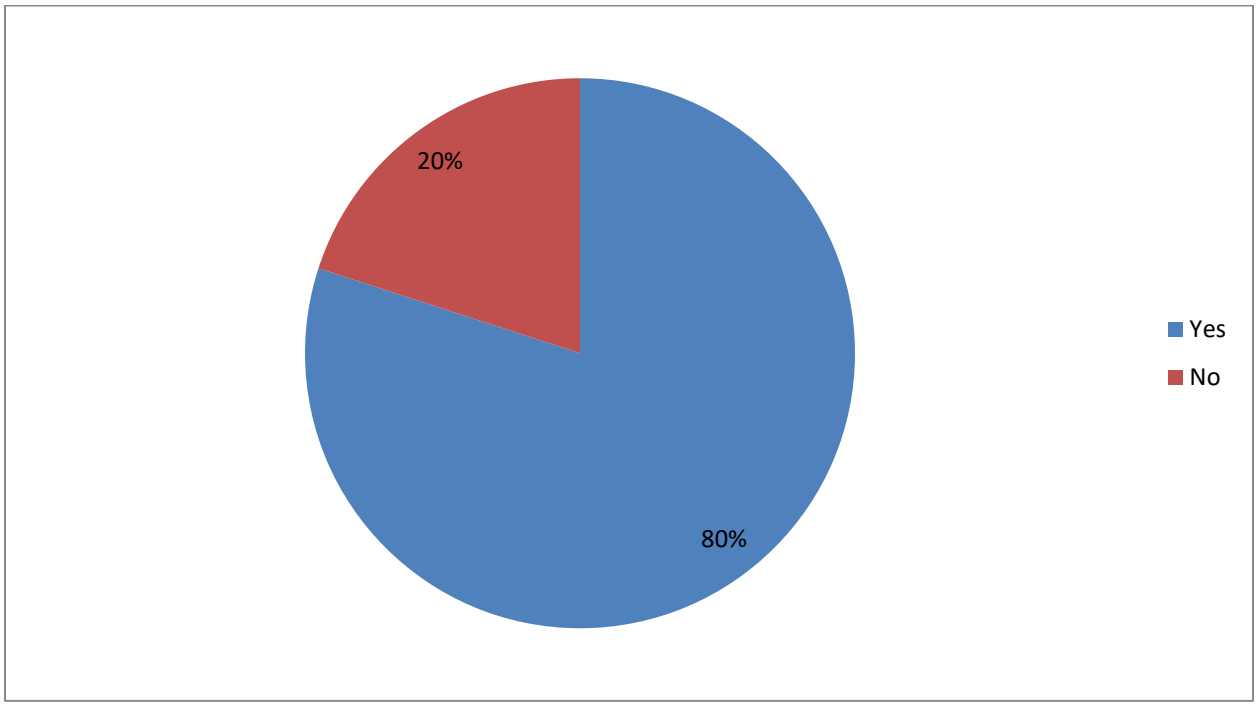

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Figure 2: Whether malaria is a serious and threatening disease

Furthermore, 85% of the respondents revealed that one cannot recover completely from malaria without treatment while 15% reported that one can completely recover from malaria without treatment (Figure2).

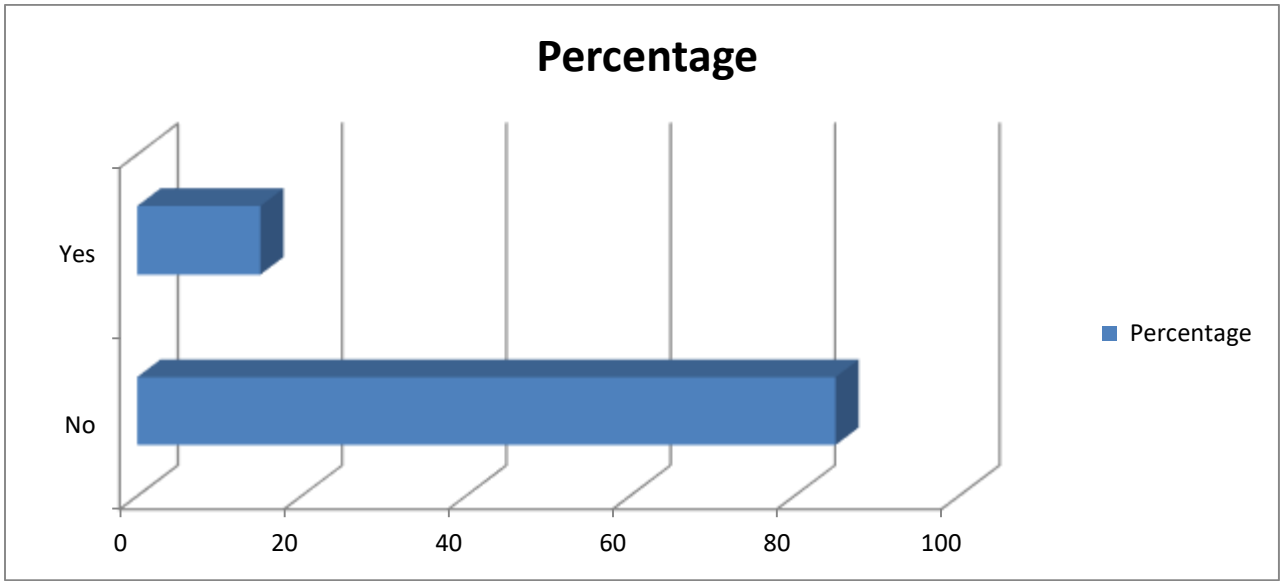

Figure 3: Whether one can recover from malaria without treatment.

According to the study findings in Figure 4, the majority of the respondents (92%) revealed that children and pregnant mothers are at the greatest risk of malaria, unlike the minority (08%)

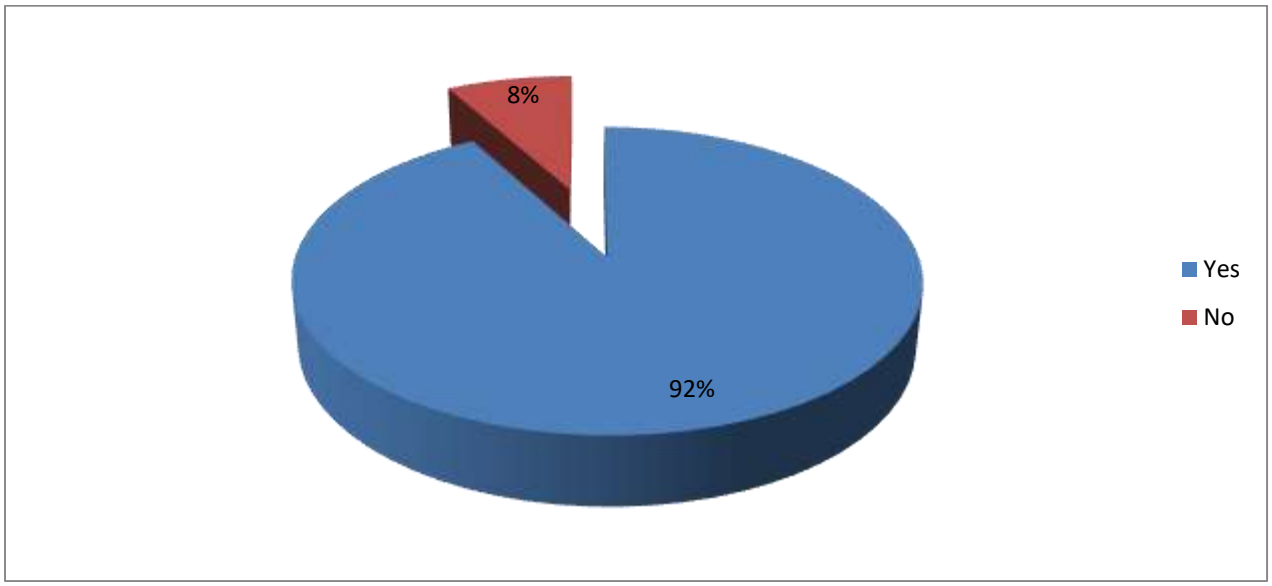

Figure 4: Whether children and pregnant mothers are at the greatest risk of getting malaria

The study findings in Figure 5 show that 88% of the respondents reported that it is dangerous if malaria medicine is not taken completely, while the rest (12%) don't believe it.

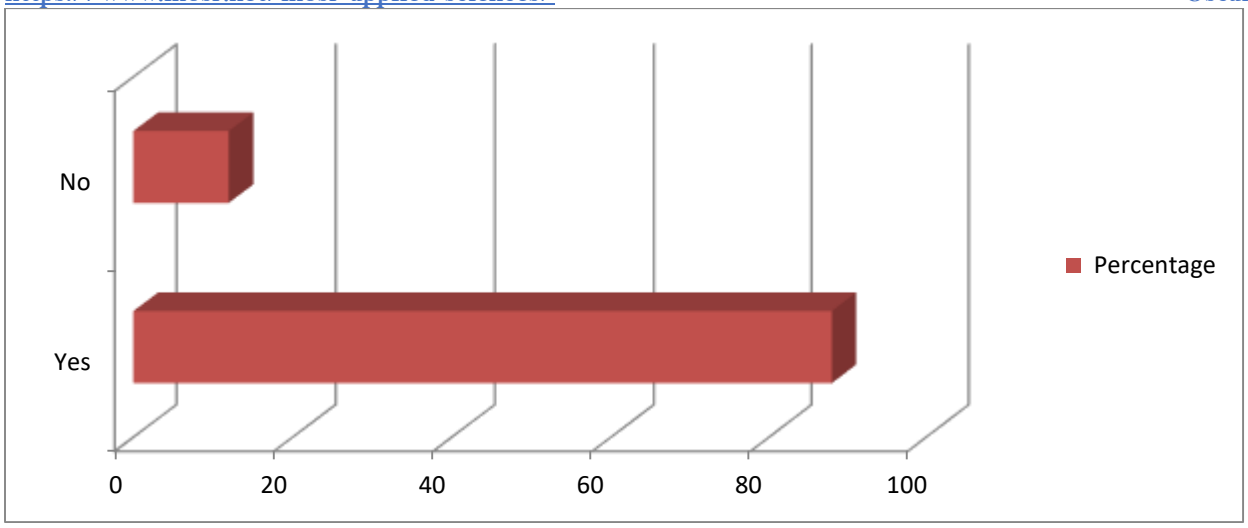

Figure 5: Whether it is dangerous if malaria medicine is not taken completely

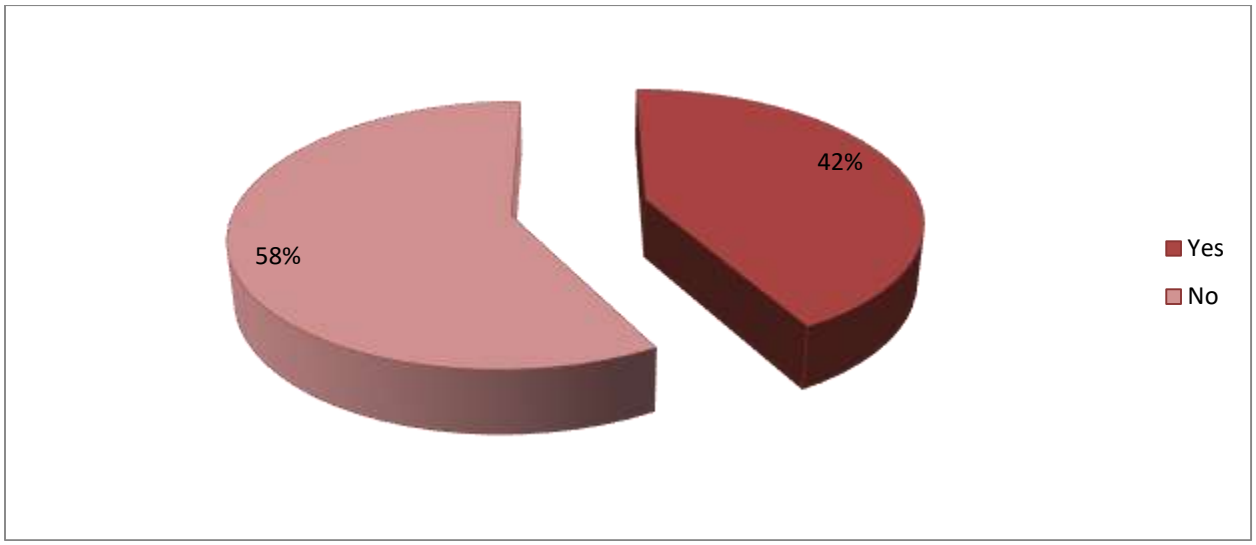

Figure 6: Can treat the child when he or she gets malaria

58% of the respondents revealed that they cannot treat their children with malaria while 42% reported that they can treat their children with malaria.

Table 2: Caretaker factors (Knowledge) on malaria transmission and prevention, influencing the prevalence of malaria among 384 children below 5 years

Variable		Total	
		Frequency (N=384)	Percentage (%)
Closing windows early	Yes	320	83.3
	No	64	16.7
Clearing bushes	Yes	348	90.6
	No	36	9.4
Mode of transmission	Mosquito	330	85.9
	Fly/Animals	54	14.1
Destroying breeding places	Yes	350	91.1
	No	34	9.9
Use repellants	Yes	250	65.1
	No	134	34.9
Prevention of malaria; Sleeping under nets	Yes	360	93.8
	No	24	6.2
Spraying with insecticide	Yes	202	52.6
	No	182	47.4

According to the study finding in Table 4.2; 360 (93.8%), 350 (91.1%), 348 (90.6%), 250 (65.1%) and 202 (52.6%) of the respondents revealed that Sleeping under nets, destroying breeding places, clearing bushes, use of repellants and Spraying with insecticide highly prevent malaria respectively. 330 (85.9%) of the respondents revealed that mosquito bites are the main mode of transmission of malaria while 54 (14.1%) reported flies/animals (Table 2).

Household factors influencing the prevalence of malaria among children below 5 years

Table 3: Household factors influencing malaria prevalence among children below 5 years

Variable		Total		Malaria Prevalence (Positive)	
		Frequency (N=384)	Percentage (%)	Frequency (N=204)	Percentage (%)
Use mosquito nets	Yes	334	87.0	160	41.7
	No	50	13.0	44	11.3
Nature of rooms	Small	264	68.8	152	39.6
	Big	120	31.2	52	13.4
Time to go to bed for children	6 pm-8 pm	148	38.5	40	10.4
	8 pm-10 pm	200	52.0	140	36.5
	Past 10 pm	36	9.5	24	06.1
Type of house	Permanent	320	83.3	162	42.1
	Semi-permanent	42	10.9	30	07.8
	Grass thatched	22	5.8	12	03.1
Number of people in the house	Below 5	220	57.3	130	33.9
	Above 5	164	42.7	74	19.1
Source of light	Candle	60	15.6	20	05.2
	Latent	84	21.9	42	10.9
	Electricity	240	62.5	142	36.9

According to the study findings in Table 4.3, 334 (87.0%) of the respondents reported sleeping under mosquito nets while 50 (13%) did not use mosquito nets. 264 (68.8%) of the respondents revealed that they stay in small rooms while 120 (31.2%) reported that they stay in big rooms (Table 4.3). Findings in Table 4.3 revealed that 220 (57.3%) of the respondents stay with less than 5 individuals while 164 (42.7%) of the respondents stay with more than 5 individuals in the house. 240 (62.5%) of the respondents reported that they used electricity, followed by 84 (21.9%) that used latent and finally 60 (15.6%) that used candles (Table 4.3). Furthermore, the study findings in Table 4.3 indicate that 320 (83.3%) lived in permanent houses while 42 (10.9) and 22 (5.8) lived in semi-permanent and grass-thatched houses respectively. 200 (52.0) of the respondents reported that their children go to sleep between 8 pm and 10 pm, followed by 148 (38.5%) who reported that their children go to sleep between 6 pm and 8 pm and finally 36 (9.5%) reported that their children go to sleep past 10 pm.

Environmental factors influencing the prevalence of malaria among children below 5 years

Table 4: Environmental factors influencing malaria prevalence among children below 5 years

Variable		Total		Malaria Prevalence	
		Frequency (N=384)	Percentage (%)	Frequency (N=204)	Percentage (%)
Water drainage	Good	334	86.9	164	42.7
	Bad	50	13.0	40	10.3
Clear stagnant water	Yes	330	85.9	159	41.4
	No	54	14.1	45	11.6
Have garbage heaps	Yes	174	45.3	84	21.9
	No	210	54.7	120	31.1
Have bushes around the house	Yes	110	28.7	86	22.4
	No	274	71.3	118	30.6
Monthly income	Less than 250,000	280	64.0	144	37.5
	Above 250,000	104	46.0	60	15.5

According to the study findings in Table 4, Out of the 384 respondents, 334 (86.9%) revealed that they had good drainage whereas 50 (13.0%) reported that they had poor drainage. 330 (85.9%) of the respondents revealed that they clear stagnant water while 54 (14.1%) of the respondents revealed that they do not clear stagnant water (Table 3). Furthermore, the majority of the respondents; 274 (71.3%) revealed that they have no bushes around their houses, while 110 (28.7%) revealed that they had bushes around their houses (Table 3). The table findings in Table 3 also indicate that 280 (64.0%) of the respondents earned less than shs. 250, 000 while 104 (46.0%) of the respondents earned more than shs. 250, 000. 210 (54.7%) of the respondents reported that they never had garbage heaps while 174 (45.3%) of the respondents revealed that they had garbage heaps.

DISCUSSION

Prevalence of malaria among children below the age of five years

The study findings showed that almost half of the children in this study were found to be sick with the parasite causing malaria which indicated a high prevalence of malaria among children below five years in Buhinga Regional Referral Hospital which was the study area. This is almost three times a higher prevalence compared to the national prevalence of 19.7% [11, 27] in their study that was carried out in Uganda. The high prevalence is probably attributed to the failure to effectively use preventive measures despite the caregivers having good knowledge of the prevention and transmission of malaria. Measures like possession of ITNs cannot determine how it is effectively used to prevent mosquito bites at night. Also, caregiver's knowledge about malaria does not determine their effective application of these measures and their attitudes towards their utilization, which may also account for the high prevalence of malaria in the study area. Future studies therefore need to assess the caregiver's knowledge of malaria about the utilization of preventive measures as this was not investigated in this study. Compared with the sample size and the population in obtaining the data, the prevalence in the study area remained high compared to the national prevalence which is at 19.7% [19]. Malaria remains the number one killer disease in children below 5 years despite its decrease in prevalence to 19% and this has remained constant since 2009 when it dropped from 42% to 19% being highest in the east central region. [19]. The high prevalence of malaria has led to a high public expenditure both in the health system and the individual households on procurement of anti-malaria drugs, low productivity where caretakers are seen spending a lot of time attending to sick children, high school dropouts, poverty, retardation among children and the increased morbidity and mortality due to severe anaemia, hypoglycemia and cerebral malaria as the common causes of death in children as compared to adults- though this was not investigated but can be proved from other studies or information, for example, the WHO overview on malaria indicates that children below five years were the most affected with malaria disease and this accounted for 71% of deaths among children in 2019 [28]. Strategies like improving the general prevention and control measure of malaria infections by involving all the stakeholders in the community and the community at large to implement the measures and not stopping at only knowing malaria.

Caretaker factors influencing the prevalence of malaria

Considering the findings of the study on the caretaker's factors, demographic factors had no statistically significant relationship with malaria prevalence among children below the age of five years. Caretaker's knowledge of malaria prevention; control and transmission was not significantly associated with malaria prevalence among these children. The findings of this study are not different from the study that was done in Malawi where an MIS indicated an increase in prevalence (P> 0.05) of 33% in 2014 in children below 5 years of age despite the Caretaker's knowledge of prevention, transmission and control of malaria infection [2, 29]. The caretaker's attitude towards the prevention of malaria was not significantly associated with malaria prevalence according to the study. This is contrary to the study carried out in Nigeria where caregivers did not have enough knowledge on how malaria is prevented, controlled and even transmitted [25]. In another study that was carried out in Okomesi- Ekiti state [30] caregivers had good knowledge of 99.7% of the prevention and transmission of malaria. Though the caregivers had enough knowledge and good attitudes toward malaria prevention, it still showed that little was done on the side of preventive measures and this could be associated with the Caretakers social economic status this can be compared to a study that was done in Gambia which showed that children from families with low social economic status were more likely to suffer from malaria compared to those with a high social economic status [2]. There could benew breeding sites that have not been identified for example congested rooms, under chairs, in birth rooms in case of self-contained houses or houses that have birth rooms near residents with stagnant waters may be acting as breeding sites for mosquitos. Therefore, there is a need for further investigation on the same. The other probable reason may be the lack of a boosting method of prevention like IRS which had not been implemented in the study area as in other areas where similar studies have been done before for example in Botswana where significant progress has been noticed in the decline of malaria prevalence in children below the age of five through a sustained provision of both LLINs and IRS [31-35]. In a similar study that was conducted in Uganda, children who suffered from malaria were 7.6 times in households that were not sprayed

compared to those from sprayed households. There is a need for the implementation of IRS in Fort Portal households as this is one of the recommended WHO strategies for eliminating malaria infection [31-35]. Other reasons for the caretaker factors that could be influencing the prevalence of malaria in children below five years would include the sharing of drugs among the sick children, use of local herbs, long distances to the health units and delay in seeking medical treatment. This is related to a study in Nigeria where 37% of caregivers preferred using herbs and only 17% could visit the dispensary for treatment of malaria. Also, the Caretaker's lack of knowledge on signs like loss of appetite and loss of energy as signs of malaria can affect proper diagnosis and treatment seeking for children who might present with no signs other than these two signs and this can lead to severe disease of complicated malaria increasing on hospital admissions and even mortality rates. There is a need for proper and intense health education on the signs and symptoms of malaria so that none of the signs is neglected by the caregivers.

Environmental factors influencing the prevalence of malaria in children below the age of five years

With the environmental factor influencing malaria prevalence, garbage heaps were seen to be significantly associated with malaria prevalence among children below the age of five years. A lot is needed to be done as this has been proved with other studies as being a breeding site of mosquitoes. For example, a study that was conducted in the Bata district, Equatorial Guinea where caregivers (24.77%) revealed that garbage was a breeding site for mosquitoes both in urban and rural settings [28]. A similar study which was carried out in Bolifamba –Cameroon also proved that garbage heaps among other environmental factors like stagnant waters, and swampy/bushy surroundings were highly associated with malaria infection [25]. Being an urban centre and seen to be a crowded area and overpopulated, there is no free space for people to dispose of their garbage. So, it is heaped around the households increasing or creating a favourable site for mosquitoes to breed and bite children. There is a need for an organized system of environmental control programs to improve garbage disposal by the municipal/town council team and households should be sensitized on storage before it is disposed to a specified destination. Proper use of preventive measures like sleeping under bed nets is another strategy to avoid mosquito bites in children.

Household factors influencing malaria prevalence in children below the age of five years

Malaria prevalence in children below the age of five years in the study area varied significantly over the different types of sources of light used in the individual households as presented earlier in the results. This probably is due to the failure of caretakers to utilize the preventive measures available with a misconception that mosquitoes don't bite when there is light and they do bite only in the dark. This is contrary to the study conducted in Uganda where Children in households without electricity were more than one and a half times more likely to have malaria than those children in households with electricity (OR 1.756, 95 % CI 1.072–2.877) [7]. Caretakers should be encouraged to use preventive measures despite the type of source of light they use in their households. They should ensure that the children sleep under the mosquito nets regardless of the available type of source of light in the household.

CONCLUSION

The prevalence of malaria among children below age five was very high as almost half of the sample size of children tested positive with a proportion (47), negative. Similarly, the occurrence of malaria among children below five years was significantly influenced by the presence or absence of garbage heaps in the home environment. The source of light was the only household factor that significantly influenced the prevalence of malaria among children below five years.

RECOMMENDATIONS

Enforcement of communication strategies and information dissemination to change individual and community behaviour and attitudes towards the control and prevention of malaria and insist that they should not only have knowledge of the transmission and control but also put in practice or implement the acquired knowledge practically both individually and as a community at large. This should be delivered by well and appropriately trained community health workers, VHTs, and health unit staff in the local languages that are most understood and mainly to vulnerable households. Efforts should also be made for these caretakers to know and understand the different signs and symptoms of malaria especially those that significantly contribute to the high prevalence of malaria for example loss of appetite and loss of energy which are serious signs of severe malaria. The municipality/town council administrators should find a way to dispose of garbage to avoid heaps around the households and also find and strategize a way of involving the entire town council

community and the surrounding communities on how to avoid garbage in their households as this is another suitable breeding site for mosquitoes.

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