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# Impact of the Knowledge of Malaria Fever Causes and Symptom among Patients Attending in the Primary Health Care at Saudi Arabia 2022

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**Abstract:**

**Background:**

Malaria is an infectious disease caused by a protozoan parasite species belonging to the genus Plasmodium. There are five Plasmodium species that affect humans. The female Anopheles mosquito is a vector that can carry the parasite and transmit the disease from an infected individual to a healthy one. The major Anopheles species that transmit the malaria parasites in Saudi Arabia, malaria morbidity has reduced significantly in most regions of Saudi Arabia, but it is still a serious issue. Saudi Arabia and Yemen are the only two countries in the Arabian Peninsula that are yet to achieve malaria elimination. This study assessed Impact of the knowledge of Malaria fever causes and symptom among patients attending in the Primary health care at Saudi Arabia 2022. More than 80% of the total populations are at risk of malaria in the 22 countries in Asia and the Pacific. South Asia alone is home to an estimated 1.4 billion people at risk of contracting malaria. Utilization of malaria interventions are influenced by, among other things, the level of knowledge and attitude that the community has toward the infection as well as the available interventions. This study assessed malaria knowledge, attitudes, and practices on malaria infection and interventions in Saudi Arabia.

**Aim of the study:** To assessed Impact of the knowledge of Malaria fever causes and symptom among patients attending in the Primary health care at Saudi Arabia 2022.

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**Methods:** Across sectional descriptive study conducted among patients attending in the Primary health care at Saudi Arabia, during the January to March, 2022, the Sample size of patients. Our total participants were (300).
**Results:** shows that the majority of participants approximately (39.0%) were aged from 35-50 years of age, followed by <25 years and >50 were (15.0%), sex, more than half of participant (58.0%) were male, income, most of participants (50.0%) were have more than >10000 SR monthly, regarding the educational level, this table reveals that approximately of participant (30.0%) were university while primary were (29.0%), regarding the Sources of knowledge about dengue fever the majority of participant Communication Web-sites were (31%).
**Conclusion:** knowledge of Malaria fever causes and symptom among patients in malaria-endemic rural areas of the Saudi Arabia. There is a need for the implementation of interventions that will focus on increasing knowledge of malaria prevention and causes and symptom as well as promoting regular bed net usage and healthcare seeking behaviors.
**Keywords:** Assessment, Impact, knowledge, Malaria, causes, symptom, patients, Primary health care, Saudi Arabia.

## Introduction

Malaria is a major human health problem in tropical and subtropical regions of the world. Malaria kills about 2 million people each year (1). About 90% of all malaria deaths in the world occur in Africa, south of the Sahara (2). Severe anemia and cerebral malaria constitute the major causes of death, mostly in children under the age of 5 years (3)

Despite the achievements performed by Saudi Arabia in recent years, the malaria infection remains as one of the leading causes of morbidity and mortality in the country (4). Malaria prevalence in the country has declined to 7.31%, however, it varies from one region or district to another, with some regions having prevalence as low as one percent while others show a higher prevalence up to 40.00% (5)

On a global scale, Saudi Arabia is still among 10 countries with the highest prevalence of malaria (6), and in 2020 this country contributed to about of the global malaria-related deaths (7). Saudi Arabia recently included the seasonal malaria chemoprevention (SMC) strategy in the 2020–2025 Malaria Control Strategic Plan (8). However, before it was scaled out, the protective effectiveness of the strategy had to be evaluated in Saudi Arabia the settings where malaria transmission showed to be highly seasonal (9). It was also important that the target communities' level of knowledge, attitudes, and practices on malaria infection and the available interventions was assessed. (10) The information would help to understand how SMC would be perceived and utilized in the two settings. Likewise, understanding the communities' level of knowledge, attitudes, and practices would enable them to improve the implementation of the available interventions and hence to increase their impact against the infection (11). Education and knowledge to the causes and symptom are used to combat malaria (12). Even though malaria is endemic and has a seasonal outbreak in the region of Saudi Arabia, there is no data on knowledge, attitudes, or practices about malaria prevention in the region(13) .

Saudi Arabia is one of the seriously affected countries in African countries, as malaria is the top ranking in the list of common communicable diseases in the country (14). It is one of the leading causes of morbidity and mortality in Saudi Arabia (15). Nearly 3/4 of the land is malarias, with malaria primarily associated with altitudes as high as 2500 meters and high risk

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with rainfall patterns above 100 mm (but peak during and just after the rainy season (16). Malaria appears to be on the decline in Saudi Arabia which have greatly increased coverage of insecticide-treated bed nets (ITNs) and indoor residual spraying (IRS), and expanded programs for the diagnostic testing and treatment of malaria (WHO, 2011). (17) The control of the disease and its vectors in Africa is less successful because of the occurrence of ant malarial resistant parasites and insecticide resistant vectors, the shifting behavior of mosquitoes (from indoor to outdoor) as a result of frequent indoor insecticide sprays, lack of efficient infrastructure, shortage of trained manpower, lack of appropriate management, short falls in funding and inability to integrate different methods of control (18).The main malaria control strategies in Saudi Arabia include: early diagnosis and prompt treatment, selective vector control, epidemic management and control, environmental management, and personal protection through the use of ITNs (19).

**Literature Review**

Study by (20) reported that poor knowledge resulted in poor management of malaria (20). A person's knowledge about malaria prevention was affected by male gender, rural residence, low income level, and illiterate educational level (21, 22). Male gender, rural residence, low educational level, low income (16), and Islamic religion were associated with lower rates of use of malaria prevention measures; whereas good knowledge boosted the use of malaria prevention practices (23). A person's attitude toward malaria prevention was affected by a low wealth quintile and a low educational level (21).

As of 2020, there is one vaccine which has been shown to reduce the risk of malaria by about 40% in children in Africa (Anonymous, 2020; WHO, 2016). A pre-print study of another vaccine has shown 77% vaccine efficacy, but this study has not yet passed peer review (24).

Previous studies conducted in Jazan and some other regions of the country, including the Makkah region and in the Al-Ahsa governorate in Eastern province (25) Alonso et al. (26) showed a dual trend of malaria cases in Jazan between 2000 and 2014, i.e., a significant reduction in autochthonous malaria cases (from 35.3 per 10,000 population in 2000 to the lowest rate of 0.11 cases per 10,000 population in 2014 and a constant number of imported malaria cases. A similar situation was also reported in the neighboring Aseer region (25) However, since 2015, a steady rise in malaria cases in both Jazan and Aseer regions has been noted (27), and this observation is supported by the findings of the current study. Compared to the very low proportion of autochthonous cases reported annually as compared to imported cases since 2014, the anther study found that 4.5% (51/1124) of the cases can be considered autochthonous, with autochthonous cases reported during the outbreak in Baysh governorate were excluded. Hence, generally, it can be said that Saudi Arabia continues to make good progress toward achieving the WHO (28).

Saad et al.,( 2015) report that malaria fever vector change occurs on a large range of intricate temporal and spatial scales, where the change occurs on a daily scale to where the evolution of a potential repetition zone of the vector occurs on a yearly scale. In addition, modeling the daily changes of hotspots of the vector is conceivable on a sub-district scale but not on a sub-municipality scale, where long-range interactions cannot be modeled accurately (29). This could be due to a lack of training on the recognition of warning signs and case classification of

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malaria fever as per the updated WHO guidelines. Identification of warning signs of malaria fever and indications that lead to shock is critical for managing dengue (14).

also previous knowledge, attitude and practices (KAP)studies concerning control of Malaria fever showed the lack of knowledge about clinical features or control measures as the most common problem.(13) This study found almost a third of PHC physicians had insufficient knowledge about important investigations of dengue as well as prevention measures toward DF. In southern Taiwan. (30)

Study by (28) showed that the majority of the study population presented good knowledge of malaria infection and interventions. Similar findings have been reported in other studies (14).Of the study participants, 92.20% knew that malaria is transmitted through a mosquito bite. Findings in other parts of Tanzania (17) and other countries (30) have indicated a much lower proportion of subjects having knowledge of malaria transmission. Likewise, 83.40% of the study population knew that mosquitoes breed in stagnant water, but only 36.60 and 34.30% knew that mosquitoes could thrive in grasses and bushes, respectively. Fever was the most mentioned malaria symptom, followed by headache; however, other symptoms including sweating, shivering, body weakness, and abdominal pain were each mentioned by <40.00% of the individuals. Furthermore, treated bed nets were mentioned by 94.60% of the study population as a malaria intervention, but majority of them did not know other interventions such as insecticide spray, destroying of breeding sites, mosquito coil repellents, as well as treatment of malaria patients. (31)

**Rationale:**

Malaria is a vector-borne disease endemic in most of where the most common parasite to infect humans is Plasmodium falciparum. It is a disease with complicated patterns of transmission that is linked to significant geographical and temporal variation. Malaria poses a threat to millions of people living in tropical and subtropical countries. The Knowledge of Malaria fever causes and symptoms among patients attending in the Primary health care may pace alarm and improve the outcome of malaria control. In Saudi Arabia the national malaria control programmer, which was established in 1948, has achieved a tremendous reduction in the annual number of malaria cases. Throughout the world, malaria causes 300–500 million cases and up to three million fatalities annually; of these, Africa alone bears more than 90% of the burden, and more than 80% of malaria deaths take place there, while occur in Asia and Eastern Europe Globally, malaria cases increased by and deaths, in the global context, this number of cases is considered high and the country therefore remains determined to make vigorous efforts to achieve status stability

**Aim of the study:**

To assessed Impact of the knowledge of Malaria fever causes and symptom among patients attending in the Primary health care at Saudi Arabia 2022.

**Objectives:**

To assessed Impact of the knowledge of Malaria fever causes and symptom among patients attending in the Primary health care at Saudi Arabia 2022.

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**Methodology:**

**Study design:**

This study is a prospective cross-sectional study design was used in carrying out of this study.

**Study Area**

The study will be carried out in the city of Saudi Arabia is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad and the principal place of the pilgrims to perform Umrah and Hajj. It is located in the western area in Kingdom of Saudi Arabia and called the Holy Capital. Contains a population around 2.578 million. This study was conducted in primary health–care centers at Saudi Arabia, and it reflects a diversified demographic profile with a considerable portion of the population comes from rural descent, while others come from an urban one. This difference translates into biological, socioeconomic and lifestyle differences in the population.

**Study Population**

The study has been conducted among primary health-care regarding the malaria fever the sample was selected to include primary health-care medical practitioners who aged from <25years - > 50 years and their total number was 300

**Selection criteria**:

**Inclusion criteria**

- aged from 25 to >50 year

**Exclusion criteria :**

- No specific exclusion criteria.

**The sample size**

The sample size has been calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly to sample size from medical practitioners by the required sample size; (300). (Male and female) and adding 10 more to decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been 300. Computer generated simple random sampling technique was used to select the study participants. Data collection was done by the researcher during a during the January to March, 2022,

**Sampling technique**:

Systematic random sampling technique is adopted. After that, by using random number generator, then simple random sampling technique was applied to select the patients attending in the Primary health care . Also, convenience sampling technique will be utilized to select the participants in the study. By using systematic sampling random as dividing the total patients attending in the Primary health care by the required sample size; (300 ).

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**Data collection tools of the study:**

Tool was designed to collect the necessary data, and developed by the researchers after review of the literature.

**Tool I: PHC patients' knowledge and practices regarding** Malaria fever **structured interview questionnaire**:

It included five parts as follows:

**Part one: Patient's socio demographic characteristics**:

This part consisted data about patient's age, sex, marital status, level of education, religion, income and sources of information.

**Part two**: **Knowledge about** causes**, signs and symptoms of** Malaria fever**:**

Include items that determine the patient's knowledge about clinical manifestations of Malaria fever. This part contains 9 questions.

**Data collection technique**:

Researcher has been visits the selected primary health care setting after getting the approval from the ministry of health. The researcher has been obtained permission from primary health care setting director and participants.

After the arrival of the participants has been explained the purpose of the study to all participants attending.

**Data entry and analysis**:

The Statistical Package for Social Sciences (SPSS) software version 24.0 has be used for data entry and analysis. Descriptive statistics (e.g., number, percentage) and analytic statistics using Chi-Square tests ($\chi 2$) to test for the association and the difference between two categorical variables were applied. A p-value $\leq 0.05$ will be considered statistically significant.

**Pilot study**

A pilot study has be conducted in primary health care patient's the same sector due to the similarity to the target group using the same questionnaire to test the methodology of the study. As a feedback, the questionnaire will be clear and no defect has be detected in the methodology

**Ethical considerations**

Permission from the joint program Family Medicine program has be obtained. Permission from the Directorate of health, verbal consents from all participants in the questionnaire were obtained. All information was kept confidential, and results has be submitted to the department as feedback .

**Budget:** Self-funded

**Result**

**Table 1. Distribution of the demographic characteristics of about symptoms and sign of the malaria fever in the participants. (n=300)**

| | N | % |
|---|---|---|
| **Age** | | |
| <25years | 45 | 15 |
| 25-35 years | 93 | 31 |
| 35-50 years | 117 | 39 |
| >50 years | 45 | 15 |

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| | | |
|---|---|---|
| **Sex** | | |
| Female | 126 | 42 |
| Male | 174 | 58 |
| **Marital status** | | |
| Single | 84 | 28 |
| Married | 129 | 43 |
| Widow | 33 | 11 |
| Divorced | 54 | 18 |
| **Income** | | |
| Less than 5000 SR | 96 | 32 |
| 5000-10000 SR | 54 | 18 |
| >10000 SR | 120 | 50 |
| **Educational level** | | |
| Illiterate | 57 | 19 |
| Primary | 87 | 29 |
| Secondary | 66 | 22 |
| University | 90 | 30 |
| **Sources of knowledge about dengue fever** | | |
| TV | 48 | 16 |
| Health professionals | 45 | 15 |
| Family | 84 | 28 |
| Communication Web-sites | 93 | 31 |
| Journals and magazines. | 78 | 26 |

This table 1 shows that the majority of participants approximately (39.0%) were aged from 35-50 years of age, while age from 25-35 years were (31.0%) followed by <25 years and >50 were (15.0%), regarding sex, more than half of participant (58.0%) were male followed by female were (42.0%) , regarding marital status, the majority of participant (43.0%) were married, followed by single were (28.0%) while divorced were (18.0%), regarding income, most of participants (50.0%) were have more than >10000 SR monthly followed by less than 5000 SR were (32.0%) while from 5000-10000SR were (18.0%), regarding the educational level, this table reveals that approximately of participant (30.0%) were university while primary were (29.0%) while secondary were (22.0%), regarding the Sources of knowledge about dengue fever the majority of participant Communication Web-sites were (31%).

**Table 2 Distribution of the malaria care-seeking behaviors.**

| | N | % |
|---|---|---|
| **Sought treatment** | | |
| Yes | 201 | 67 |
| No | 99 | 33 |
| **Time of care-seeking** | | |
| Prompt treatment | 246 | 82 |
| Not prompt treatment | 54 | 18 |

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| | | |
|---|---|---|
| **Reasons for choosing a providers** | | |
| First location of care-seeking provider | 30 | 10 |
| Health Centers | 39 | 13 |
| Community health workers | 45 | 15 |
| Family stock | 69 | 23 |
| Traditional healer | 96 | 32 |
| Private pharmacy | 21 | 7 |
| **Distance travelled for careb (km)** | | |
| < 5 | 66 | 22 |
| ≥ 5 | 234 | 78 |
| **Means to reach health care providers** | | |
| Walking | 57 | 19 |
| Bicycle | 72 | 24 |
| Motorbike | 159 | 53 |
| Others | 12 | 4 |

This table 2 shows regarding the ddistribution of the malaria care-seeking behaviors regarding sought treatment the majority of participants answer Yes were (67.0%) followed by answer No were (33.0%), regarding time of care-seeking more than half of participant (82.0%) were prompt treatment followed by not prompt treatment were (18.0%) , regarding reasons for choosing a providers the majority of participant (32.0%) were traditional healer, followed family stock were (23.0%) while community health workers were (15.0%) while health Centres were (13.0%), regarding distance travelled for careb (km) most of participants ≥ 5 were (78.0%) followed by > 5 were (22.0%) , regarding Means to reach health care providers most of participant motorbike were (30.0%) were university while primary were (29.0%) while secondary were (53.0%) followed by bicycle were (24.0%) but the walking were (19.0%) .

**Table(3) Distribution of the total Knowledge among the malaria fever**

| **Total knowledge** | | | | Score | |
|---|---|---|---|---|---|
| | | **N** | **%** | **Range** | **Mean+SD** |
| **Weak** | | 198 | 66 | 2-23. | 12.057±3.88 |
| **Average** | | 84 | 28 | | |
| **High** | | 18 | 6 | | |
| **Total** | | 300 | 100 | | |
| **Chi-square** | **$X^2$** | 165.84 | | | |
| | **P-value** | <0.001* | | | |

Table 3 regarding total knowledge of the participants among responses the malaria fever results show the majority of participant had weak information were (66.0%) while average of the knowledge about malaria fever were (28.0%) while high were (6.0%) but the data rang from(2-23) by mean ±SD (12.057±3.88) and a statistical significant relation while $\mathbf{X^2}$ 165.84 and P=value 0.001.

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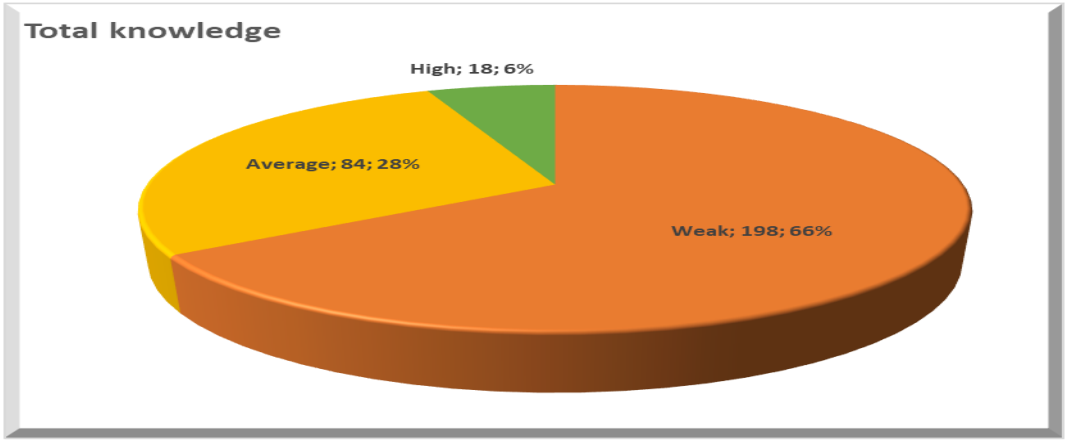
**Figure (1) Distribution of the Knowledge among causes of the malaria fever**




**Table(4) Distribution of the total knowledge and the demographic data(age, gender, marital status, level of education, income level, sources of knowledge )**

| | | N | Total knowledge | F or T | ANOVA or T-test | |
|---|---|---|---|---|---|---|
| | | | Mean ± SD | | Test value | P-value |
| Age | <25years | 45 | 6.25 ± 3.87 | F | 112.588 | <0.001* |
| | 25-35 years | 93 | 8.35 ± 3.02 | | | |
| | 35-50 years | 117 | 15.22 ± 3.21 | | | |
| | >50 years | 45 | 18.552 ± 3.88 | | | |
| Gender | Female | 126 | 13.154 ± 3.152 | T | 4.855 | <0.001* |
| | Male | 174 | 11.021 ± 4.137 | | | |
| Marital status | Single | 84 | 15.071 ± 3.822 | F | 38.215 | <0.001* |
| | Married | 129 | 8.624 ± 4.007 | | | |
| | Widow | 33 | 12.654 ± 3.517 | | | |
| | Divorced | 54 | 11.86 ± 3.722 | | | |
| Educational level | Illiterate | 57 | 8.56 ± 2.982 | F | 173.2898 | <0.001* |
| | Primary | 87 | 11.254 ± 2.564 | | | |
| | Secondary | 66 | 12.025 ± 3.591 | | | |
| | University | 90 | 16.308 ± 3.89 | | | |
| Income | Less than 5000 SR | 77 | 12.871 ± 2.875 | F | 2.2158 | 0.8754 |
| | 5000-10000 SR | 81 | 11.289 ± 3.833 | | | |
| | >10000 SR | 192 | 12.05 ± 4.514 | | | |
| Sources of knowledge | TV | 48 | 11.384 ± 2.651 | F | 202.877 | <0.001* |
| | Health professionals | 45 | 16.58 ± 4.242 | | | |
| | Family | 84 | 14.56 ± 2.547 | | | |
| | Communication Web-sites | 93 | 9.506 ± 2.637 | | | |
| | Journals and magazines. | 78 | 8.254 ± 3.215 | | | |

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Table (4) show regarding ddistribution of the total knowledge and the demographic data regarding the age is a significant relation between total knowledge and demographic data were F=-112.588 and P-value=0.001 (increase in >50 years follow by age 35-50) where by mean+ SD (18.552±3.88, 15.22 ±3.21). regarding gender in our study the majority of our participants were noticed in female more than male with Mean± SD (13.154±3.152) with a significant relation between total knowledge and gender were T=4.855 and P-value=0.001,
regarding marital status show that a significant relation between total knowledge and marital status (increase in single) were F=38.215 and P-value=0.001 by mean+ SD (15.071± 3.822) followed by widow mean+ SD (12.654±3.517) , regarding level of education show that a significant relation between total knowledge and level of education (increase in university) were F=173.2898 and P-value=0.001 by mean+ SD (16.308±3.89) while secondary (12.025±3.591), regarding the income level show that a significant relation between total knowledge and income level (increase in the Less than 5000 SR participants) were F=2.2158 and P-value=0.001 by mean+ SD (12.871±2.875) followed by mean+ SD >10000 SR were (12.05± 4.514), regarding Sources of knowledge show that a significant relation between total knowledge and sources of knowledge (increase in health professionals) were F=202.877 and P-value=0.001 by mean+ SD (16.58±4.242).

**Discussion**

The present study provided an insight into assessment of the Knowledge of Malaria fever causes and symptoms among patients attending in the Primary health care at Saudi Arabia 2022. Our study reported the most of the participants they were weak about Knowledge of Malaria fever causes had insufficient information about causes of the malaria. Surprisingly the main source of information was the communication web-sites.

On the contrary study by (32) to assess the knowledge, attitudes, and practices on malaria infection and its interventions in the communities of Masasi districts, Tanzania, involved in the seasonal malaria chemoprevention. The findings showed that the majority of the study population presented good knowledge of malaria infection and interventions. Similar findings have been reported in other studies (28). Of the study participants, 92.20% knew that malaria is transmitted through a mosquito bite. Findings in other parts of Tanzania (17) and other countries (32) have indicated a much lower proportion of subjects having knowledge of malaria transmission. In our study shows that the majority of participants approximately (39.0%) were aged from 35-50 regarding sex, more than half of participant (58.0%) were male, marital status, the majority of participant (43.0%) were married, educational level, this table reveals that approximately of participant (30.0%) were university, sources of knowledge about dengue fever the majority of participant Communication Web-sites were (31%) (See table 1)

These results are in contrast to the findings from a study conducted in Swaziland in 2009 that reported patient's facilities as the primary source of malaria information (24). A possible explanation for the results of our study is that the respondents' answers reflect the impact of technological advancements on public health. However, the potential risks that may be associated with the accessibility and use of open communication (i.e., social media) should not be ignored, despite the fact that it is currently a readily available and accessible source of information on a previously unfamiliar disease .

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Another study reported also as far as patient's information on Malaria fever causes is concerned, of the participants in this study believed that they did not have sufficient knowledge about malaria, and a similar proportion thought that it was not a treatable disease. These findings are inconsistent with a previous study that reported that 78.1% of participants believed that malaria was preventable ,(23) in our study regarding distribution of the malaria care-seeking behaviors shows regarding sought treatment the majority of participants answer Yes were (67.0%) time of care-seeking more than half of participant (82.0%) reasons for choosing a providers the majority of participant (32.0%) while health Centres were (13.0%), regarding distance travelled for careb (km) most of participants ≥ 5 were (78.0%) (See table 2). Nevertheless, despite the level of illiteracy, participants showed interest in learning more about malaria. Thus communicable diseases awareness programs and other teaching strategies should be developed and implemented to educate and increase the public awareness of this disease.(29)

Distribution of the total Knowledge among the malaria fever show the majority of participant had weak information were (66.0%) while average of the knowledge about malaria fever were (28.0%) while high were (6.0%) but the data rang from(2-23) by mean ±SD (12.057±3.88) and a statistical significant relation while X2 165.84 and P=value 0.001.(see table3 )

Compared to previous studies that was conducted among Nigerian patients attending, the current knowledge status of participants was lower than that (41%). (30) In another study from Nigeria good and fair knowledge among participants was reported as 50% and 44% respectively. In Ethiopia, Yakob et al. showed that all participants had acceptable knowledge about contaminated needles and sharp materials that transmit disease causative agents, while 70.4% knew that gloves and gowns were required for any contact with patients, also identified a gap between knowledge of standard precautions and the practical applications among physicians. (22)

Contrary to the results of our study, we found anther a study, reported that though the knowledge of malaria fever causes and symptoms among some participants was found to be generally high, which was similar to the previous studies conducted in Nigeria, Zimbabwe and Sudan (11), the barriers seem mostly to be at the implementation step, largely due to socio-economic and cultural factors. This study has also revealed that those people who were most at risk mainly children and pregnant women were not given priority when dealing with preventive and treatment measures at both healthcare and household levels. This was consistent with the findings from Ethiopia's studies (30) as they reported that malaria mostly affected poor and underserved tribal populations, who lived in remote forest areas, as these people are deprived in terms of access to adequate modern treatment facilities. (29)

Regarding distribution of the total knowledge and the demographic data show regarding distribution of the total knowledge and the demographic data regarding the age is a significant relation between total knowledge and demographic data were F=-112.588 and P-value=0.001 (increase in >50 years follow by age 35-50) where by mean+ SD (18.552±3.88, 15.22 ±3.21). regarding gender in our study the majority of our participants were noticed in female more than male with Mean± SD (13.154±3.152) with a significant relation between total knowledge and gender were T=4.855 and P-value=0.001, regarding marital status show that a significant relation between total knowledge and marital status (increase in single) were F=38.215 and P-value=0.001 by mean+ SD (15.071± 3.822) followed by widow mean+ SD (12.654±3.517) ,

regarding level of education show that a significant relation between total knowledge and level of education (increase in university) were F=173.2898 and P-value=0.001 by mean+ SD (16.308±3.89) while secondary (12.025±3.591), regarding the income level show that a significant relation between total knowledge and income level (increase in the Less than 5000 SR participants) were F=2.2158 and P-value=0.001 .

## Conclusion

Although the majority of participants poor knowledge of malaria causes and symptom and prevention, there are still a significant number of participants with poor knowledge of malaria prevention . Only a small percentage of individuals used bed nets regularly to avoid malaria. Economic reform and community health education were required to address issues with low-income and illiterate household heads' poor knowledge and married and illiterate participants' negative attitudes. Malaria prevalence among study participants. Almost all age groups affected but the age group of >50 were infected more than other age groups. The prevalence of malaria in the area shows difference among sexes, more males were infected than females. The results also confirmed that, of study participants were possessed at least one ITN. The ratio of ITNs within family is not adequate and there is no accessibility of ITNs in area during study. ITN utilization among study participants were good where of them were slept under ITNs

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