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### Assessment of Knowledge, Attitude, and Preventive Practices Towards Dengue Fever Among the Community in Qardho District

Dr. Ahmed Nur Hersi<sup>1\*</sup> & Mohamud Shire Abdi<sup>2</sup>

<sup>1</sup> Prof. Abdirizak Hospital Bosaso, Bosaso Puntland, Somalia.

<sup>2</sup> Institute for Policy, Research and Dialogue, Qardho Puntland, Somalia.

\*Author ORCID ID: <https://orcid.org/0009-0008-5726-8696>; Email: [hersi2182@gmail.com](mailto:hersi2182@gmail.com)

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#### Date ABSTRACT

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Dengue fever is caused by a virus belonging to the Flaviviridae family, which is spread by *Aedes egypti* mosquitoes and is the most rapidly spreading mosquito-borne viral disease in the world. The objectives of this study were to assess knowledge, attitude, and preventive practices towards dengue fever among the community in the Qardho district. A descriptive, cross-sectional study was conducted by using a structured questionnaire. A sample size of 384 participants was selected, and face-to-face interviews through structured questionnaires were done between August and November 2023. Although 77.2% of the respondents had heard about dengue fever, the study found that Qardho residents had poor knowledge of the disease. Only 27.6% of the respondents recognised the agent causing dengue fever as a virus. About 40% of them thought that mosquitoes were responsible for the disease. Further, only 7% of them maintained that clean water and clean water holding containers might be breeding sites for mosquitoes. Taken together, 73.8% of the respondents had poor knowledge. Despite their poor knowledge, circa 52% of the participants had good attitudes towards dengue-suspected patients, and most of them (71.9%) took preventive measures against the disease. Most of the respondents (43.6%) used mosquito nets. This preventive practice might be due to their prior awareness that mosquitoes are vectors for another serious illness, malaria. Most of the residents in the Qardho district had poor knowledge about dengue fever, the agent causing the disease, its mode of transmission, breeding sites of the vector, treatment, and biting behaviour. The study suggests there is a need to increase health education activities, such as awareness campaigns and mass media, to enhance knowledge about dengue fever. Also, community awareness of vector control plays an important role in disease prevention and control.

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**INTRODUCTION**

Dengue is the most rapidly spreading mosquito-borne viral disease in the world. In the last 50 years, the incidence has increased 30-fold due to the expanding geographic reach into new countries. Additionally, in the current decade, the incidence has spread from urban to rural areas. An estimated 50 million dengue infections occur annually, and approximately 2.5 billion people live in countries where dengue is endemic (WHO, 2009). Dengue fever (DF) and its severe forms, dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) have emerged as significant global public health concerns. Dengue is found in tropical and subtropical regions around the world, predominantly in urban and semi-urban areas. The disease is caused by a virus belonging to the Flaviviridae family, which is spread by *Aedes* (*Stegomyia*) mosquitoes. There is no specific treatment for dengue, but appropriate medical care frequently saves the lives of patients. The most effective way to prevent dengue virus transmission is to combat the mosquitoes that carry the disease (WHO, 2021).

Dengue is caused by four closely related dengue viruses (DENV-1, -2, -3, and -4). Infection with one serotype of DENV provides immunity to that serotype for life but provides no long-term immunity to other serotypes. Classic dengue fever, or "break-bone fever," is characterised by acute onset of high fever 3-14 days after the bite of an infected mosquito. Symptoms include frontal headache, retro-orbital pain, myalgias, arthralgias, haemorrhagic manifestations, rash, and a low white blood cell count. The patient may also complain of anorexia and nausea. Acute symptoms, when present, typically last for about

one week, but weakness, malaise, and anorexia may persist for several weeks (Centres for Disease and Prevention CDC, 2n.d.).

The weight of evidence regarding climate change's impact on dengue indicates that dengue transmission is sensitive to climate variability and change. A literature search conducted in October 2012 focused on peer-reviewed journal articles published in English from January 1991 through October 2012. The study shows that sixteen studies met the inclusion criteria, and most of them indicated that the transmission of dengue is highly sensitive to climatic conditions, particularly temperature, rainfall, and relative humidity. Studies on the potential impacts of climate change on dengue indicate an increase in climatic suitability for transmission and an expansion of the geographic regions at risk during this century (Naish et al., 2014).

Although dengue exists in the African Region, surveillance data is poor. Outbreak reports exist, although they are not comprehensive. There is evidence indicating that dengue outbreaks are increasing in both size and frequency. Dengue is not officially reported to the World Health Organization (WHO) by countries in the region. Dengue-like illness has been recorded in Africa, though usually without laboratory confirmation and could be due to infection with the dengue virus or with viruses such as chikungunya that produce similar clinical symptoms. For Eastern Africa, the available evidence so far indicates that DEN-1, -2, and -3 appear to be common causes of acute fever (WHO, 2009).

Dengue outbreaks have persistently occurred in Eastern African countries for several decades.

Baba et al. (2016) assessed outbreaks to identify risk factors and propose a framework for prevention and mitigating the impact. Seven out of ten countries in Eastern Africa and three islands in the Indian Ocean experienced dengue outbreaks between 1823 and 2014. Major risk factors associated with past dengue outbreaks include climate, virus and vector genetics, and human practices. One study showed that Dengue fever is a significant public health issue and a newly emerging threat in the affected town of the Ethiopian Somali region. The study highlights that dengue appears cyclically every year and mainly affects the adult population of reproductive age groups. It also shows signs of expanding to other towns in the region, as there is no proper vaccine for the prevention of dengue fever. The main preventive strategy is to raise awareness in the community about the process of source reduction (Ahmed & Salah, 2016).

In Somalia, epidemics of a malaria-like illness affected several thousand residents of the Dam Camp, a refugee camp near Hargeisa, in 1985, 1986, and 1987. The disease was characterised by fever, chills, sweats, headache, and back and joint pains, lasting up to 10 days in some patients. Blood smears from acutely ill patients were negative for malaria. The clinical description of the febrile illness recorded in 1987 among the refugees of the "Dam Camp" and the serological results suggest that the dengue virus was most likely the cause of this disease outbreak. Two years earlier, similar but more severe outbreaks had occurred in the same camp. It appears that the same disease affected the refugees for three consecutive years, with the last outbreak characterised by mild illness, possibly due to immunity acquired previously (Boulos et al., 1989). Also, another study reveals that Dengue fever was considered a potential cause of febrile illness in US troops deployed to Somalia during Operation Restore Hope in 1992-1993. A prospective study was conducted on hospitalised troops with fever, along with a zero-epidemiologic survey of 530 troops. The data indicated that DF was an important cause of febrile illness among US troops in Somalia and

demonstrated the difficulties in preventing DEN infection in troops operating in field conditions (Sharp et al., 1995).

In June 2011, an outbreak of acute febrile illness (AFI) was reported among peacekeepers of the African Union Mission in Somalia (AMISOM) in Mogadishu. The outbreak resulted in three deaths. All individuals tested were negative for malaria through blood smear examination. The majority (82%) of individuals tested were positive for the dengue virus (DENV) (Bosa et al., 2014). The co-circulation of multiple dengue serotypes and possible repeated secondary heterotypic dengue infections may be responsible for the high proportion of severe forms of dengue, including death. The extent of severe dengue infection, co-circulation of three dengue serotypes, and co-infection with multiple dengue serotypes have not been previously described in Africa (Bosa et al., 2014). The World Health Organization (WHO) documented an outbreak of dengue fever reported in Somalia in October 2022. In the Banadir region, a total of 211 suspected cases were detected, with no associated deaths. Most cases were reported from the Wadajir, Hodan, and Daynile districts in the capital city. Of the 211 suspected cases, 18 tested positive for dengue-specific immunoglobulin M (IgM), and 13 tested positive for dengue-specific protein NS1 (WHO, 2023).

In the present study, we selected a sample size of 381 individuals of Qardho residents to investigate the knowledge that Qardho residents have about the dengue disease, their attitudes towards dengue-suspected patients, and the preventive measures they practice against dengue fever.

## LITERATURE REVIEW

Various studies investigated the know-how, attitudes, and preventive measures that different communities carried out against dengue fever. For instance, a previous study conducted in Malaysia assessed the knowledge, attitude, and practice regarding dengue fever, as well as the effectiveness of a health education program (Alzurfi et al., 2015). This study has shown that the majority of the respondents had good knowledge

(63.2%) and positive attitudes (79.9%) about dengue fever. Another study conducted in Beled-Hawa, Gedo (Somalia) reveals that the respondents have good knowledge about the disease and its breeding grounds (Gaal & Mohamed, 2022). However, other studies indicate that, though the participants of these studies had heard of dengue fever, most of the respondents had inadequate knowledge of the disease, its symptoms, management, and transmission (Itrat et al., 2008; Gunasekara et al., 2012; Kazaura, 2020). Further, a study conducted in Diri-Dawa among healthcare professionals revealed that about half of the participants (49.3%) had a moderate level of knowledge, 46.7% of them had neutral attitudes, and 52% of the respondents practised low-level preventive measures against dengue fever (Dawa et al., 2022).

Also, a survey conducted among selected communities with varying socioeconomic backgrounds in Karachi (Pakistan) showed that, because of their high socioeconomic status, these communities exhibited better preventive practices against dengue fever (Syed & Saleem, 2010). In another study, awareness of dengue fever and how it spreads was quite high, but participants lacked knowledge about the behaviours that increase the risk of vector breeding in their surroundings, especially about water storage (Arora et al., 2017). Also, a study in Tanzania showed that the majority of the participants (97.7%) were aware of dengue fever (Kazaura, 2020).

Several studies (Itrat et al., 2008; Naing et al., 2011; Al-zurfi et al., 2015; Arora et al., 2017; Dawa et al., 2022; (Gaal & Mohamed, 2022) have found inadequate preventive measures against transmission vectors, including a misconception about the effectiveness of preventive measures. In these studies, a significant number of participants failed to mention environmental clean-up as a strategy to reduce the spread of dengue fever. The participants were not aware of the practices that put their surroundings at risk of vector breeding, especially when it comes to water storage behaviours. Taken together, misconceptions regarding dengue transmission were common, and

the implementation of dengue control measures was found to be inadequate. The vector of dengue fever, *Aedes aegypti*, breeds in a wide variety of man-made containers. To control these mosquitoes, it is important to consider integrating different methods (Getachew et al., 2015). Efforts of the authorities and community members need to be united to prevent the breeding of vector mosquitoes (Jeelani et al., 2015). Behaviour change at the individual and community levels is also essential for eradicating vectors and, therefore, controlling dengue fever (Arora et al., 2017). Because effective preventive practices against the vector are more common among individuals in high socioeconomic groups, greater focus should be given to low socioeconomic areas in future health campaigns (Syed & Saleem, 2010). Also, Gaal and Mohamed (2022) highlighted the significance of providing assistance and information to the population regarding crucial mitigation measures and local health programming strategies.

Furthermore, other studies (Gunasekara et al., 2012; Dawa et al., 2022) demonstrated gaps in knowledge and poor attitudes of the respondents, which may affect the effectiveness and consistency of preventive practices. These studies highlighted the need for training of healthcare providers, strengthening the surveillance system, organising workshops, raising the awareness of the communities, providing the necessary resources for dengue-patient management, and increasing health education campaigns and communication programs in the community. In addition, other studies (Al-zurfi et al., 2015; Nijhawan et al., 2018; Kazaura, 2020) emphasised the need to create and improve friendly, accurate, simple information and educational messages for rural populations. Moreover, these later studies suggest conducting surveys and assessments in the communities about the knowledge and attitudes towards dengue fever and to correct any misconceptions of populations on the disease.

Because there is a lack of basic data regarding the knowledge, awareness, and preventive practices towards dengue fever among the communities in

Somalia, particularly in the Qardho District, the present study aims to assess these factors about dengue fever among Qardho residents. The results may be useful for developing strategies for disease prevention.

## METHODS AND MATERIALS

A descriptive, cross-sectional study was conducted by using a structured questionnaire. The data regarding dengue fever was collected on the KAPs of the residents using a pretested interviewer-administered questionnaire. The participants who volunteered for the pretesting of the questionnaire were excluded from the main study, and minor changes were made after the pretesting. The questionnaire covered the following areas: (1) demographic information (gender, age, occupation, and education.), (2) attitude towards DF, (3) knowledge about DF, (4) preventive practices and treatment for DF, i.e. methods used to reduce breeding sites, reduce human mosquito contact (bed nets, repellents, covering water jars), seeking treatment and home management of patients. The questionnaire comprised both defined questions where the respondents could select the answer (yes / no questions) and multiple-choice questions. Face-to-face interviews through interviewer-administered questionnaires were done between August and November 2023. A convenience sample of 384 participants was selected, The

sample size was calculated using the formula  $n = \frac{Z^2 * p(1-p)}{D^2}$  (Pourhoseingholi et al., 2013). Confidence interval is 95%, estimated error is 5%, and the estimated population proportion 50%; n = estimated Sample size; Z = standard value for 95% confidence level = 1.96; p = estimated population proportion which is 50% and D= 5%. Therefore, sample size was  $n = \frac{1.96^2 * 0.5(1-0.5)}{0.05^2} = 383$

Study Area was Qardho Puntland state of Somalia.

## Data Analysis

The data was entered in MS Excel and analysed using SPSS version 20. Descriptive analysis was carried out for computing frequencies. Variables were recoded to facilitate statistical analysis.

## RESULTS

Table 1 reports the profile of the participants in this study. The data of 381 individuals was collected, of which 52% were male and 48% were female. The majority (72%) of the participants belonged to the age group (18-35 years). As shown in Table 1, 37% of the respondents had higher education, whereas 27% of them had no formal education, 24% and 12% of the respondents attended secondary and primary schools, respectively.

**Table 1: Socio-demographic distribution of the respondents**

	Variables value	N	%
Gender	Male	198	52.0%
	Female	183	48.0%
Age-category	35 years and below	273	71.7%
	36 years and above	108	28.3%
Occupation	Government employee	55	14.4%
	Non-government employee	42	11.0%
	Self-employee	76	19.9%
	non-paid volunteer	17	4.5%
	Student	91	23.9%
	Homemaker	33	8.7%
	Unemployed	67	17.6%
Education level	No formal education	91	23.9%
	Primary	45	11.8%
	Secondary	103	27.0%
	Tertiary	142	37.3%

Table 2 summarises the knowledge of the participants about the dengue fever disease.

**Table 2: Knowledge of the respondents about dengue fever**

Variables value		Number	%
Have you ever heard about dengue fever?	Yes	294	77.2%
	No	87	22.8%
Dengue fever is caused by What?	Bacteria	25	6.6%
	Virus	105	27.6%
	Mosquito	154	40.4%
	I do not know	97	25.5%
What is the common breeding site of mosquitoes that spread dengue?	Stagnant water	220	57.7%
	Drains and garbage	78	20.5%
	Clean water-holding containers	27	7.1%
The most frequent mosquito biting time	I do not know	56	14.7%
	Day	50	13.1%
	Night	215	56.4%
	Anytime	107	28.1%
Dengue fever is transmitted by what agent?	I do not know	9	2.4%
	By mosquito	267	70.1%
	Drinking dirty water	28	7.3%
	By air	25	6.6%
	By flies	10	2.6%
In which season does dengue fever occur?	I do not know	51	13.4%
	Summer	49	12.9%
	Winter	28	7.3%
	Rainy season	224	58.8%
	Any season	20	5.2%
Source of information about dengue fever	I do not know	60	15.7%
	Radio	26	6.8%
	Television	42	11.0%
	Healthcare professionals	148	38.8%
	Friend/relatives	95	24.9%
	Awareness campaign	25	6.6%
What is the most common symptom of dengue fever?	I do not know	45	11.8%
	Fever	225	59.1%
	Joint pain	50	13.1%
	Headache	37	9.7%
	Pain behind eyes	11	2.9%
	Abdominal pain	5	1.3%
	Weakness	12	3.1%
Which medication should not be given to a patient suspected of Dengue fever?	Others	5	1.3%
	I do not know	36	9.4%
	Aspirin	99	26.0%
	Paracetamol	73	19.2%
	Antibiotics	70	18.4%
	I do not know	139	36.5%

From Table 2 analysis, the study found that 77.2% of the participants had heard of dengue fever and that the main source of this information was from healthcare professionals (38.8%), followed by friends and relatives (24.9%) and television

(11%). Only 6.6% of the participants pointed out the source to be from awareness campaigns. About 51% of the respondents were able to correctly identify the most common symptom of dengue fever as a high fever, while (9%) of them

failed to indicate any symptom. In addition, 27.6% of the respondents were able to recognise the cause of Dengue fever as a virus, but most of them (40.4%) stated that mosquito was the agent, and some attributed it to bacteria (6.6%), whereas (26%) answered that they did not know the agent causing the disease. Further, 70.1% of the respondents thought that the transmission of the disease occurs via mosquito bites, and 13.4% did not know how dengue fever is transmitted, while 7.3% of them believed drinking dirty water was the main factor spreading the disease. Regarding the biting time of mosquitoes, 56.4% of the participants stated that the most frequent mosquito biting time is at night, whereas 28% of them thought at any time, and 23.1% stated during the day.

When the respondents were asked about the season in which dengue fever is most likely to occur. About 59% of the participants answered that dengue fever occurs in the region mainly in the rainy season, and 15.7% of them did not know the seasonal outbreak dependency of the disease. Regarding the breeding sites of mosquitoes,

57.7% of the respondents stated that stagnant water is the breeding ground for mosquitoes, while 20.5% believed drains and garbage were the breeding sites. Only 7.1% thought that dengue vectors breed in clean water-holding containers. The rest (14.7%) had no clue where mosquitoes breed. This result shows that a significant portion of the participants had insufficient knowledge about the breeding sites of mosquitoes.

When the participants were asked if any drug should not be given to a dengue patient, 36.5% of them responded negatively, 18.4% thought antibiotics and 19.2% answered paracetamol. Only 26% of the respondents were able to recognise aspirin as the only contraindicated medication on the list (*Table 2*). Taken together, the participants showed poor knowledge about the dengue fever. As the analysis shows, the majority of the respondents had poor knowledge. In addition (5.2%) of the respondents had 0 scores of knowledge about dengue fever, which means they corrected nothing about the knowledge questions, and only 1.6% had the highest score of knowledge.

**Table 3: Attitudes of the respondents towards dengue fever**

Variables value	Number	%
I will treat a patient suspected of Dengue fever with home remedies	Yes	145 38.1%
	No	236 61.9%
I must frequently check for mosquito breeding sites in my home	Yes	284 74.5%
	No	97 25.5%
I am motivated to find more information about Dengue fever	Yes	294 77.2%
	No	87 22.8%
I think Dengue fever is a serious illness	Yes	340 89.2%
	No	41 10.8%
Has anyone in your family/neighbourhood suffered from dengue fever?	Yes	176 46.2%
	no	205 53.8%

Furthermore, *Table 3* shows that the study investigated the attitudes of the participants towards dengue patients. About 62% said that they would not treat dengue-suspected patients with home remedies, while 38% considered home remedies treatment effective. Circa 75% of the participants thought that frequent checking of the mosquito breeding sites in their homes is required,

and 77.2% were motivated to find more information about dengue fever. This analysis shows the need for aggressive awareness and learning campaigns to prevent the impact of the disease. Most of the respondents (89%) believed dengue fever to be a serious illness, and 46% of the respondents stated that a family member had suffered from dengue fever.

**Table 4: Preventive practices of the respondents towards dengue fever**

Variables	value	N	%
I prevent mosquito bites by using the following methods	Liquid vaporiser	52	13.6%
	Coil	31	8.1%
	Electric bet	17	4.5%
	Mosquito net	166	43.6%
	Mosquito spray	85	22.3%
	Nothing	30	7.9%
I prevent breeding sites of mosquitoes by	Prevent water stagnation	236	61.9%
	Covering containers	97	25.5%
	Cutting trees/vegetation	14	3.7%
	Do not know	34	8.9%
Would you allow your family to use mosquito-repellent creams?	Yes	220	57.7%
	No	161	42.3%
Do you practice covering water jars at home?	Yes	218	57.2%
	No	163	42.8%

Finally, on questions of preventive practices against dengue fever, the participants answered as summarised in *Table 4*. To prevent mosquito bites, 43.6% of the respondents used mosquito nets, 22.3% of them utilised mosquito sprays, 13.6% used liquid vaporisers, 8.1% used coils, and the rest 9% did not practice any preventive measures. Regarding the prevention of mosquito breeding sites, 61.9% of the participants prevented water stagnancy, while 25.5% covered clean water-holding containers as they considered these sites as the main breeding ground for mosquitoes. About 58% of the respondents used mosquito-repellent creams and allowed family members to do the same, and 57.2% of them covered water jars at home. Most of the residents in the study area did not use jars and tanks for storing water but employed water taps as water sources. However, there were containers used for other purposes, such as for cleaning. Home wells are also an important breeding ground for mosquitoes. However, the participants of the present study claimed that they cover home wells regularly.

## DISCUSSION

This study has been done to provide baseline information about community knowledge, attitudes, and practices towards dengue fever in Puntland State (Somalia). Increases in population density and relocation of people in the state due to wars such as the Las'anodwar, climate change

such as droughts, and urbanisation are the most common factors attributed to the distribution of vector-borne diseases. These factors might have affected the Qardo district, and indeed, a haemorrhagic disease with a high degree of fever became frequent. That climate change might play a role in mosquito-borne disease transmission in the tropical highland regions was previously reported (Caminade et al., 2014).

In this study, we randomly selected 381 individuals living in the Qardho district to investigate their know-how of dengue fever disease, their attitudes towards dengue-suspected patients, and the preventive measures that the participants employ. The study revealed that most of the respondents had poor knowledge about dengue fever disease. Indeed, only 27.6% of the respondents recognised the agent causing dengue fever as a virus (*Table 1*). Most of them (40.4%) thought that mosquitoes were responsible for the disease (*Table 1*). Though 59% of the respondents identified fever as the main symptom of the disease (*Table 1*), the rest did not (*Table 1*). This result is in contrast to previous studies, where a higher percentage of the respondents heard about dengue fever (Gunasekara et al., 2012; Kazaura, 2020). However, our result is comparable to that obtained in Indonesia, where half of the respondents had poor knowledge of the disease (Harapan et al., 2018); similarly, in Tanzania, the majority of the respondents had low knowledge



(Kazaura, 2020). In contrast, in a study carried out in Gedo (located in southern Somalia), the respondents showed good knowledge about the disease (Gaal & Mohamed, 2022).

Regarding the nature of the vector of dengue disease, 70% of the respondents answered mosquitoes as the main vector. This result is like other studies, where most of the respondents were able to identify mosquitoes as the vector of the disease (Al-zurfi et al., 2015; Nijhawan et al., 2018; Kazaura, 2020). A few participants thought that drinking dirty water and flies transmitted the dengue disease (*Table 2*). Also, Saghir et al. reported that 50% of their respondents believed flies transmitted the dengue fever disease.

Although most of the residents in the Qardo district stored tap water in containers and used home wells for domestic use, most respondents believed stagnant water was a breeding site for mosquitoes, and only 7% of them thought that clean water and clean water holding containers might be the breeding sites for mosquitoes (*Table 2*). Twenty percent of the participants thought drains and garbage sites might be breeding grounds for mosquitoes (*Table 2*). The respondent's lack of knowledge about mosquito breeding sites was also previously reported ((Jeelani et al., 2015) Thaker et al., 2016). However, several studies performed in Sri Lanka, Pakistan, and Yemen revealed that respondents were able to identify clean water as the breeding site of dengue vectors (Gunasekara et al., 2012; Qadir et al., 2015; Saghir et al., 2022). These contrasting results underline the different levels of knowledge about dengue disease of the participants studied. It should be noted that people are largely unaware of tires and flower pots as important breeding places for mosquitoes (Syed & Saleem, 2010; Getachew et al., 2015).

Regarding the biting time of mosquitoes, 56.4% of the participants stated that the most frequent mosquito biting time is at night, while 28% of them thought anytime and 23.1% thought that the biting time was during the day. This result shows the insufficient knowledge of the respondents about the mosquito biting time. This inadequate

knowledge of respondents about biting times was described before (Jeelani et al., 2015), but contrasts with the results of another study carried out in Sri Lanka (Naing et al., 2011). In this latter study, about half of the respondents knew the dengue vector's day-biting habit, whereas, in another study, the respondents knew that dengue fever might be transmitted by day-biting mosquitoes bred in clean water (Gunasekara et al., 2012).

Concerning the sources of information about dengue fever for the participants of the present study, we found that the main source of information (38.8%) for the respondents was from healthcare professionals (*Table 2*). This result is similar to a study performed in Nigeria (Shehu et al., 2022). However, other studies concluded that the main source of information for their respondents was mass media, particularly television, newspaper, and other electronic media (Naing et al., 2011; A (Arora et al., 2017); Jeelani et al., 2015; Itrat et al., 2008; Qadir et al., 2015). When the participants of this study were asked to name a drug contraindicated to dengue fever patients, 26% of the respondents recognised this drug as aspirin (*Table 2*). It is known that aspirin should not be given to dengue-suspected patients (Shuaib et al., 2010; Qadir et al., 2015). Further, about 59% of the respondents stated that the disease is seasonal and is strongly influenced by rainfall (*Table 2*). Somalia receives rain in two seasons: spring and autumn.

Despite their poor knowledge, the respondents of this study showed good attitudes in dealing with the disease (*Table 3*). About 62% thought that home remedies could not be used for the treatment of a patient suspected of dengue fever, while 38% considered home remedies treatment effective (*Table 3*). Circa 75% of the participants stated that frequent checking of mosquito breeding sites in their homes is required, and 77.2% were motivated to find more information about the disease. Also, 89% of the respondents considered dengue fever a serious illness, and 46% of them stated that a family member had suffered from dengue fever. This result is comparable to that of

a study performed in Delhi (Arora et al., 2017), where 90% of the respondents considered dengue a serious illness, and 69.4% of them indicated that someone from their family had suffered from the disease.

Finally, the various preventive practices of the respondents against mosquito bites are reported in *Table 4*. Most of the respondents (43.6%) used mosquito nets. This result is comparable to those of previous studies, where mosquito net was the prevalent method of prevention (Gaal & Mohamed, 2022; Arora et al., 2017; Gunasekara et al., 2012), but differs from the result of another study, which participants used liquid vaporisers as the main preventive measure against mosquito bites (Jeelani et al., 2015). Concerning the prevention of breeding sites, most participants (61.9%) prevented stagnant water, and a quarter of them covered clean water-holding containers because of their potential to act as breeding grounds for mosquitoes (*Table 4*). The majority of the respondents were allowed to use mosquito-repellent creams and covered water jars at home (*Table 4*). Most residents in Qardho did not use tanks for storing water but utilised water taps. However, the residents use other containers for cleaning purposes. Home wells are also important breeding sites for mosquitoes, but the participants claimed they regularly cover home wells.

## CONCLUSIONS AND RECOMMENDATIONS

We found that most participants of the study had poor knowledge of dengue fever, the agent responsible for the disease, the nature of the vector transmitting it, the breeding sites of mosquitoes, and the biting behaviour of the vector. The preventive measures against mosquitoes in clean water holding containers were insufficient. Though most of the respondents stated that their source of information about dengue fever was from healthcare professionals, the percentage was rather low, and, therefore, there is a need for carrying out awareness and learning campaigns to prevent the impact of the disease, especially during rainy seasons. Tap water is the major source of water in the study area, and there is a

low chance of breeding sites in the containers. However, the rainy season is a major risk factor, where stagnant water and collection of water in containers and tires are common. Based on our results, we recommend the Ministry of Health organise health education programs for the communities to raise their awareness against dengue fever, particularly during rainy seasons. Dengue fever is a major public health concern.

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