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Knowledge, attitude and practice regarding dengue infection among Jazan inhabitants, Saudi Arabia 2019

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ABSTRACT

Introduction: Dengue outbreaks are occurring in many countries of the world. Population awareness is fundamental for dengue prevention. The aim of this study was to assess the Knowledge, attitude, and practice (KAP) regarding dengue infection among Jazan inhabitants of Saudi Arabia. *Methods*: An observational cross-sectional survey was done on four hundred and forty (440) participants of primary health care attendants in Jazan Region, Saudi Arabia by a self-administered questionnaire in the period from July to October 2019. *Results*: The majority of the participants belonged to the age group of 25-34 years old (n= 318, 72.4%). There was significant variation in the level of knowledge and Age group of the participants (*p*-value 0.006). There were no significant variations in the level of knowledge and gender differences, educational level, housing condition and working status of the participants (*p*-value 0.204, 0.806, 0.057, 0.052 respectively). 89.6% of the participants considered dengue as a serious disease, 65.1% agreed that patients with dengue fever need to be isolated, 79.6% agreed that all patients with dengue can recover, and 69% agreed that dengue fever is a contagious disease. *Conclusion*: Knowledge was adequate with regard to dengue disease transmission, presentation and severity. However, there was limited practice in preventing the mosquito bites. Policy makers can formulate strategies to enhance knowledge and to translate knowledge into sound practice.

Keywords: Dengue fever; knowledge; practice; mosquitoes; vector control

1. INTRODUCTION

Dengue disease is a mosquito-borne viral infection, found in tropical and sub-tropical climates, mostly in urban and semi-urban regions (WHO, 2019). Incidence of dengue fever has increased rapidly in the last five decades, making it a global health concern over the world (Azhar et al., 2015; Word Health Organization, 2009). The disease is transmitted by female mosquitoes

mainly of the species Aedes aegypti. Unplanned rapid urbanization, temperature, and rainfall influence the widespread of dengue disease throughout the tropics (WHO, 2019). The mosquitoes prefer clean and clear water bodies. However, recently it was evidenced that they can breed on water with high organic matter content and low dissolved oxygen levels (Gunathilaka et al., 2018). Severe dengue epidemics were first reported in the Philippines and Thailand in 1950 (Bravo et al., 2014; Dantes et al., 2014). At present, South-East Asia, America and Western Pacific regions are the most seriously affected (WHO, 2019). Recently, the incidence of dengue has grown dramatically around the world. One study estimates 390 million dengue infections per year, of which 96 million manifests clinically with different severity (Bhatt et al., 2013). Another study, in 128 countries, estimates that 3.9 billion people are at risk of dengue infection (Brady et al., 2012).

In 2016, large dengue outbreaks were reported worldwide (WHO, 2019). More than 2.38 million cases were reported in the Americas region and more than 375 000 cases were reported in the Western Pacific Region. Symptomatic dengue fever usually presented as mild to moderate flu like symptoms. However, dengue fever can presented seriously with hemorrhagic fever or dengue shock syndrome (Guzmán, 2002; Centers for Disease Control and Prevention, 2019). Currently, there is no vaccination or antiviral drugs available against dengue (Ashfaq, 2013; Halstead, 2012). Therefore, vector control efforts are the only effective measures to prevent spread of infection (World Health Organization, 1999; Dhimal et al., 2014).

At present, the main method to prevent dengue disease is to impede the vector cycle through cleaning of domestic water storage containers, prevention of mosquito breeding and using of personal household protection measures (WHO, 2019; Sugunadevi & Dharmaraj, 2017; Radhika et al., 2019). Knowledge, attitude and practice of general population are crucial for effective control measures (Alyousefi et al., 2016; Chandren & Wong, 2015). Lack of knowledge and practice with regard to dengue transmission was reported to be associated with spread of dengue fever (Wong & AbuBakar, 2014).

Dengue virus was first detected in Saudi Arabia in 1994 in Jeddah, since that the disease exhibits geographic variations and Jeddah has the highest number of cases followed by Makka , Jazan, and Madinah (Binsaeed et al., 2015; Ibrahim et al., 2009; Alhazmi et al., 2016). Insufficient knowledge and poor practice regarding dengue fever were reported in many regions in Saudi Arabia, including Jazan (Alhazmi et al., 2016; Binsaeed et al., 2015). Knowledge, attitude, and practice (KAP) regarding dengue fever was not sufficiently studied in Jazan. One study was done in by Binsaeed et al. (2015), among secondary school students and the other was done by ELyas, et al. (2016), in rural areas of Jazan region. There is a need for community based study to address the variation in environmental and socio-behavioral factors of Jazan inhabitants. The aim of this study is to assess the KAP regarding dengue infection among Jazan inhabitants.

2. METHOD

Setting

This study was conducted among Jazan City population. Jazan is situated in the southwest corner of Saudi Arabia and straightforwardly toward the north of the outskirt with Yemen. Jazan city is arranged on the shore of the Red Sea and serves an expansive rural and the complete populace is evaluated at 1,567,547 million. This city is composed of 18 PHCC (ELyas et al., 2016).

Ethics approval and consent form

This study was conducted taking into account the Bioethics standards of the Kingdom of Saudi Arabia. Participants were informed that they have the right to withdraw from the study at any time, their information would be kept anonymous and the data collected would only be used for scientific purposes. The purpose of the study was explained then written consents were obtained from the participants. Also, permission was obtained from administration of all colleges participated in the study before data collection. Finally, ethical approval for this study was provided by the Institutional Review Board of Jazan University (reference number; REC 40/3-079)

Study design and population

This was a cross-sectional, descriptive, questionnaire -based study conducted to gather information related to the knowledge, attitude, and practices towards dengue fever among Saudi inhabitants attending the primary health care centres in the period from July to October, 2019.

Systematic random sampling was appointed for this study. A total of 440 participants was the estimated sample size for this study using the Epi Info program formula. The calculation of the sample size was conducted on the presumption that confidence level (95%), margin of error not more than (5%), non-response rate of 10% and prevalence of dengue among the population of (50%), as no previous study is available in the region. The value of 95% CI from the normal distribution is 1.96 and for practical

reasons we rounded it to be 2 so the estimated sample size increased to 400 participants. Participants were recruited from 8 primary health care centers (PHCCs) randomly selected from the 18 PHCCs in Jazan region. Saudi nationals of both sexes and aged 18 years or above and who had agreed to participate were included and considered appropriate for the study; those under 18 years and unwilling to participate were excluded.

Data collection tools

Following informed consent, data was collected, using a self-administered questionnaire. The questionnaire was developed in Arabic and constructed after reviewing the relevant literature. The final version of the questionnaire was consisted of 27 questions. The questionnaire was divided into five sections; introduction, social and demographic data, knowledge of disease transmission, attitudes and practice towards dengue fever. Also, the method of preparing questions provided correct and useful information about the disease and not just to measure their knowledge about it. Pilot study was conducted among 20 participants to check the reliability and validity of the questionnaire. The results of the pilot study were reassuring and were not included in the final results.

Data presentation and statistical analysis

The collected data from the questionnaire were reviewed, coded and entered into a computerized data base and analyzed using SPSS, version 25. Frequencies and percentages (descriptive statistics) were used for analyzing the selected socio-demographic data. Chi-squared test was used to determine the significance of the association between socio-demographic characteristics and knowledge on DF, as well as, to assess the responses of the participants. Questions on participants knowledge about DF were added into one score and then classified into three categories: low (less than 55), medium (55–84) and high (more than 85). The cut-off level for statistical significance was (p-value less than 0.05).

3. RESULTS

Table 1 illustrated the socio-demographic characteristics of the respondents; A total of four hundred and forty (440) participants were approached in this study. Out of total; 48.2% (212) were males and 51.8% (227) were females. The majority of the participants belonged to the age group of 25-34 years old (n= 318, 72.4%). The majority of the participants were living in traditional house (n=357, 80%). One third of the participants (34.3%) were living in the in the south of Jazan (n=150). Almost half of the participants (56.6%) had university level of education (n=248) and only 1.1% of them were illiterate. Out of total; 56.1% of the participants were working and 43.9% were not working.

Table 1 Socio-demographic characteristics of the study participants, Jazan, 2019

Characteristic	Male N%	Female N%	Total N%
Age groups (n= 439)			
15-20 year	10(4.7)	22(9.7)	32(7.3)
25-34 years	141(66.5)	177(78.0)	318(72.4)
35-44 Years	61(28.8)	28(12.3)	89(20.3)
Educational Level(n=438)			
Illiterate	1(0.5)	4(1.8)	5(1.1)
Primary	10(4.7)	10(4.4)	20(4.6)
Secondary	87(41.0)	53(23.5)	140(32.0)
University	100(47.2)	148(65.5)	248(56.6)
Postgraduate Level	14(6.6)	11(4.9)	25(5.7)
Working Status (n=431)			
Working	136(65.7)	106(47.3)	242(56.1)
Not working	71(34.3)	118(52.7)	189(43.9)
Housing Type			
Apartment	35(16.7)	44(19.5)	79(18.1)
Traditional	175(83.3)	182(80.5)	357(81.9)
Residence Area (n=437)			
North	38(18.1)	51(22.5)	89(20.4)

South	67(31.9)	83(36.6)	150(34.3)
Central	74(35.2)	59(26.0)	133(30.4)
East	27(12.9)	24(10.6)	51(11.7)
West	4(1.9)	10(4.4)	14(3.2)
Total	212(48.2)	228(51.8)	440(100)

Table 2 represented the participants' knowledge regarding some selected knowledge questions. 75.5% of the male and 66.7% of the female correctly answered the question related to the causative agent with slightly significant different between them (*p*-value 0.04). 79.7 % of the male and 83.3% of the female correctly answered the question related to the symptoms of dengue fever with no significant gender differences (*p*-value 0.328). The question related to the active time of the causative agent was correctly answered by only 36.8% of the male and 41.2% of the female again with no significant gender differences (*p*-value 0.341). The question related to the source of infection was correctly answered by only 24.5% of the male and 18.9% of the female (*p*-value 0.149).

Table 2 Participants Knowledge regarding some selected Questions

Statement	Gender	Correct Answers N%	Incorrect Answers N%	P. Value
Dengue is transmitted by the female mosquito	Male	160 75.5%	52 24.5%	0.042
	Female	152 66.7%	76 33.3%	
	Total	312 70.9%	128 29.1%	
Symptoms of dengue fever are fever, headache, back pain	Male	169 79.7%	43 20.3%	0.328
	Female	190 83.3%	38 16.7%	
	Total	359 81.6%	81 18.4%	
The active time of the mosquito is from sunrise to sunset	Male	78 36.8%	134 63.2%	0.341
	Female	94 41.2%	134 58.8%	
	Total	172 39.1%	268 60.9%	
The mosquito for dengue fever breed in clean water	Male	52 24.5%	160 75.5%	0.149
	Female	43 18.9%	185 81.1%	
	Total	95 21.6%	345 78.4%	
The mosquito for dengue fever prefer indoor house and buildings	Male	100 47.2%	112 52.8%	0.036
	Female	85 37.3%	143 62.7%	
	Total	185 42.0%	255 58.0%	
Any water collection in the house is a	Male	197 92.9%	15 7.1%	0.119
	Female	202	26	

breeding place for the mosquito		88.6%	11.4%	
	Total	399	41	
		90.7%	9.3%	
There is no effective dengue vaccine	Male	73	139	0.365
		34.4%	65.6%	
	Female	88	140	
		38.6%	61.4%	
	Total	161	279	
		36.6%	63.4%	

The variations in the levels of knowledge and participants characteristics were presented in table 3. There was significant variation in the level of knowledge and Age group of the participants (*p*-value 0.006). There were no significant variations in the level of knowledge and gender differences, educational level, housing condition and working status of the participants (*p*-value 0.204, 0.806, 0.057, 0.052 respectively).

Table 3 Study Participants Level of Knowledge according to some selected characteristics

Characteristic	Levels			P value
	Low N%	Medium N%	High N%	
Gender (n=440)				
Male	108(50.9)	85 (40.1)	19 (9.0)	0.204
Female	125(54.8)	91 (39.9)	12 (5.3)	
Age groups (n= 439)				
15-20 year	19(59.4)	11(34.4)	2 (6.3)	0.006
20-40 years	160(50.3)	138 (43.4)	20 (6.3)	
40 and more years	53(59.6)	27(30.3)	9(10.1)	
Educational Level (n=438)				
Illiterate	3(60)	1(20)	1(20)	
Primary	13 (65)	7(35)	0(0)	0.806
Secondary	75(53.6)	54(38.6)	11(7.9)	
University	129(52)	101(40.7)	18(7.3)	
Postgraduate Level	13 (52)	11 (44)	1 (4)	
Working Status (n=431)				
Working	115(47.5)	108(44.6)	19(7.9)	0.052
Not working	112(59.3)	66(34.9)	11(5.8)	
Housing Type				
Traditional	50(63.3)	27(34.2)	2(2.5)	0.057
Apartment	180(50.4)	148(41.5)	29(8.1)	
Residence Area (n=437)				
North	55(61.8)	33(37.1)	1(1.1)	
South	75(50.0)	57(38.0)	18(12.0)	0.021
Central	74(55.6)	52(39.1)	7(5.3)	
East	25(49.0)	24(47.1)	2(3.9)	
West	4(28.6)	9(64.3)	1(7.1)	
Source of Knowledge (n=438)				
Radio & TV	50(48.1)	42(40.4)	12(11.5)	0.108
Social Media	107(54.3)	77(39.1)	13(6.6)	0.858
Medical practitioners	101(48.8)	88(42.5)	18(8.7)	0.141
Relative and neighbors	101(52.3)	80(41.5)	12(6.2)	0.748
Overall	233(53)	176(40)	31(7.0)	

Attitudes toward dengue fever

The participants' attitudes toward dengue disease were presented in figure 1. 89.6% of the participants considered dengue as a serious disease. 65.1% agreed that patients with dengue fever need to be isolated, 79.6% agreed that all patients with dengue can cure, and 69% agreed dengue fever is a contagious disease.

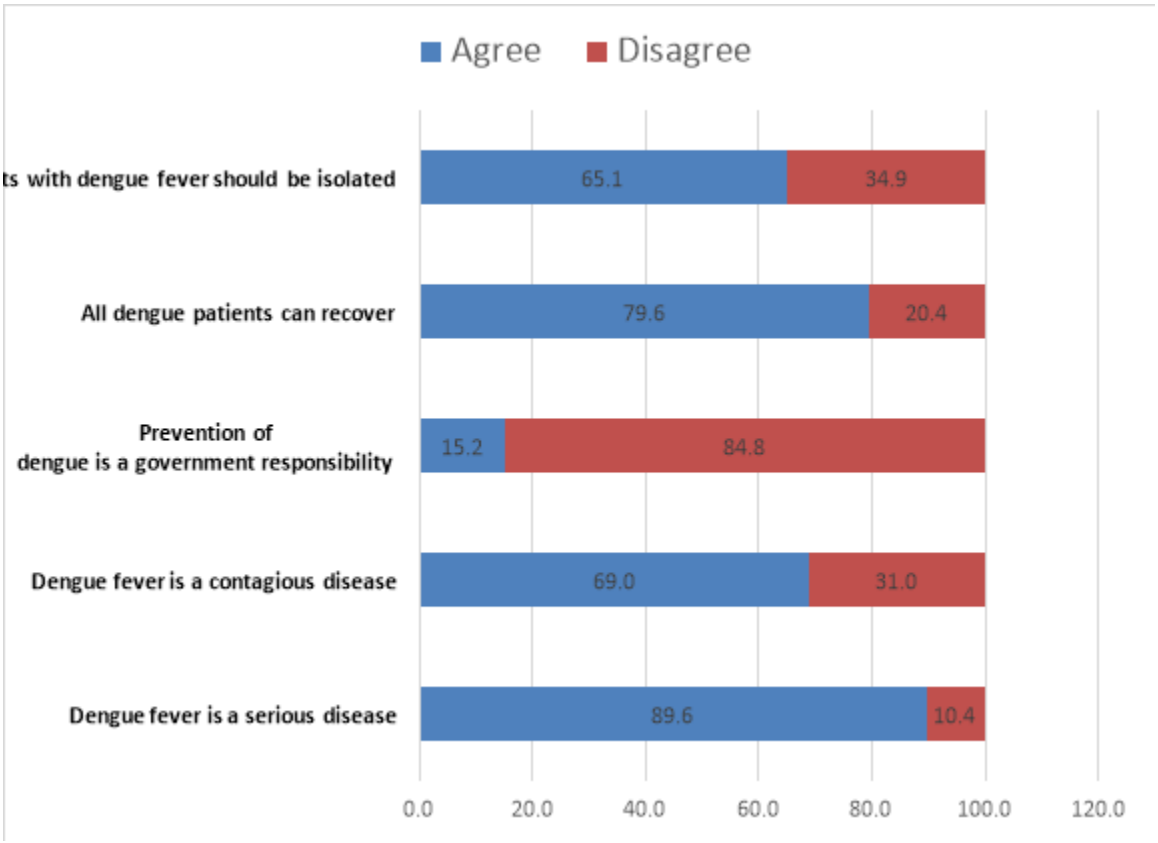

Figure 1 Participants' attitudes towards dengue fever

Dengue fever prevention practices

Participants' practice toward dengue prevention was presented in figure 2. 70.8% of the participants closed windows to reduce mosquito access and 78.9% removed the collected containers where the mosquito breeds. 45.3% used repellents creams against mosquito bite.

4. DISCUSSION

The incidence of dengue fever has grown greatly in recent decades. The actual numbers of dengue cases are under-reported, as the majority of cases are asymptomatic and self-managed (Waggoner et al., 2016). Addressing the knowledge, attitudes and practices (KAP) of the inhabitants are the most important factors for prevention of dengue fever (Chandren & Wong, 2015). In the current study, the vast majority of the participants possess the basic knowledge with regard to the severity of the disease, the clinical symptoms and the causative agent. This finding is supported by valuable studies locally in Saudi Arabia and worldwide (Binsaeed et al., 2015; Rozita, 2006; Anita, 2005; Degallier, 2000). Good knowledge with regard to the clinical symptoms and signs of DF is crucial to recognizing the disease and seeking appropriate medical intervention and to implement effective control programmes (Santos et al., 2014; Wijerathna et al., 2017). Tow-third of the participants knew there is no vaccine for dengue and most patients recover in a week or so. Universal acquirement of the basic knowledge with regard to the severity of dengue disease could be explained by the long term and recent outbreaks of dengue in different regions of the world.

In the present study, the majority of the participants knew that mosquitoes act as the primary vector for disease transmission and any water collection in the house is a breeding site for the mosquitoes. These findings concur with those from cross-sectional studies conducted in Vietnam, Pakistan, and Bangladesh (Mayxay et al., 2013; Bota et al., 2014; Dhar-Chowdhury et al., 2014). Also these findings are in line with those from a study conducted in Makkah, Saudi Arabia, among high school students (Alhazmi et al., 2016). A higher level of knowledge of the causative agents and the breeding sites is essential to facilitate more effectively targeted

control strategies (Udayanga et al., 2018). On the other hand, the knowledge with regard to mosquito preferences was found to be limited, as a valuable number of participants incorrectly answered the question; whether the mosquito prefers indoor or outdoor buildings and the question related to the active time for the mosquito.

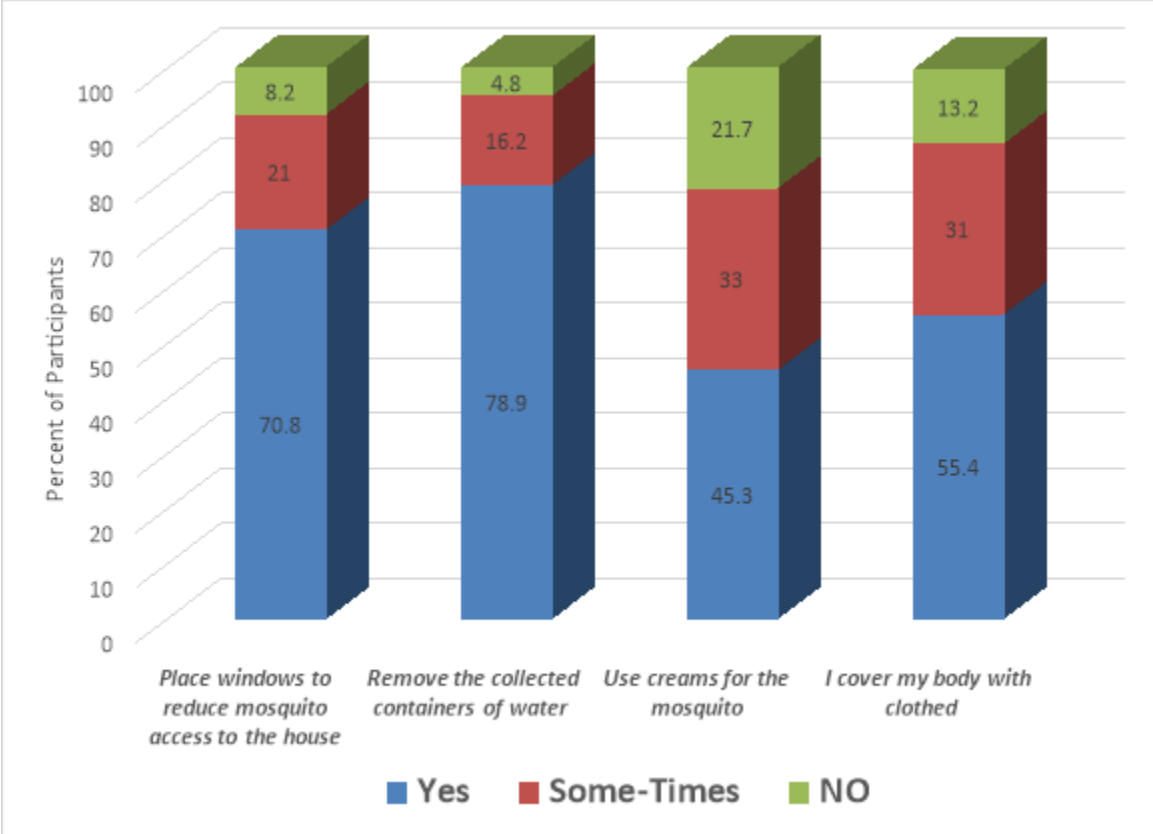

Figure 2 Some selected practices regarding Dengue fever among study participants

In the current study, the level of knowledge was significantly affected by age group and the place of residence of the participants. Participants in the age group more than forty have higher level of knowledge compared with other age groups and participants living in the south have higher level of knowledge compared with those living in other regions. In contrast, Firdous et al. (2017), in his study in Malaysia population, reported no significant relation between the level of knowledge and the socio-demographic factors. Good knowledge in more than forty years could be explained by increased knowledge with aging and instant communication and experience. The presence of high level of knowledge in South Region could be explained by the socioeconomic differences of the population and the closest of south area to the sea; hence, the likelihood of water collection, stagnation and humidity (Al-Azraqi & El Mekki, 2013).

Regarding the source of knowledge, social media, medical practitioners, radio and television and family were the commonly used sources of knowledge with no significant variation between them. Bota et al. (2014) reported that, relatives, friends and family were the most common source of information followed by radio and television. Mass campaigns, as well as community programmes are still needed to increase the awareness of the population. Regarding the attitude toward dengue fever, the majority of the participants considered dengue as a serious disease and two-third of them agreed that patients with dengue are contagious and need to be isolated. Similar findings were reported in the cross-sectional studies conducted in Vietnam, Yemen and Malaysia (Nguyen, et al., 2019; Alyousefi et al., 2016; Firdous et al., 2017). Such an attitude is very important to limit the spread of the disease. Interestingly, the majority of the participants in the present study considered themselves as part of any prevention programmes and only few of them agreed that, the prevention is the responsibility of the government only. Such an attitude represents the real partnership which is needed to facilitate implementation of the control programmes.

Regarding, the practice toward dengue prevention, more than two-third of the participants used to prevent the mosquitoes from getting indoor by closing the windows and used to remove the collected containers and cleaning them to prevent the vector breeding. Nevertheless, less than half of the participants used repellent creams to guard against mosquito bites. The use of insect repellent, specially the registered one, is recommended by the CDC and proved to be safe and effective (Centers for Disease Control

and Prevention, 2019). Similar findings with regard to elimination of breeding sites were reported in Jeddah, Brazil and Malaysia (Binsaeed et al., 2015; Degallier, 2000; Firdous, et al., 2017). Limited practices in preventing mosquito breeding have been reported by Nguyen et al. (2019) in Vietnam (Nguyen et al., 2019). Wearing long-sleeved shirts and long pants, is proved to be effective and safe in controlling the mosquito bites and its comparable to the use of mosquitoes repellents (Centers for Disease Control and Prevention, 2019). In the current study, limited practice of covering the bodies was noticed. Thus, to improve the practice of dengue prevention, more efforts are need to be exerted to enhance personal protection measures.

Strength and limitation

The strengthen points of this study is that, it explained the gap in practice toward dengue prevention and reflected the importance of personal protection. The study was community based, represented the level of awareness in the different regions of Jazan City. However, as a cross section study, the results can't be extrapolated to other cities of Saudi Arabia. Small sample size used in this study may affect the accuracy of the results. Large sample sized cross section and more qualitative studies will be suggested.

5. CONCLUSION

Participants of Jazan population have adequate knowledge with regard to dengue disease transmission, presentation and severity. However, they have limited practice in preventing mosquito bites. Therefore, it is recommended that community-based focused educational programmes and social mobilizations should be implemented in order to raise the awareness, as well as, to translate knowledge into sound practice.

Authors' contributions

All authors contributed in the process of data curation. Formal analysis effectuated by; Mohammed S Mahfouze and Osama B Albasheer. All authors contributed in supervision, methodology, writing, and editing. Osama B Albasheer accomplished final revision and drafting for publication.

Conflict of interest

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

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