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Research Article

Assessment of Knowledge and Attitude of Health Workers About Dengue Fever at Al-Hodeidah Governorate

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Abstract

Dengue fever (DF) is a viral disease transmitted by mosquitoes and is emerging as a serious global health problem. However, there is still a lack of knowledge regarding the disease. **The aim of the study:** To assess the knowledge and attitude of health workers about dengue fever in Al-Hodeidah governorate. **Subjects and methods:** Descriptive research design was used in the study with convenient sampling. The current study included 337 participants. **Results:** The study revealed that 53% of health workers had a fair knowledge level about dengue fever and 78.65% of them had a positive attitude about dengue fever. **Conclusion:** The study concluded that about half of health workers had fair knowledge about dengue fever. While about three-quarters of them had a positive attitude about dengue fever. **Recommendations**: According to the current study, educational programs for nurses and midwives on dengue fever management and prevention should be organized.

1. Introduction

Aedes mosquitoes carrying the dengue fever (DF) virus can bite people and spread the infection to humans who have the virus, as well as to Aedes mosquitoes. *Aedes aegypti* and *Aedes albopictus* are the Aedes species that are recognized as carrying the illness (1).

DF has been prevalent for over two decades, with most cases being innocuous and self-limiting. DF signs include temperature, headache, muscle, and joint aches, and a rash that mimics measles. DF is also known as "break-bone fever" because of the prevalence of muscle and joint discomfort. Classical DF cases can progress to more serious life-threatening phases of dengue hemorrhagic fever or dengue hemorrhagic fever with shock. (2) Acute dengue infection is indicated by symptoms ranging from mild fever to serious ones like hemorrhaging and shocks. The Flavivirus family, which produces DF, was first identified in Japan and Hawaii in 1943 and 1945, respectively.

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One of the four different dengue serotypes causes the illness (DENV1 to DENV4). Even though the strains are closely related and exhibit high genetic variability, they vary antigenically. There is no cross-security between serotypes and serotype-specific immunity (3, 4). Uncontrolled urbanization initiatives, population growth, and a dearth of prevention efforts in dengue-endemic areas are all factors that contribute to the spread of the illness (5).

Dengue affects between 50 and 100 million people worldwide every year, and 3 billion people live in dengue-endemic nations. The risks to human health and the financial cost of dengue fever have both grown significantly. In the past 50 years, the prevalence of DHF has grown 30 times globally. According to reports, the proportion of the Asia-Pacific population exposed to the illness has increased to almost 75% (6).

More than 6777 probable dengue cases were reported in Yemen in 2015, suggesting that the number of dengue cases in the nation was rising at an unprecedented rate. Fighting linked to the civil war was fierce in Taiz, a governorate in southwest Yemen. In this governorate, dengue cases experienced a sharp increase starting in August 2015, shortly after the war began (7). Additionally, in Hodeidah, west of Yemen, 29.0% (116/400) of admitted patients with fever and at least two symptoms of dengue or a disease that is similar to dengue were found to have the dengue fever virus, mainly of serotype 2 (8). In Hadhramout, there were two dengue epidemics in 2015. The first one was anticipated to follow the March–June seasonal trends, peaking in May like the recurrent outbreaks that have happened since 2005. The most recent outbreak is unanticipated; it happens between November and December 2015, following the Chapala cyclone storm that struck Hadhramout in late October to early November 2015. In the most recent outbreak, which occurred in November and December 2015, there were 14 fatalities out of 623 dengue cases (both verified and suspected), for a case fatality rate (CFR) of 3%. Fifty-six percent of the cases in this outbreak were recorded from the city of Al-Mukalla. Two hundred and eighty instances were reported in this outbreak as of January 2016; and is still ongoing(9). Despite extensive study on various antiviral techniques, there is currently no specific antiviral drug for treatment. Fatality rates are reduced to under 1% with early diagnosis and access to quality healthcare. Effective vector control measures that are founded on community involvement and education are necessary for both prevention and control (10). Vector management effective vector control techniques are a crucial part of lowering dengue-related morbidity and mortality due to the restricted therapeutic options and absence of a vaccine at this time. In Yemen, *Aedes aegypti* and *Aedes albopictus* are the most common dengue carriers. *Aedes aegypti* can reproduce more readily in water-holding containers such as cement tanks, plastic, and metal

drums. Vector control methods employ biological, pharmaceutical, and environmental management techniques. Reduced dengue transmission will result from the use of an efficient integrated vector control strategy that combines methods, including societal engagement and the integration of chemical and nonchemical vector control techniques targeting areas with high human-vector contact (11). Healthcare professionals can play a professional role in educating the general public about dengue control and management. Nurses are a primary source of information for the public in the fight against dengue infection. Furthermore, different people, including those who are not motivated to use health services until they experience signs and symptoms of infection, visit the hospital daily. As a result, nurses and midwives should be well-versed in dengue control and management in order to better counsel and assist their customers/patients in avoiding dengue infections (9). In many LMICs, CHWs remain the frontline health workers, particularly for underserved rural populations. CHW responsibilities vary by country, but generally include the simple prevention and treatment of noncommunicable and communicable diseases such as dengue fever (12).

It is important to use communication methods that are known, trustworthy, and available to all healthcare employees to ensure that information and service provisions are known in the community, especially among the secluded or disadvantaged. Participating in communication activities increases exposure and ensures that message content, style, and dissemination methods are suitable for a diverse variety of consumers. Communities across the nation have committed time, expertise, and resources in a variety of methods to reach out to the most vulnerable populations, offering prompt and pertinent information (13).

Both detection and therapy are delayed in nations where dengue is imported by tourists due to a dearth of clinical suspicion of the illness. In such situations, healthcare professionals may misidentify anopheles mosquitos as dengue vectors (15%), recommend paracetamol for dengue prevention, and prescribe antiviral and antimalarial medicines for dengue therapy. While, nearly, all physicians in a Texas research agreed that preventing mosquito bites is essential for dengue prevention, only 33% agreed that febrile dengue patients should avoid mosquito bites to prevent dengue virus transmission to family members (14).

2. Significance Study

In Yemen's war-torn Al-Hodeidah Province, dengue fever is becoming a major mosquito-borne illness. Yemen confronted a significant health danger as a result of DF ignorance, negative attitudes toward different parts of the illness, and inadequate disease prevention practices, all of which were exacerbated by the country's continuing civil conflict. To improve people's understanding, attitudes, and practices about dengue fever and pinpoint risk factors, a thorough education program is needed. Because frontline health services are usually insufficient and cannot differentiate DF from other infectious diseases, an emphasis on community involvement is needed (15).

According to the World Health Organization (WHO), DF has become pandemic in some areas of Yemen and has expanded to Tehama's coastal planes (Hodeidah) (16).

3. Aim of the Study

3.1. In Al-Hodeidah governorate, assess health employees' understanding and views toward DF.

3.2. Research question

1. Are health workers having a high level of knowledge about DF?

2. Are health workers having a good attitude regarding DF?

4. Methods

4.1. Design

4.2. Descriptive research design was used.

4.3. Setting

The current study was conducted in the clinics of Al-Thawra, Al-Olfi, and Al- Salakhana Hospitals at Al- Hodeidah governorate.

4.3.1. Sample

The total number of health workers studied for convenient sampling were 337, of which 124 were physicians, 183 nurses, and 30 midwives).

4.4. Tools of the study

The study included two tools as following:

Tool (I): questionnaire. It has two parts.

4.5. Part one- demographic data.

It included details about health workers' socio-demographics, such as their name, age, gender, employment, qualification, and years of experience.

4.5.1. Part two - knowledge of health workers.

The researchers developed this tool after reviewing the relevant literature. This section contains seven items to assess health workers' knowledge of DF, including the definition of dengue disease, method of transmission, sources of dengue infection, signs and symptoms, diagnosis, treatment, prevention, and control. For each scoring system followed, the correct answer was given (1) and the incorrect (0). The knowledge level was classified into three levels as following: poor knowledge if the score is less than 50%, fair knowledge if score is 50%- 70%, and good knowledge if score is more than 70% (17).

Tool (II): Likert scale.

It was created by the researchers after reviewing the relevant literature to assess health workers' attitudes toward DF and each item has five responses ranging from strongly agree to strongly disagree. The total score is classified into negative attitude if the score is less than 60% and positive attitude if the score is equal or more than 60% (18).

Validity and reliability

Three academic professors from the Faculty of Nursing- Assiut University performed validity for all tools. The reliability was measured using the Cronbach alpha coefficient test to knowledge questionnaire about DF was (0.87) and the Likert scale for assessing health worker attitude toward DF was (0.90).

4.6. Data collection methods

A pilot study

It was carried out on 29 healthcare workers (10%) to evaluate the precision of tools and the time needed to finish the study tools. There were no modifications made to the sample that was examined.

Field work

Data for the research were gathered until June 2022. The researchers introduced themselves in order to contact healthcare workers, describe the nature and goal of the study, and acquire oral permission. Each self-administered assessment required an average of 10-20 minutes to finish.

4.7. Data analysis

The experts analyzed, categorized, and coded the material of each tool. SPSS version 19.0 software was used for data analysis, and figures were made in Excel. To identify differences in understanding and mindset in connection to demographic data of subjects, descriptive statistics (i.e., percentage, mean, standard deviation) were used, and Chi-square was used for analytical statistics. A p-value of 0.05 was used to establish statistical relevance.
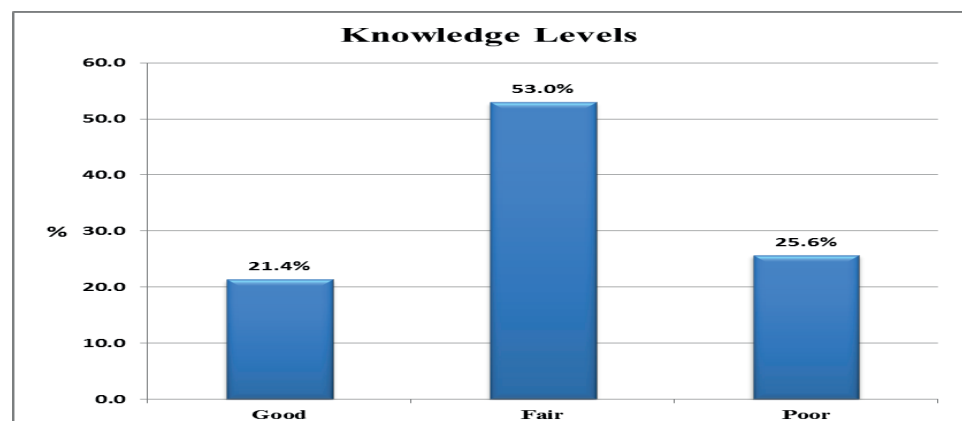
5. Results

Figure 1: Total knowledge level of health workers about DF.

TABLE 1: Distribution of healthcare workers, according to their demographic data.

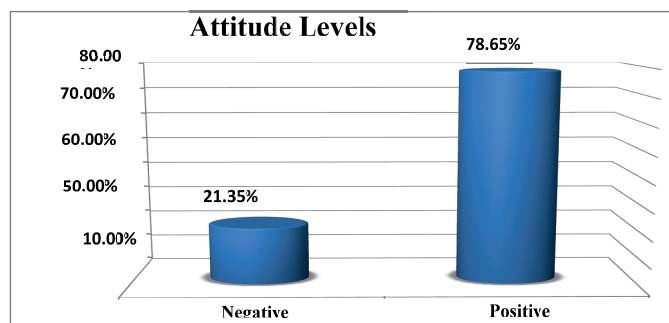| Demographic data	Healthcare workers	
	No = 337	**%**
Age (years)		
20-30	213	57.6
>30-40	109	29.4
>40 - <60	48	13.0
Mean ± SD	**31.5 ± 7.3**	
Gender		
Male	223	60.3
Female	147	39.7
Occupation		
Physician	124	33.5
Nurse	183	49.5
Midwife	30	8.1
Qualification		
Diploma	197	49.1
Baccalaureate	173	45.9
Years of experience		
< 5 years	205	55.4
5-10	165	44.6
Mean ± SD	**5.6 ± 0.29**	
Total	**337**	**100%**

Figure 2: Total attitude levels of health workers about DF.

Table 1 shows that most health professionals (57.6%, 60.3%, 56%, 33.5%, 49.5%, and 8.1%) were aged between 20 and 30 years old, with a mean age of 31.57.3 years, and were of the male gender, married, doctors, nurses, and midwives.

Table 2 shows the knowledge scores of healthcare workers about DF, (88.1, 90.3, 85.4, 90.3, 87.3, 89.7, 82.4, and 83.0) Meaning of dengue disease, mode of transmission of DF, sources of DF infection, signs and symptoms of DF, diagnosis of DF through, treatment of DF through, vaccine against DF, and prevention of DF respectively.

Table 2: Knowledge scores of health workers about DF.

Items	No = 337	%
Meaning of dengue disease		
Correct	326	88.1
Incorrect	44	11.9
Mode of transmission of DF #		
Mosquito bite	334	90.3
Body fluid from a person to another	38	10.3
Contaminated syringe	32	8.6
Sexual contact	9	2.4
I don't know	14	3.7
Sources of DF infection #		
Stagnant water	316	85.4
Tanks of water storage	247	66.8
Places of water accumulation such as flowers pots	222	60.0
Old automobiles tires	183	49.5
I don't know	55	14.9
Signs and symptoms of DF #		
Fever	334	90.3
Joints and muscles pain	307	83.0
Headache	282	76.2
Bleeding manifestations	253	68.4
Retro-orbital pain	239	64.6
Hypotension	170	45.9
Others	17	4.6
Diagnosis of DF through #		
History of disease	186	50.3
Decrease of platelets count	323	87.3
PCR test to examine the virus	106	28.6
I don't know	11	3.0
Treatment of DF through #		
Intravenous fluids	332	89.7
Antipyretics	292	78.9
Avoid aspirin	188	50.8
Others	36	9.7
Vaccine against DF		
Correct	305	82.4
Incorrect	65	17.6
Prevention of DF #		
Eliminating of mosquito breeding places	307	83.0
Proper disposal of items that can collect water	290	78.4
Proper covering of water tanks containers	286	77.3
Spraying and filling the swamps	281	75.9
Using windows and doors screen to prevent from mosquito bites during daytime	260	70.3
Using the mosquito net during sleeping	249	67.3
Using mosquito's repellent	241	65.1
Dispose of old tires	212	57.3

#The participants allow selecting more than one answer

TABLE 3: Attitude scores of healthcare workers about DF.

Items	Strongly agree		Agree		I don't agree		Disagree		Strongly disagree	
	No	%	No	%	No	%	No	%	No	%
DF is a serious disease	168	45.4	181	48.9	14	3.8	4	1.1	3	0.8
DF is a preventable disease	93	25.0	233	63.0	34	9.2	5	1.4	5	1.4
DF infects all age groups	94	25.4	168	45.4	59	15.9	35	9.5	14	3.8
The principal vector of DF is the mosquito	179	48.3	129	34.9	44	11.9	18	4.9	0	0.0
Dengue shock syndrome is higher stage of severity	95	25.7	153	41.4	104	28.1	18	4.9	0	0.0
Blood tests are important to confirm the infection	177	47.8	174	47.0	11	3.0	8	2.2	0	0.0
Infection gives the person lifelong immunity from the same serotype	56	15.1	64	17.3	102	27.6	127	34.3	21	5.7
Healthcare workers has important role in control and prevention of dengue disease	108	29.2	220	59.4	24	6.5	17	4.6	1	0.3
The preventive procedures are more important than the clinical treatment	143	38.6	156	42.2	36	9.7	34	9.2	1	0.3
Prevention and control of mosquito can reduce dengue infection	169	45.7	152	41.0	39	10.5	5	1.4	5	1.4
Discarded of breeding places to prevent DF	166	44.9	176	47.6	15	4.0	7	1.9	6	1.6
Spraying and filling the swamps around the house to prevent DF	193	52.2	140	37.8	28	7.6	7	1.9	2	0.5
Use fan to drive away the mosquitoes	69	18.6	204	55.1	57	15.4	39	10.5	1	0.3
Repeating the infection of the same person but with another type of virus	56	15.1	111	30.0	139	37.6	49	13.2	15	4.1

Figure 1 shows the majority of the total knowledge level of healthcare workers about DF, (53.0%) were fair, while (21.4%) were good.

Table 3 reveals that nearly half of participants (48.9%) agree about DF being a serious disease and 63.0% of participants agree for the DF to be a preventable disease. While 45.4% of health workers agree that DF infects all age groups. Moreover, 47.8% participants strongly agree that blood tests are important to confirm the infection. While 34.3% disagree that infection gives the person lifelong immunity from the same serotype.

Also, 59.5% participants agree that the health workers have an important role in prevention of DF; also, 42.2% of participants agree that the preventive procedures are

TABLE 4: Relation between knowledge and demographic data about DF.

Demographic data	Knowledge of participants about DF						X2	P-value
	Total No = 337							
	Poor		Fair		Good			
	No = 95		No = 196		No = 79			
	No.	%	No.	%	No.	%		
Age groups								
20-30 years	74	20.0	91	24.6	48	13.0	26.75	0.001**
>30-40 years	14	3.8	72	19.5	23	6.2		
>40 years	7	1.8	33	8.9	8	2.2		
Gender								
Male	42	11.4	133	35.9	48	13.0	14.95	0.001**
Female	53	14.3	63	17.0	31	8.4		
Occupation								
Physician	5	1.4	105	28.4	14	3.8	84.56	0.001**
Nurse	66	17.8	72	19.5	45	12.2		
Midwife	15	4.1	6	1.6	9	2.4		
Qualification								
Diploma	64	17.3	63	17.0	40	10.8		
Baccalaureate	25	6.8	110	29.7	33	8.9	33.43	0.001**
Postgraduate	6	1.6	23	6.2	6	1.6		
Years of experience								
<5 years	66	17.8	94	25.4	45	12.2		
5-10 years	29	7.8	102	27.5	34	9.2	13.25	0.010**

Chi-Square test.
Statistically significant difference at P-value <0.05
Statistically significant difference at P-value <0.01

more important than the clinical treatment. Around 52.2% of the participants strongly agree for spraying and filling the swamps around the house. In addition, 55.1% agree to use of fan to drive away the mosquitoes. While 37.6% of participants neither agree nor disagree repeating the infection of the same individual, but with another type of virus.

Figure 2 indicates that the majority of health employees (78.65%) have a favorable outlook toward DF, while 21.35% were negative.

Table 4 shows the relationship between overall DF information and demographic statistics disclosed. It shows a statistically significant difference was observed between the understanding of participants and their age categories, gender, profession, and qualification, P-value = (0.001, 0.001, 0.001, and 0.001). It shows that no statistically significant relationship was observed between participants' knowledge and married status (P = 0.105); however, a statistically significant relationship was observed between participants' knowledge and years of experience (P = 0.010).

TABLE 5: Relation between attitudes and demographic data toward DF.

Demographic data	Attitude of health workers about DF				X2	P-value
	Total No. 337					
	Positive		Negative			
	No. 291		No. 79			
	No.	%	No.	%		
Age groups						
20-30 years	171	46.2	42	11.4	2.75	0.251
>30-40 years	80	21.6	29	7.8		
>40 years	40	10.8	8	2.2		
Gender						
Male	167	45.1	56	15.1	4.72	0.029*
Female	124	33.5	23	6.2		
Occupation						
Physician	105	28.4	19	5.1	4.54	0.208
Nurse	138	37.3	45	12.2		
Midwife	24	6.5	6	1.6		
Qualification						
Diploma	137	37.0	30	8.1		
Baccalaureate	126	34.0	42	11.4	2.44	0.295
Postgraduate	28	7.6	7	1.9		
Years of experience						
<5 years	166	44.9	39	10.5		
5-10 years	125	33.8	40	10.8	2.42	0.297

Chi-Square test
*Statistically significant difference at P-value <0.05
**Statistically significant difference at P-value <0.01

Table 5 proves that there is a connection between the overall score of attitudes toward DF and demographic statistics. It shows that no statistically significant difference was observed between individuals' views and demographic data, except for gender and marital status, which have P-values = 0.029 and 0.011, respectively.

6. Discussion

DF is the most prevalent vector-borne viral disease in the twenty-first century. It can be found in rural regions, but it is more prevalent in metropolitan and peri-urban areas. The present research investigates the rising frequency of dengue epidemics in Yemen (19). The current study describes the importance of health workers' knowledge and attitudes in the treatment, prevention, and control of DF infection, as well as educating the community about DF prevention and control.

The current research discovered that more than half of participants aged between 20 and 30 in terms of demographic statistics for health workers. This finding was consistent with those who reported age-wise distribution among the study population (11). The age of the women who participated in the study was above 21 years.

Men made up more than half of the participants in the present research. This is because guys outnumber girls in Yemeni university study. This result was unanimous (9). This is most likely due to the fact that (94.0%) were males and only 23(6.0%) were females.

According to the present research, more than half of the participants were married. This finding was consistent with another research by Grigary (20) who reported that nearly two-thirds (61.6%) were females and 68.8% were married. According to the current study's findings, half of the subjects were nurses, and one-third were doctors. This is in line with the results of Gyawali et al's study (21). Primary care physicians and nurses are the first-line healthcare providers in diagnosing, notifying, and treating dengue patients. The KAP of HCPs regarding dengue diseases also provides early detection and improves dengue outcome. In addition, according to (16), Primary care doctors and nurses are the first-line health-care workers for diagnosing, notifying, and treating dengue cases. Dengue control outcomes are also influenced by basic health care workers' understanding of dengue diseases.

The present research showed that the majority of participants were aware that DF is a viral illness spread by mosquitos.. (9) performed another study. Almost a quarter of all responses (97.7%) thought the insect that spreads the DF virus attacked at night.

According to the results of the present research, the majority of subjects were aware of the mechanisms of spread of DF via mosquito attack. A similar result was found in another Australian study by (4), who demonstrated that the majority of respondents were aware that dengue fever is spread by mosquito bite.

Regarding sources of infection, the current study presented that majority of partici-pants knew that stagnant water considered as the main source of DF infection because of increasing number of DF cases in rainy seasons. This result was in the same line with (4) who stated that the majority of participants were aware that stagnant water is the primary breeding ground for mosquitos.

In terms of the signs and symptoms of DF, many participants identified temperature as an indicator of dengue. This finding could be attributed to the illness known as DF. Furthermore, more than four-fifths of subjects reported joint and muscle discomfort, and more than three-quarters reported a headache. These results matched those of a study performed by Ajibola et al. (4) who reported that most of dengue patients had fever

and chills. Also, most of them had a headache, pain upon moving the eyes, and low backache. Hamid et al. (22) stated that knowing the signs and symptoms of DF was crucial in identifying the disease and getting proper health treatment early in order to save a life.

The present study findings also showed that bleeding manifestations were mentioned by slightly more than two-thirds of participants. This result disagrees with Hassan Hussein (23), who conducted KAP study regarding DF at Al- Mukalla district, found that the respondents about bleeding were 18.9%. In addition, in the current study majority of participants were aware that a decline in platelet count and a rise in hematocrit level were indicators for DF diagnosis. Furthermore, approximately 28.6% of subjects were aware of the PCR test. Because PCR is expensive and requires highly equipped labs, there is little information about it. These results were compatible with Ho et al. (24) who mentioned the majority of participants answered by leukocyte, platelets, and hematocrit are diagnostic tests. As well as only 12.1% answered by the dengue reverse-transcription polymerase chain reaction.

The current research found that more than three-quarters of individuals believe intravenous fluids are the best treatment option for DF. It was critical for health personnel to be able to identify the S&S of dengue illness, particularly fever, in order to provide appropriate treatment. This result is consistent with **Ibrahim and Bayomi** (25) who found that more than three-quarters of subjects were aware of antipyretics, which are medications used to treat DF. Furthermore, the present results showed that half of the subjects were aware that aspirin should be avoided in DF cases. This outcome is comparable to (26) who claimed that aspirin is contraindicated in DF in less than half of the subjects.

According to the findings of the current study, most participants stated that there is no available vaccine against DF, while the minority did not know. These findings contradict the findings of Alghazali et al. (5), who stated that one-third of participants believe there is a vaccine against DF and one-quarter believe there is no vaccine available.

More than three-quarters of those polled in the present research of participants were aware of the importance of removing mosquito breeding sites and properly disposing of items that can collect water in order to prevent DF. Furthermore, the same percentage of participants were aware of proper container covering as well as spraying the swamps to prevent DF. As a result, DF prevention should include not only avoiding mosquito bites, but also eliminating breeding sites both outside and inside. These results are congruent with those of Kantha et al. (27), reported that 81% of participants responded to the change of stagnant water (pet bowls, vases). In addition, the same percentage choose covering

water containers and emptying containers around the house. Furthermore, the majority of participants responded that DF can be prevented by properly disposing of items that can retain water, while more than half of participants responded that it can be prevented by putting Abate/chemical in water containers. Because of this, knowledge of vector biology is critical in the planning and development of programs and actions to teach the community on dengue prevention measures (28).

The current research found that while more than two-thirds of subjects were aware of using a barrier to prevent mosquitos, slightly less than two-thirds were aware of using mosquito repellent to prevent mosquitos. These results are congruent with those of (29), who found that more than two-thirds of subjects were aware of home screening and replanting.

According to the present research, more than half of the participants had fair awareness of DF, one-quarter had poor knowledge, and roughly one-fifth had excellent knowledge. Dengue disease has been prevalent for many years, which could be the cause. This result corroborates the results of a study performed by (30, 31) who reported that majority of participants had adequate knowledge. Also, Phuyal et al. (32) who discovered a lack of overall DF understanding among high school pupils in Jazan in their research. This could be because the illness has only recently appeared in Jazan, Saudi Arabia, as opposed to other nations where it has been prevalent for decades.

The current study revealed that slightly more than three-quarters of the participants had a positive attitude toward DF. This finding was consistent with Gyawali et al's study (21) who showed a mainly neutral attitude toward DF (46%). This is because the research was carried out among different HCPs who offered health services at various health facility sites (urban versus rural). Another research in the same line was carried out by (4, 19), who discovered that the bulk of respondents were optimistic.

In terms of the connection between participant expertise and demographic data, the present research discovered a statistically significant difference. The practitioners' better knowledge level is influenced by their older age, more years of experience, and higher certification. This discovery clashed with Qadir et al. (33), who discovered no substantial relationship between education and race (p-value = 0.73). Furthermore, no substantial link existed between knowledge and socioeconomic position (p = 0.16), nor between residence and knowledge (p = 0.156). Another research was carried out by Saghir et al. (34) who asserted that the interviewees' demographics had no effect on their education score. The finding highlights the importance of educational initiatives for workers at all levels. Furthermore, except for gender and married status, no statistically significant difference was observed between subjects' views and personal data in the

present research. This is comparable to Santhi et al. (35) who claimed that no statistically significant variations existed between sociodemographic and attitude variables. Furthermore, the present research found a substantial difference between physician practice and qualification, with a P value of 0.015. However, in another research performed in Jazan, Saudi Arabia, a substantial relationship was found between the use of DF preventive and control methods and the gender of the respondents P value of 0.005 (36).

6.1. Study implication

The assessment of health workers' knowledge about DF remains largely ignored by researchers. This is a significant gap since insufficient knowledge and negative attitude lead to a direct or indirect increase in DF morbidity and mortality. In addressing this research gap, this study targeted the health workers in outpatient clinics to assess their knowledge and attitude about DF. Health workers' knowledge and attitudes are critical in preventing DF disease. Health workers knowledge about DF, its transmission, and preventative techniques may educate communities. Well-trained health staff can quickly detect the signs of DF and deliver an accurate diagnosis. Early identification enables timely medical management, lowering the risk of severe consequences, and transmission to others. Health workers can influence community attitudes toward dengue prevention through their positive attitudes and behavior.

7. Conclusion

According to the research, approximately half of all health workers had a rudimentary knowledge of DF. While three-quarters of them had a favorable outlook toward dengue disease. Dengue is emerging as a major mosquito-borne disease in Al-Hodeidah governorate, Yemen. The lack of knowledge about dengue and undesirable attitudes toward various aspects of the disease and weak preventive prevention practices against the disease, exacerbated by the ongoing civil posed a serious health threat to Yemen. A rigorous campaign is needed to educate and inform to improve knowledge, attitudes, and practices regarding DF, and to identify and the identification of factors associated with DF. Emphasis on community participation is a necessity, as frontline health services are quite poor and are unlikely to be able to distinguish DF from other infectious diseases.

Acknowledgment

Ethical Consideration

The work followed common research ethics guidelines. The research was authorized by Thamar University's Faculty of Medicine and Health Sciences' ethical council. The health workers gave their verbal permission to gather data. The investigator outlined how health workers could join in the research. Healthcare workers have the ethical freedom to agree or refuse to join.

Conflict of Interests

Availability of Data and Material

Funding

Author Contributions

Recommendation

Based on the current study findings, the following recommendations were suggested: primary prevention of infectious diseases like DF should be given priority, and education about it should be applied in fever hospitals, through in-service health educational training session to be provided to all nurses and midwives in the fever hospitals, especially the newly appointed ones before starting their work. Furthermore, they need to be given illustrated booklets for maintaining knowledge of the most important types of DF and to be used as a reference. Further research should be geared toward implementing interventions to improve nurses' knowledge and attitudes about DF.

References

[1] Suwanbamrung, C., Le, C. N., Maneerattanasak, S., Satian, P., Talunkphet, C., Nuprasert, Y., Siwarin, A., Kotchawat, S., Srimoung, P., Ponprasert, C., & Nontapet, O. (2020). Developing and using a dengue patient care guideline for patients admitted from households to primary care units and the district hospital: A community participatory approach in Southern Thailand. *One Health, 10*(August), 100168.

[2] Numanovich, A. I., & Abbosxonovich, M. A. (2020). The analysis of lands in security zones of high-voltage power lines (power line) on the example of the Fergana Region PhD of Fergana polytechnic institute, Uzbekistan PhD applicant of Fergana polytechnic institute, Uzbekistan. EPRA International Journal of Multidisciplinary Research (IJMR)-. *Peer Review Journal,* (2), 198–210.

[3] Gaal, A. O., & Mohamed, M. H. (2022). Assessing the knowledge, awareness, and preventive particles of dengue fever in Beled Hawo District, Somalia. *The Journal of Communicable Diseases, 54*(3), 48–57.

[4] Phuyal, P., Kramer, I. M., Kuch, U., Magdeburg, A., Groneberg, D. A., Lamichhane Dhimal, M., Montag, D., Harapan, H., Wouters, E., Jha, A. K., Dhimal, M., & Müller, R. (2022). The knowledge, attitude and practice of community people on dengue fever in Central Nepal: A cross-sectional study. *BMC Infectious Diseases, 22*(1), 454.

[5] Budi, A., Duarsa, S., Widiyanto, A., Fajriah, A. S., & Putri, Si. (2022). Knowledge, behavior, and attitudes on dengue fever. *Systematic Reviews*.

[6] Santhi, H., & Marsaulina, I. (2020). Nurmaini. revenue, knowledge, attitudes, and implementation regarding the dengue fever prevention program in Medan, Indonesia. *Britain International of Exact Sciences Journal, 2*(1), 77–83.

[7] Alghazali, K. A., Teoh, B. T., Loong, S. K., Sam, S. S., Che-Mat-Seri, N. A. A., Samsudin, N. I., Yaacob, C. N., Azizan, N. S., Oo, A., Baharudin, N. A., Tan, K. K., Abd-Jamil, J., Nor'e, S. S., Khor, C. S., Johari, J., Mahdy, M. A. K., & AbuBakar, S. (2019). Dengue outbreak during ongoing civil war, taiz, yemen. *Emerging Infectious Diseases, 25*(7), 1397–1400.

[8] Alyousefi, T. A. A., Abdul-Ghani, R., Mahdy, M. A. K., Al-Eryani, S. M. A., Al-Mekhlafi, A. M., Raja, Y. A., Shah, S. A., & Beier, J. C. (2016). A household-based survey of knowledge, attitudes and practices towards dengue fever among local urban communities in Taiz Governorate, Yemen. *BMC Infectious Diseases, 16*(1), 543.

[9] Alhebshi, H. S., Al-hatemi, N. A., Bamaga, O. A. (2022). Assessment of knowledge of pharmacies and drug stores workers toward dengue and its management at Al-Mukalla district Assessment of knowledge of pharmacies and drug stores workers toward dengue and its management at Al-Mukalla district – Hadhramout-Yemen. *19*(1).

[10] Alhoot, M. A., Baobaid, M. F., Al-Maleki, A.R., Abdelqader, M. A., Paran L. R., Kannaiah, B. Balasingam, K., Appanu, M., Bathmanathan, P., Maniam, M. (2017). Knowledge, attitude, and practice towards dengue fever among patients in Hospital Taiping. *Malaysian Journal of Public Health Medicine, 17*(3), 66–75.

[11] Grigary, P. C. (2018, April). Knowledge, attitude and practice towards dengue fever among the population in rural community.

[12] Ozano, K., Simkhada, P., Thann, K., & Khatri, R. (2018). Improving local health through community health workers in Cambodia: Challenges and solutions. *Human Resources for Health, 16*(1), 2.

[13] Leadership, S. C. (2020, June). Supporting community leadership in the response to the COVID-19. *19,* 1–11.

[14] Tsheten, T., Clements, A. C. A., Gray, D. J., Gyeltshen, K., Wangdi, K. (2021). Medical practitioner's knowledge on dengue management and clinical practices in Bhutan. *PLoS One*, *16*(7 July):1–15.

[15] Alghazali, K. A. A., Teoh, B. T., Sam, S. S., Abd-Jamil, J., Johari, J., Atroosh, W. M., et al. (2020). Dengue fever among febrile patients in Taiz City, Yemen during the 2016 war: Clinical manifestations, risk factors, and patients knowledge, attitudes, and practices toward the disease. *One Heal*, *9*(December 2019):100119.

[16] Abdullah, Q. Y., Ogaili, M., Alahdal, M., & Al-kamarany, M. A. (2015). Dengue fever infection in Hodeidah, Yemen: Risk factors and socioeconomic indicators. *British Biomedical Bulletin, 3*(1), 8.

[17] Al Jawfi, A. M., Fahmy, H. D., & Hassan, A. K. (2017). Assessment of the awareness and practice of health team toward dengue fever at Al-Hodeidah City –Yemen. *Assiut Scientific Nursing Journal., 5*(12), 33–42.

[18] Ibrahim A. (2018). Knowledge and attitude regarding global warming phenomenon among Assiut University Students. *Assiut Scientific Nursing Journal, 6*(14), 1–11.

[19] Alyousefi, T. A. A., Abdul-Ghani, R., Mahdy, M. A. K., Al-Eryani, S. M. A., Al-Mekhlafi, A. M., Raja, Y. A., Shah, S. A., & Beier, J. C. (2016). A household-based survey of knowledge, attitudes and practices towards dengue fever among local urban communities in Taiz Governorate, Yemen. *BMC Infectious Diseases, 16*(1), 543.

[20] Hassan Hussein, Y. H. (2021). Egypt COVID-19: Assessment of knowledge, attitudes, and practices among the general population, a cross-sectional study. *Egyptian Family Medicine Journal, 5*(2), 33–48.

[21] Mohammed Yusuf, A., & Abdurashid Ibrahim, N. (2019). Knowledge, attitude and practice towards dengue fever prevention and associated factors among public health sector health-care professionals: In Dire Dawa, eastern Ethiopia. *Risk Management and Healthcare Policy, 12*, 91–104.

[22] Alotaibi, S. A., Alsuliman, M. A., & Durgampudi, P. K. (2019). Smoking tobacco prevalence among college students in the Kingdom of Saudi Arabia: Systematic review and meta-analysis. *Tobacco Induced Diseases, 17*(April), 35.

[23] Dhimal, M., Aryal, K. K., Dhimal, M. L., Gautam, I., Singh, S. P., Bhusal, C. L., & Kuch, U. (2014). Knowledge, attitude and practice regarding dengue fever among the healthy population of highland and lowland communities in central Nepal. *PLoS One, 9*(7), e102028.

[24] Madewell, Z. J., Yang, Y., Jr, I. M. L., Halloran, M. E., & Dean, N. E. (2020). NOTE: This preprint reports new research that has not been certified by peer review and should not be used to guide clinical practice. *medRxiv,* (165):1–13.

[25] Althawadi, A. N. (2021). AL-mutairi BG, Alharbi RA, Tork HMM. A cross-sectional assessment of Knowledge and attitudes of primary schools' teachers towards first aid of children: A step for injuries prevention in Qassim.... *NoveltyjournalsCom, 8*(3), 68–77.

[26] Getachew, B., Alemayehu, T., Abebe, S., Hamba, N., Tesfaye, S., Etefa, T., et al. Prevalence of overt congenital anomalies and associated factors among newborns delivered at Jimma university medical center, southwest Ethiopia, 2018: A cross-sectional study. *International Journal of Africa Nursing Sciences*. 2023;18(June 2022):100513.

[27] Mohebi, S., Parham, M., Sharifirad, G., Gharlipour, Z. (2018, January). Social support and self - care behavior study. 1–6.

[28] Elyas, T. B., Elsidig, E. M., Aseri, A., Break, A., Salim, H., Adil, R., .Hamoud, R. (2016). Knowledge, attitudes and preventive practices of house hold regarding dengue fever in the rural areas of Jazan Region, Saudi Arabia. *International Journal of Preventive Medicine, 2*(2), 8–12.

[29] Ramzan, A., Memon, K. Y., Zameer, S., Memon, K. A., Sultana, A., & Abbas, S. H. (2022). Knowledge attitude and practice of paramedical staff about prevention of Dengue virus Infection. *Pakistan Journal of Medical & Health Sciences, 16*(1), 494–496.

[30] Kantha, K., Arundhathi, S., Indira, A., & Chanu, L. (2016). Knowledge regarding management of dengue fever among staff nurses. *International Journal of Applied Research, 2*(6), 147–149.

[31] Saghir, M. A., Ahmed, W. A. M., Dhaiban, M. M. A., Osman, M. E., & Abduljabbar, N. I. (2022). Knowledge, attitude, and practices of the community toward dengue fever in Shabwah Governorate, Yemen: A descriptive study. *The Journal of the Egyptian Public Health Association, 97*(1), 27.

[32] Ahmed, A. E., Almarhabi, M. A., Shami, M. O., Alhazemi, A. A., Alsharif, H. M., Abu Hayyah, A. E., Alhazmi, W. A., Alfaifi, M. A., Abdali, A. Q., Alshihri, M. S., Alhazmi, A. H., Qasem, H. A., Alhazmi, M. A., & Abdelwahab, S. I. (2022). Knowledge, attitudes, and

practices of the population in Jazan Region, Saudi Arabia Regarding dengue fever and its prevention measures: A community-based cross-sectional study. *International Journal of Environmental Research and Public Health, 19*(24), 16812.

[33] Kajeguka, D. C., Desrochers, R. E., Mwangi, R., Mgabo, M. R., Alifrangis, M., Kavishe, R. A., Mosha, F. W., & Kulkarni, M. A. (2017). Knowledge and practice regarding dengue and chikungunya: A cross-sectional study among healthcare workers and community in Northern Tanzania. *Tropical Medicine & International Health, 22*(5), 583–593.

[34] Selvaraj, V., & Parajulee, S. (2013). Knowledge of Nurses towards cardio-pulmonary resuscitation in a tertiary care Teaching Hospital in Nepal. *Journal of Clinical and Diagnostic Research: JCDR, 5*(8), 1585–1588.

[35] Uematsu, M., Mazier, C. Z. (2016). Knowledge, attitudes, and practices regarding dengue among the general population in Honduras. *American Journal of Public Health Research, 4*, 181-187.

[36] GYM A, AS B-G, SS A-A, AAS A, MSA A, AMA A, et al. (2021). Occupational hazards among health workers in hospitals of Mukalla City, Yemen. *Journal of Community Medicine & Health care, 6*(1).