Factors Contributing to the Prevalence of Malaria among Children Under Five Years attending Health Care at Logoba Health Center III, Moyo District. A Cross- sectional Study.

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Abstract

Background:
Malaria is an urgent public health priority, its costs of treatment trap families in a cycle of illness, suffering, and poverty, total funding for malaria control and elimination reached an estimated US$ 3billion, and contributions from the government of endemic countries amounted to US$ 900million, representing 31% of total funding (UNICEF, 2019).

Methodology:
The study design used was a descriptive cross-sectional study design using quantitative data that involved a sample size of 100 caretakers of 100 children below the age of five who attended health care at Logoba HCIII. A simple random sampling method allowed data to be collected on the prevalence of malaria and factors contributing to the Prevalence of Malaria simultaneously from 20th December 2021 to 07th January 2022.

Result:
The prevalence of malaria was high (35%) and the factors that were significant for the prevalence of malaria included; the caregiver's knowledge of signs and symptoms like loss of appetite and loss of energy 01%, Socio-economic factors which were contributed by farming and farming related activities, 75% and environmental factor about the presence of garbage heaps 56%.

Conclusion:
In conclusion, the prevalence of malaria was high at 35% and it was contributed to caregiver's knowledge about signs and symptoms of malaria, farming and related farming activities like water channels across the garden and farming near home, and garbage heaps around the homes.

Recommendation:
The study recommended more studies to be done in different areas and regions in the line, an effort to know and understand all signs and symptoms of malaria which are serious signs of severe malaria, sensitization by concerned authorities on how to avoid heap around the household as this is another suitable breeding sites for mosquitoes and sensitization by concerned authorities on safe farming and farm-related activities free for mosquitoes to hide and breed.

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1 Background to the study

The world health organization defines malaria as an acute febrile illness, a life-threatening parasitic dis-

ease caused by a bite of an infected female anopheles mosquito (WHO, 2016). Malaria can kill within 24 hours of the onset of symptoms and whereas it affects all people the most affected are children under five years of age (WHO, 2021).

Malaria has been and continues to be if not checked and controlled the number one parasitic killer disease globally that affects children mainly less than five years due to their low immunity. Malaria is an entirely preventable and treatable mosquito-borne illness (WHO, 2016). Globally, Malaria accounts for 227 million cases with 274, 000 deaths among children under the age of five accounting for 67% of the population. Malaria is an urgent public health priority, its costs of treatment trap families in a cycle of illness, suffering, and poverty, total funding for malaria control and elimination reached an estimated US$ 3billion, and contributions from the government of endemic countries amounted to US$ 900million, representing 31% of total funding (Badmos, 2021).

According to WHO the malaria prevalence depends on the possible environmental factors related to the parasite, vector the human host, and the environment. The transmission is also observed more in places where the life span of the mosquito is longer favoring the parasite to develop completely in a mosquito increasing the transmission and therefore high prevalence of malaria. The climatic conditions such as rainfall patterns, temperature, and humidity also affect the number and survival of mosquitoes, and in many places, transmission is seasonal and high always in rainy seasons and immediately after the rainy season. More transmissions and 2 epidemics can occur in people who have little or no immunity to malaria.

The African region accounts for 94% of the 229 million malaria cases and death of which 67% of deaths are due to malaria among children under the age of five worldwide (UNICEF, 2019). These children are the most vulnerable because they have not yet developed immunity to the disease (Danielle Roberts, 2015).

Sub-Saharan- Africa continues to carry a high portion of the global malaria burden with 90% of malaria cases and 92% of malaria deaths, children being particularly vulnerable accounting for 70% of all the malaria deaths. Malaria remains a major cause of morbidity in children in sub-Saharan Africa under the age of 5 years and one child dies after every 2 minutes (WHO, 2015). The East African region accounts for 88% of the malaria cases in Africa, and 10% of the cases occur in the south Eastern region (WHO, 2015).

In Uganda malaria is still a major public health problem associated with slow economic development and poverty and is the most frequently reported disease at both public and private health facilities in Uganda (UDHS, 2016). It accounts for 30 - 50% of the outpatient visits at health facilities and 15 -20% of inpatients or hospital admissions (UDHS, 2016). Malaria accounts for 27.7% of deaths among children under the age of five years (MOH, NMCP 2014 - 2020). Uganda ranked third in the total number of malaria cases in sub-Saharan Africa (WHO, 2015). Malaria is the leading cause of morbidity in Uganda with 90 -95%of of the population at risk and contributing to approximately 13% of the under-five mortality (Daniel Roberts and Glenda Mathews, 2016).

Prevalence of Malaria among children under five in the West Nile region accounts for 27.4% of the cases and this includes Moyo district (UDHS, 2016) and with 29.5% of outpatient attendances and 32% of inpatient admissions (MOH, 2018).

In Moyo district where the study area is located, malaria is the most common cause of death in children under five and the district suffers the highest malaria burden in the country. This creates a reason to find out the prevalence of malaria and the contributing factors in children below five years according to Uganda HMIS data from 2015-2019 (Sebuguzi, C. M, *et al* 2020).

2 Methodology.

Study design.

The study design used was a descriptive cross-sectional study design using quantitative data because this design allowed data to be collected on factors contributing to and Prevalence of Malaria simultaneously at a particular point in time and within the shortest time possible.

Study area.

The study was conducted in Logoba Health center III in the Moyo sub-county in the Moyo district WestNile region, Northern part of Uganda. Logoba Health center III is located in Onyire village in Logoba parish along Moyo town and Afoji border between Uganda and South Sudan.

The Health center offers Outpatient, Laboratory, Inpatient, Maternity, Immunization and Vaccina-

tion, MCH, ANC, family planning, and HIV/TB services to the community and the turn up is always good

Study population.

Data were collected from Caregivers of children under five years the Children under Five years were inclusive and caregivers who fully consented to the study were the ones who participated

sample size determination.

The sample size was determined by calculation using the Kish and Leslie formula 1965

N= Z2P(1-P)

D2 Is the sample size (total number of subjects required in the sample

Z is a standardized normal deviation value at 95% that corresponds to the level of significance=1.96.

P is an estimation of the prevalence of malaria in children under five years in Uganda on malaria prevalence in children under five. P=25%

D is a margin of error in which the normal range is 0.01 to 0.1. (0.085) is the estimated error that would occur

P=0.25, D=0.085, Z=-1.96

N = (1.96) (1.96) x 0.25(1-0.25)/085*0 085

N= 3.8416x0.1875/0.007225

N = 99.69550173 caregivers of the children under five years

N=100 caregivers of the children under the age of five years

: - Therefore the sampling size used was 100 caregivers of the children under five years

Sampling technique.

A simple random sampling technique was used in the study because every caregiver of the children under the age of five had an equal chance of participating in the study.

Sampling procedure.

Respondents were selected using Simple random sampling where the list of Children Under-five and their Caregivers who present to the health center every day for a period of 3weeks, where the name and outpatient numbers were written on small pieces of paper and folded. Then the folded pieces of paper are put in a box and shaken and then the participants were asked to pick the paper without replacement to find out participants of that day and a researcher self-administered questionnaire and questionnaire guides for those who can read and write and illiterate respectively were used to collect data from the Caregivers of the children under five years who consented, which was done every day from Monday to Friday for 3weeks.

Data collection method.

Data were collected using the researcher's self-administered questionnaire and questionnaire guide where respondents were given questions and translated questions to those who cannot read and immediately responded to the questions and were recorded.

Data collection tool.

Checklists on the questionnaire as guideline questions, self-administered, and pens were used for recording responses, for clarity, and illiterate questions were translated into the local language for proper responses to the questions.

Data collection procedure.

The questionnaires with closed-ended questions were used to collect quantitative data. The questionnaire was also used on the literate respondents who filled in the self-administered questionnaire since some were able to read and write the answers, the respondents were willing to answer the questions honestly and it is less expensive for data collection. The respondents recorded their answers within closely defined alternatives. In this study, the questionnaires were hand-delivered to the respondents. The questionnaires were subjected to Caregivers of the Children Under five years who were among the selected respondents in the sample filled it. The technique was used because it was appropriate for the investigation of the researcher's needs, expectations, perspectives, priorities, and preferences.

Questions were asked using researcher-administered questionnaires and responses were recorded until 100 respondents were interviewed.

Piloting the study.

The questionnaires were pretested in Eria Health center III in Moyo sub-county, Moyo district with 10 Caregivers of children under the age of five to assess the reliability and viability of the questionnaires and to allow correction of poorly constructed questions.

Study variables.

The study variables were independent and dependent.

Dependent variable.

The dependent variable was The Prevalence of Malaria among Children Under five years.

Independent variable.

The independent variables included were Caregivers, socioeconomic, and Environmental/community-related factors contributing to the prevalence of Malaria among Children Under five years attending Logoba Health center III, Moyo district.

Quality control.

The research tools were pretested in Eria parish with the help of two research assistants who were trained for two days and the pilot study was carried out in Moyo Sub-county in Moyo district with a sample of twenty participants to pretest the efficiency of the tools and some adjustment on the questions.

Selection criteria.

The selection criteria for the study were inclusive and exclusive.

Inclusive criteria.

The persons included in the study were caregivers, Children Under five years available and with a sound state of mind at the time of consent and data collection, and those who were attending Health care at Logoba Health center III, Moyo district.

Exclusive criteria.

The study excluded all people who were below 18 and above 5 years of age, unless a caregiver and those who did not consent, those with the unsound mind during the time of study especially those who were drunk and mentally ill in the area were also excluded.

3 Data analysis and presentation.

Data collected were manually tallied using tallying sheets and information obtained was analyzed statistically using Microsoft and presented in form of tables, pie charts, bar graphs, and frequency distribution tables.

Data management.

Data generated were checked for completeness. The researcher administer a questionnaire to the respondents and these were checked for completeness afterward. It was managed using Microsoft Word and Microsoft Excel. After data were analyzed, the questionnaires were kept securely for future reference which only authorized persons can access for confidentiality.

Ethical consideration.

An introductory letter was obtained from the Research ethics committee of Medicare Health Professional College introducing the researcher to the District Health Officer and the In-charge of Logoba Health Centre III to carry out the study from Caregivers who had consented without using the names of the participants.

4 Results:

Socio-demographic characteristics of the caregivers of children under five years

A total of 100 participants were assessed, out of which the majority were female 90(90%) and the minority were male 10(10%). The respondents most of which were aged 16-24years 43(43%), closely followed by 25-34yaers 33(33%) and followed by 35-44years and >45years were 17(17%) and 07(07%) respectively. The respondents were also assessed for the level of education they had to attain and almost a half attained primary education 44(44%), secondary level attainders were 38(38%), tertiary and university attainders were 14(14%), and those who never went to school were only 04(04%). Most of the participants 75(75%) were married and the single was the least 06(06%). Of the 100 participants, the majority of the respondents were 68(68%) and only 04(04%) were from other religions

Level of knowledge of the Caregivers related factors to the prevalence of malaria among children under five years.

According to the two diagnostic tests above the prevalence of malaria among children under five years who took part in the study, Out of 100 who participated 27(27%) were positive and 54(54%) were negative by MRDT and 08(08%) malaria parasites seen and 11(11%) no malaria parasites were seen under microscopy.

The bar graph above shows the participant's knowledge about malaria and whether they had ever heard about malaria out of 100 respondents 98(98%) had ever had about malaria and only 02(02%) had never heard about malaria.

From the findings above, the majority of the respondents 80(80%) heard information about malaria in the health care unit, 17(17%) heard from the radio 02(02%) from other sources and 01(01%) heard from Newspaper.

The bar graph above shows the participant's knowledge about the transmission and spread of malaria. Out of 100 respondents 93(93%) men-

Table 1. Socio-demographic characteristics of caregivers of the children under five years attending health care atLogoba Health Centre III, Moyo district.

Variables	Attributes	Frequency (N=100)	Percentage (%)
	Female	90	90
Gender	Male	10	10
	Total	**100**	**100**
	16-24	43	43
	25-34	33	33
Age	35-44	17	17
	>-45	07	07
	Total	**100**	**100**
	Never went to school	04	04
Educational level	Primary	44	44
	Secondary	38	38
	Tertiary and University	14	14
	Total	**100**	**100**
	Single	06	06
Marital status	Married	75	75
	Separated	09	09
	Widowed	10	10
	Total	**100**	**100**
	Catholics	68	68
	Protestants	15	15
Religions	Muslims	13	13
	Other religions	04	04
	Total	**100**	**100**

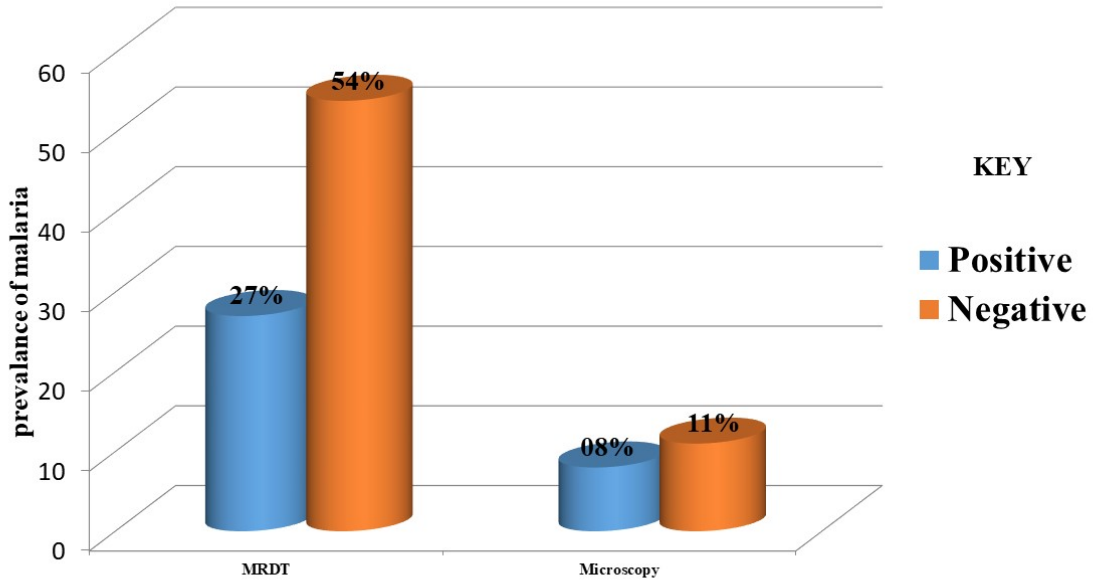

Figure 1. Distribution of malaria diagnosis with MRDT and Microscopy (N=100)

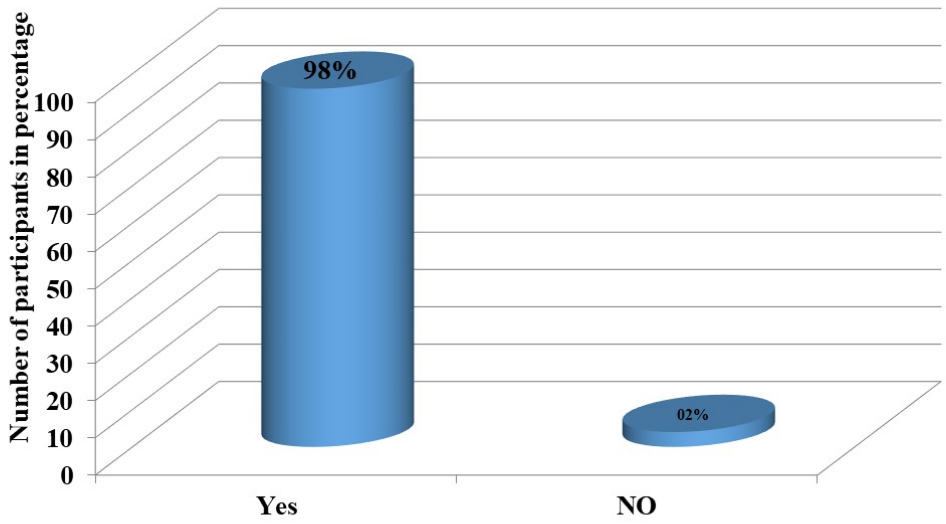

Figure 2. Participants have ever heard about malaria (N=100)

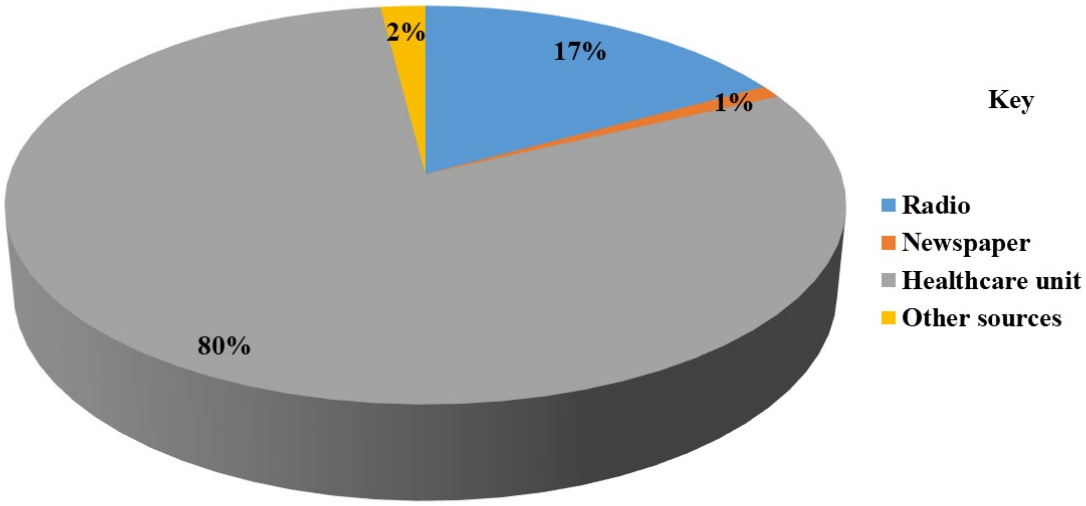

Figure 3. Information flow on malaria to the participants (N=100)

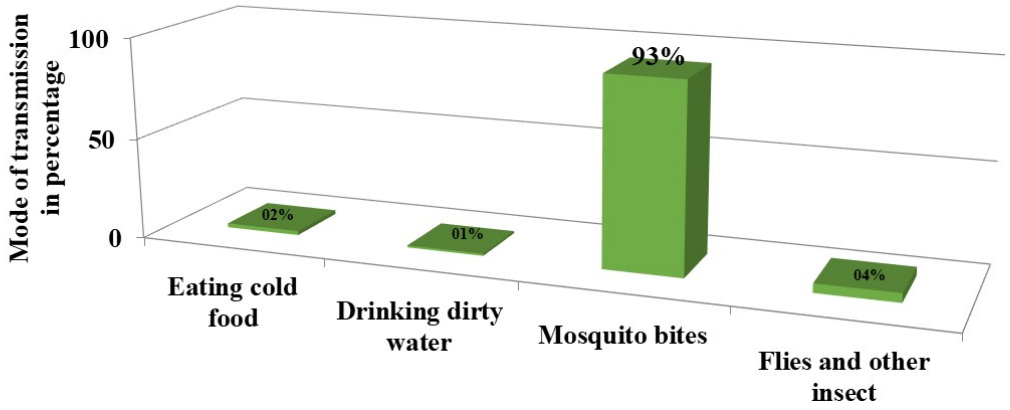

Figure 4. Modes of transmission of malaria (N=100)

tioned that it is transmitted via bites of a mosquito infected with malaria parasites, 04(04%) mentioned flies and other insects. However, 02(02%) mentioned eating cold food and 01(01%) said drinking dirty water.

According to the findings above 60(60%) of respondents were not residing close to a swamp and only 40(40%) reside close to a swamp.

5 Socio-economic factors contributing to the prevalence of malaria among children under five years

The bar graph above shows participants' economic activities that earn living for them, out of 100 respondents 75(75%) were farmers, 17(17%) earned through another source, 06(06%) had small business enterprises, and 02(02%) as maids.

The pie chart above shows the participant's possession of mosquito nets as one of the ways to prevent the spread of malaria among children under five years. Of which, 95(95%) of the respondents had a mosquito net and only 05(05%) respondents had no mosquito net because of the two main reasons that are it expensive and had no access to the nets as 04(04%) and 01(01%) respectively.

Other malaria spread preventive measures (N=100)The graph above shows the participant's knowledge of other malaria spread preventive measures, majority of the respondents 62(62%) mentioned pouring paraffin on stagnant water and followed by insecticides and mosquito repellent with 18(18%) and 15(15%) respectively and only 05(05%) mentioned mosquito coils.

The bar graph above shows the farming activities that can put the respondent's children at risk of getting malaria, most of the respondents mentioned Water channels across the gardens 70(70%), 15(15%) mentioned farming near homes, 07(07%) and 08(08%) said farming near the game park and river respectively.

Environmental/Community-related factors contributing to the prevalence of malaria among children under five years

From the findings above they had garbage heap close to the house and 0ut of 100 participants, 56(56%) had garbage heap close to the house and only 44(44%) didn't have garbage heap close to the house. Most of the participants 68(68%) cleared stagnant water around the homesteads and 32(32%) do not r clear stagnant water around the homesteads. Out of 100 participants who were assessed for a season where malaria affects their

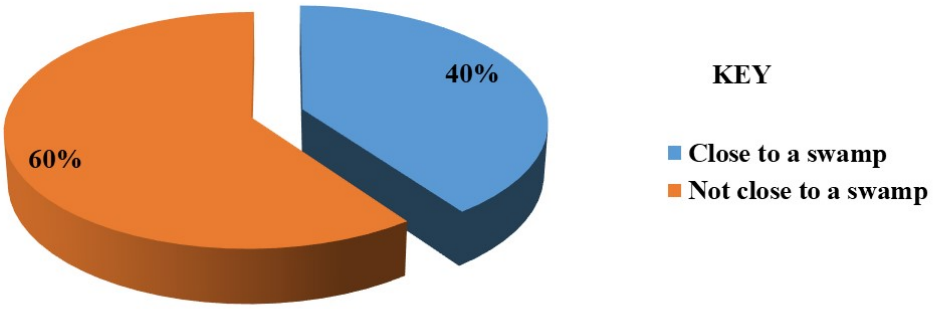

Figure 5. Participants' residence location in relation to swamp (N=100)

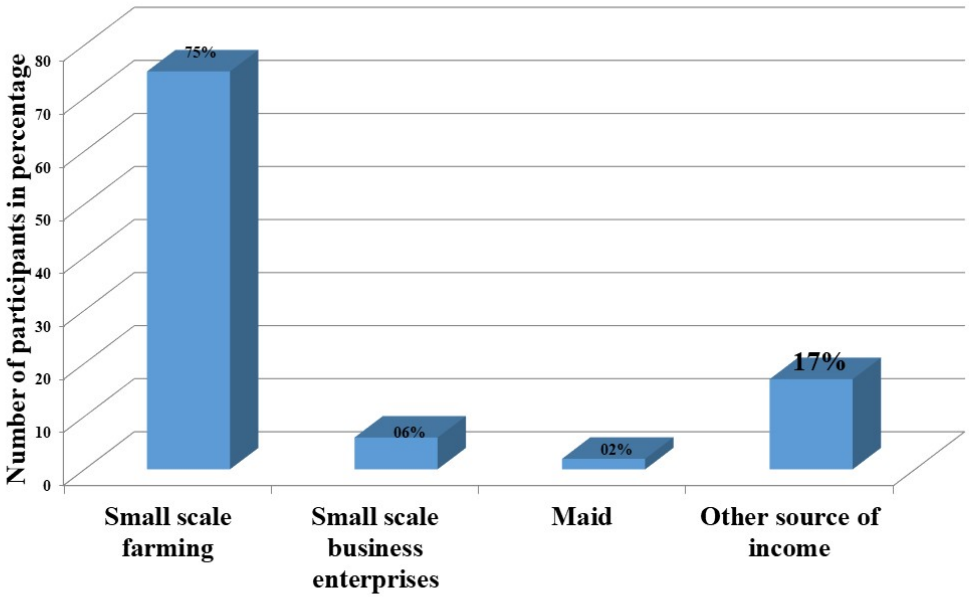

Figure 6. Economic activity that earn living for respondents (N=100)

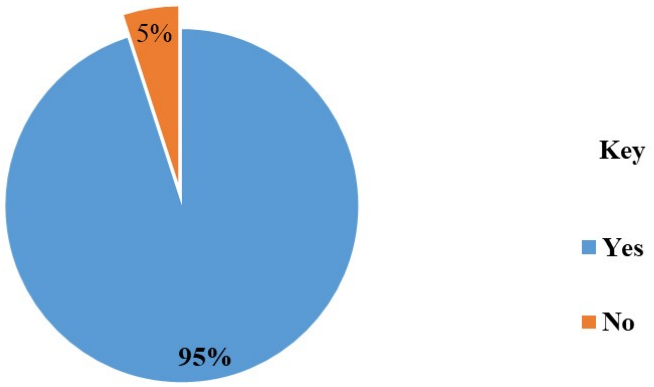

Figure 7. Respondents with mosquito net as one of the preventive measure (N=100)

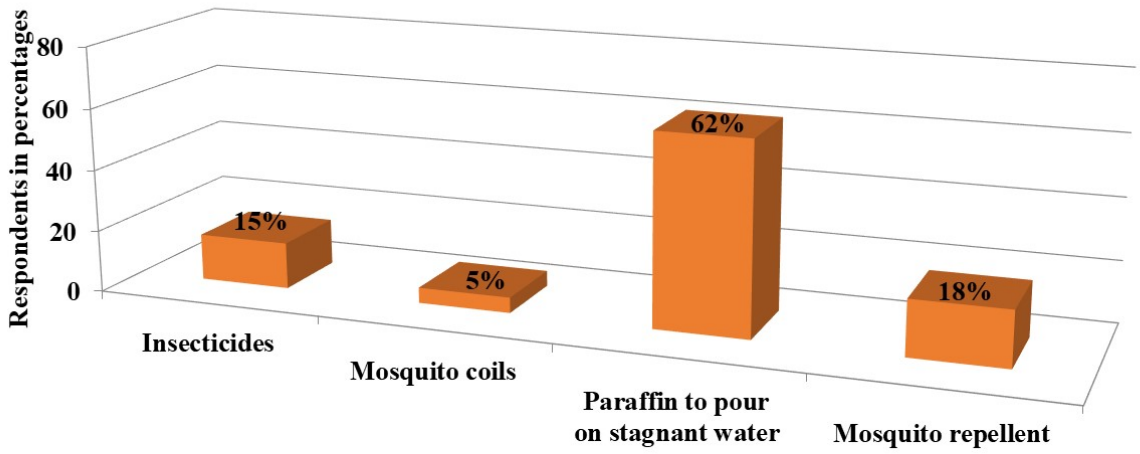

Figure 8. Other malaria spread preventive measures (N=100)

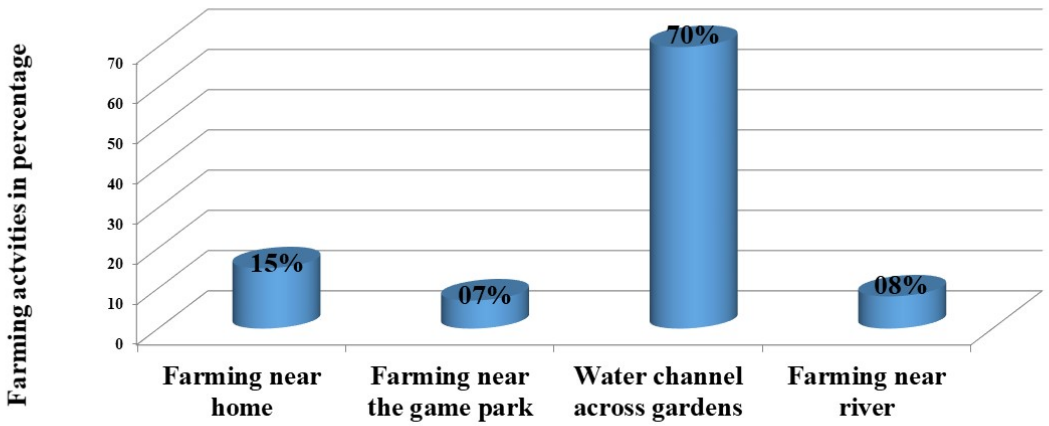

Figure 9. Farming activities that can lead to spread of malaria (N=100)

Table 2. Environmental/Community-related factors contributing to the prevalence of malaria among children under five years attending health care atLogoba Health Centre III

Variable and Attributes	Frequency N=100	Percentage (%)
Water drainage system	59	59
Good	41	41
Bad	**100**	**100**
Total		
Clear stagnant water	68	68
Yes	32	32
No	**100**	**100**
Total		
Have bushes around the house	42	42
Yes	58	58
No	**100**	**100**
Total		
Have garbage heap close to the house	56	56
Yes	44	44
No	**100**	**100**
Total		
Season where malaria affect their children most	10	10
Dry season	84	84
Rainy season	06	06
Doesn't have season	**100**	**100**
Total		

children most, the majority 84(84%) respondents said rainy season, 10(10%) said dry season and 06(06%) said doesn't have seasons.

The findings above show the participant's ideas about seasons of the year where malaria affect the children under five years, of which the majority mentioned wet(rainy) season 84(84%), 10(10%), and 06(06%) mentioned dry season and doesn't have season respectively.

The bar graph above shows the participant's residence about the garbage heap close to the house of which 56(56%) had a garbage heap close to the house and 44(44%) were not having a garbage heap close to the house.

6 Discussion, Conclusions, and Recommendations

7 Discussions

Level of knowledge of the caregivers contributing to the prevalence of malaria among children under five years at Logoba HCIII.

The majority of the caregivers 98(98%) said they had ever heard about malaria this was probably due to the continuous health education of the caregivers and the communities on malaria and its preventive measures since most of them 80(80%) said they got information about malaria from the health care unit while minority 02(02%) never heard about malaria, this might have been due to believing in traditional medicines and hence no access to the health care unit where most of the respondents got their information from. This study is in line with research conducted by Jumbam et al, (2020) in Zambia that showed that out of 75 respondents 69(92%) had ever heard about malaria and only 06(08%) had never heard about malaria.

The majority of the respondents 93(93%) knew that malaria is transmitted through a bite of an infected mosquito this might have been due to routine education of the caregivers and community by the health care providers, radio talk shows, and school children by their teachers while minority 07(07%) don't know how malaria is transmitted and said through drinking of dirty water 01(01%), eating cold food 02(02%) and 04(04%) mentioned flies and other insects this was probably due to less access to health education and radio talks where the other caregivers got their information from. This study agrees with a study conducted in Tanzania with 277 respondents by Jumbam et al, (2020). Out of which 264(95.31%) know that malaria is transmitted through a bite of an infected mosquito and only 13(4.69%) said malaria is transmitted by eating a lot of mangoes, coming in close contact with malaria patients, and drinking dirty water.

Minority 01(01%) don't know the important signs and symptoms of malaria-like loss of appetite and loss of energy, this was probably due to less information's provided by the health care providers the caregivers about the most common signs and symptoms of malaria while the majority of the respondents 79(79%) knew that malaria presents with high body temperature, this might have been due to the source of information about malaria given by the health workers about the most common signs and symptoms.

Socio-Economic factors the contributing to the prevalence of malaria among children under five years at Logoba HCIII

The majority of the respondents 75(75%) were farmers and said farming activities like creating water channels across farmland 70 (70%) this was because they said it could act as a breeding ground for mosquitoes which could bite their children during the farming time while the minority 07(07%) farming game park this was because they said the mosquitoes might have few places to hide since the animals in the game park are always moving around looking for what to eat hence destroying the habits for mosquitoes. This study agrees with the study carried out by Fredrick G. Kabbale et al, (2014) in Nabwigulu parish, Nabwigulu Sub County Kamuli district. Malaria burden was found to be highest (46%) among the subsistence farming communities of Nabwigulu, compared to Bukungu fishing community (26.3%) and Kyanshama subsistence farming communities neighboring the game park (7.7%).

Environmental/Community-related factors contributing to the prevalence of malaria among children under five years at Logoba HCIII

Garbage heaps near the house were 56(56%) this was because the garbage heap might act as breeding grounds for the mosquitoes while 44(44%) said garbage heaps far from the house would reduce the breeding place for mosquitoes hence reducing the number of mosquitoes.

The majority of the respondents 78(78%) said malaria is high during the rainy season this was be-

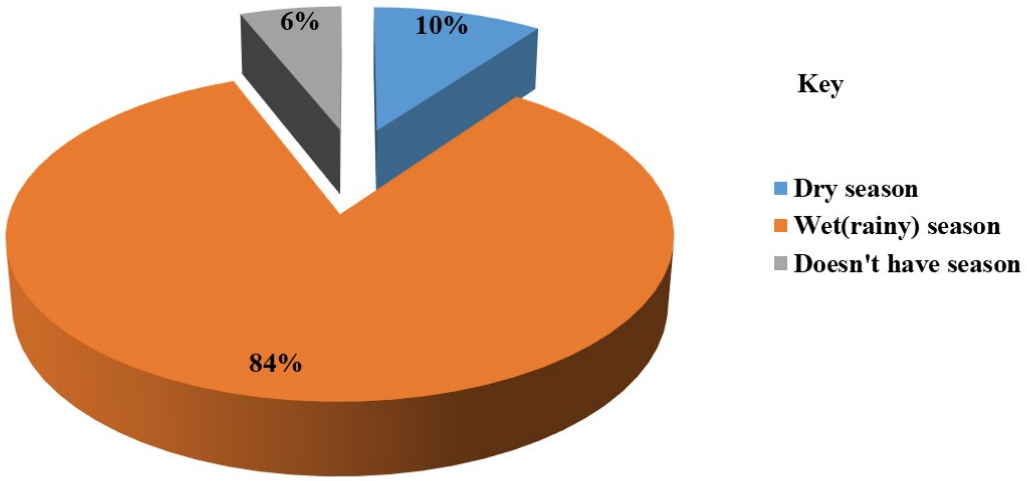

Figure 10. Seasons where malaria affects the children most (N=100)

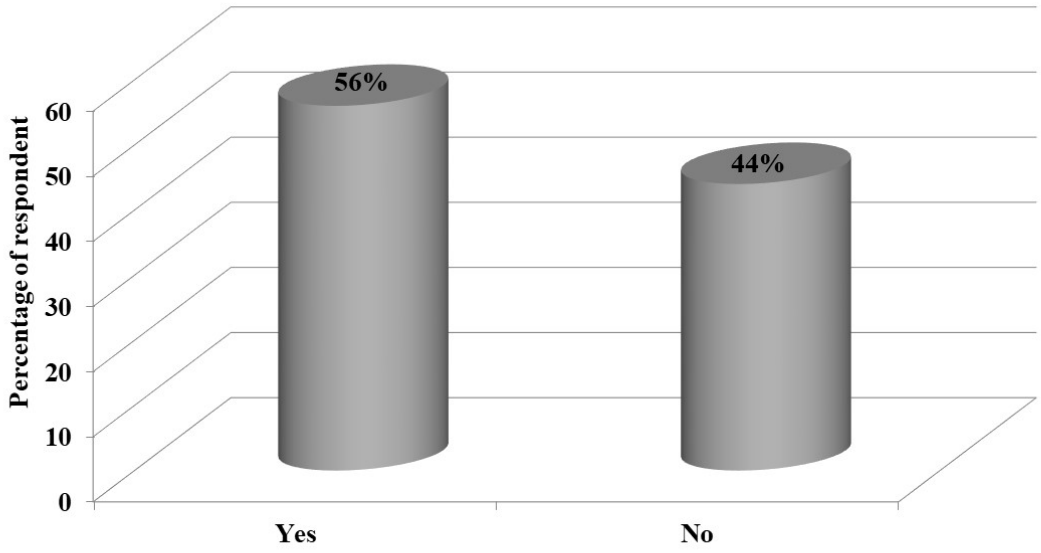

Figure 11. Participants who had garbage heaps close to their house (N=100)

cause rain could provide water which could act as a breeding ground for mosquitoes meanwhile minority of 07(07%) respondents said malaria infection has no specific season this is because mosquitoes can breed anywhere since there is water through the year from boreholes and wells.

8 Conclusion

The study found out that, the prevalence of malaria among children under five years was high, 35% in Moyo district which is twice compared to 16.9% prevalence of malaria in Uganda(UBOS, 2019) and it was due to not knowing that malaria causes loss of energy and loss of appetite, farming and farming related activities like water channel across the garden and the presence of garbage heaps in the home environment; the majority of the respondents knew a lot about malaria prevention and control measures and how malaria is transmitted as majority said through a bite of infected mosquito but had no option than to continue with activities that expose them and their children to mosquito bites like farming and farming activities since most of them stopped at the primary level of education.

Recommendation

Since the study was done in one area, MOH and health schools should allow more studies to be carried out in different areas and regions of the country to reduce the high prevalence of malaria in the country

Efforts should be made for these caregivers by the health workers and village health teams (VHT) to know and understand every sign and symptom of malaria, especially those that significantly contributed to the high prevalence of malaria for example loss of appetite and loss of energy which are serious signs of severe malaria.

The district and Sub-county administrators should find a way how to address the issue of disposal of garbage to avoid heaps around the households and also find and strategize a way of involving the entire community and the surrounding communities on how to avoid garbage in their households as this is another suitable breeding site for mosquitoes.

The district and Sub-county authorities should liaise with the district agricultural department to ensure safe farming activities free from hiding and breeding place for mosquitoes through community sensitization this is because farming was seen to be a significant factor contributing to the prevalence of malaria in children below the age of five years.

9 Acknowledgement.

I would like to take this opportunity to give thanks to Almighty God for His protection and love throughout the course and protection of my family members in terms of health and finances.

I extend my heartfelt gratitude to my supervisor MS Santa Gloria whose efforts made the success of my research report by dedicating her precious time to guiding me to meet the standards required of me in the research report.

Also in special ways the In-charge Logoba Health center III, the entire research committee of Medicare health professional college, Ocen Jerome, Drani John, Asindua Denis, Olwochi Habert, and my class DCM III for supporting me physically, materially, and spiritually.

Study limitations.

The dry season to some extent limited the study as the Caregivers who had been going to the garden to harvest their crops, thus sent children who could not consent as well as scattered Caretakers in different villages of the Logoba and Vura parish.

10 List of abbreviations and acrynoms.

ACT : Artimesinine Combined Therapy

IPT : Intermittent Preventive Treatment

ITN : Insecticides Treated Net

LLTN : Long Lasting Treated Nets

MOH : Ministry Of Health

RDT : Rapid Diagnostic Treatment

TB : Tuberculosis

UBOS : Uganda Bureau of Standards

UDH : Uganda Demographic Health Survey

UNICEF : United Nations Children Emergency Fund

WHO : World Health Organization

Operational Definitions.

Malaria: Is the life-threatening disease caused by a bite of an infected Female anopheles mosquito during a blood meal (WHO, 2019)

Malaria prevalence: Is the proportion of people infected with malaria infection at a given time (Jill Seladi-Schulman, Ph. D, 2020).

Anemia : Is a condition in which the number of red blood cells or the hemoglobin concentration within them is lower than normal (WHO, 2016).

Endemic: Is a disease that is always present in the community at a constant level.

Fever: Is body temperature above 37.5 degrees Celsius depending on the time of the day (WHO).

Morbidity: Is a state of having a specific illness or condition (Jill Seladi- Schulman, Ph. D, 2020).

Mortality: Refer to several deaths that occurred due to a specific illness (Jill Seladi- Schulman, Ph. D, 2020).

Prevalence: Is the proportion of a population that has a disease, illness, or medical condition (Jill Seladi- Schulman, Ph. D, 2020).

Caretaker: Refer to someone who takes responsibility for those children below the age of five years.

Environment: The surroundings or conditions in which a person, animal, or plant lives or operates.

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