Knowledge, Attitude and Practice Regarding Dengue Fever among Secondary School Students in Jeddah city During the year 2014-2015

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Abstract

Background: Dengue fever is a mosquito-borne infection that in recent decades has become a major international public health concern.

Objective: To identify the level of Knowledge, Attitude and Practice of Dengue Fever among secondary schools students in Jeddah city from October 2014 to April 2015.

Design and Methods: A cross sectional study was carried out from 2014 to 2015 among secondary school students. 440 students were randomly selected and given a questionnaire to be filled by themselves. Data was collected and analyzed by using statistical package for social science software program.

Results: The results of this study showed that, the students have adequate knowledge toward dengue fever. Mass media (TV and radio) were the main sources of information about Dengue Fever. Gender of the students was the main predictor for knowledge score of student toward dengue fever followed by paternal education level. 75% of the respondents refuse to living with Dengue fever patients. Cover the water containers and use of pesticides were the most protective used methods.

Conclusion: In general the results of study showed that the total knowledge of the students regarding to Dengue Fever was good and the most significant factor that assess the knowledge of the students is the gender of them.

Keywords: Dengue; KAP Study; Knowledge; Attitude; Practice

Introduction

Dengue fever is a mosquito-borne infection that in recent decades has become a major international public health concern. Dengue is found in tropical and sub-tropical regions around the world, predominantly in urban, semi-urban and coastal areas [1].

The first reported epidemics of Dengue Fever (DF) occurred in 1779 - 1780 in Asia, Africa, and North America. In the past 50 years, its incidence has increased 30-fold with significant outbreaks occurring in five of the six World Health Organization (WHO) regions [2,3].

Four distinct, but closely related, viruses cause dengue. Recovery from infection by one provides lifelong immunity against that virus but confers only partial and transient protection against subsequent infection by the other three viruses. There is good evidence that sequential infection increases the risk of developing Dengue Hemorrhagic fever [4,5].

Dengue hemorrhagic fever (DHF), a potentially lethal complication, was first recognized in the 1950s during dengue epidemics in the Philippines and Thailand. Today DHF affects most Asian countries and has become a leading cause of hospitalization and death among children in the region [4,5].

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The spread of dengue is attributed to expanding geographic distribution of the four dengue viruses and their mosquito vectors, the most important of which is the predominantly urban species *Aedes aegypti*. A rapid rise in urban mosquito populations is bringing ever greater numbers of people into contact with this vector, especially in areas that are favorable for mosquito breeding, e.g. where household water storage is common and where solid waste disposal services are inadequate [5,6].

Over half of the world's population resides in areas potentially at risk of dengue transmission, making dengue one of the most important human viral diseases transmitted by arthropod Vectors in terms of morbidity and mortality [1-7].

Today the geographic distribution includes more than 100 countries worldwide. Many of these had not reported dengue for 20 or more years and several have no known history of the disease [8]. The World Health Organization estimates that more than 2.5 billion people are at risk of dengue infection. WHO currently estimates there may be 50 million cases of dengue fever worldwide every year and 500,000 cases of dengue hemorrhagic fever (DHF) occur in the world with a fatality rate of 0.5 - 3.5% in Asian countries. Of those with Dengue Hemorrhagic Fever, 90% are children less than 15 years of age [2,3].

The aim of our study is to assess the knowledge, attitude and practice of secondary school students in Jeddah city regarding dengue fever.

Materials and Methods

Methodology

Study design, area and time: A cross-sectional study conducted with aims to identify the knowledge, attitude and practices toward dengue fever among secondary school students from 2014 - 2015. The study was conducted in Jeddah city, Mukkah almukurramah province. The study populations were students who joined governmental secondary schools registered in education office in Jeddah city during the study period.

Sampling: The sample size was calculated by using the following formula:

$$N = \frac{z^2\,(pq)}{d^2}$$

Based in the following indicators:
N = Sample size required.
Z = Certainly (for 95% z = 1.96)
p = proportion of the characteristic in the population. (p = 50%)
q = 1 - p (1 - 0.5 = 0.5)
d = precision or error allowable = 5%
The number obtained by this program was 384 students.
Assuming drop cases of (15%), so the sample size was increased to 440 students.

Sample technique: Jeddah city have 104 male and 121 female general public secondary schools, 7 of these schools were selected randomly and were involved in our study. A list of all students in these secondary schools was obtained from Ministry of Education (Statistic and Planning Department).

The sample size was distributed proportionally among these Secondary Schools according to total number of students in each school (Annex I, II).

In each School, the sample was distributed proportionally among each level: (Annex III, IV, V, VI, VII, VIII, IX).

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Number	School	Gender	Level I	Level II	Level III	Total
1	School I	Male	715	703	640	2058
2	School II	Female	383	265	307	955
3	School III	Male	360	300	293	953
4	School IV	Both	250	222	198	670
5	School V	Female	232	198	177	607
6	School VI	Female	191	169	142	502
7	School VII	Male	77	69	60	206
Total			2208	1926	1817	5951

Annex I

Number	School	Total Students	Percent	Student Sample
1	School I	2058	34%	150
2	School II	955	16%	70
3	School III	953	16%	70
4	School IV	670	11%	48
5	School V	607	10%	44
6	School VI	502	9%	40
7	School VII	206	4%	18
	Total	5951	100%	440

Annex II

Levels	Total Students	Percent	Sample
Level I	715	12%	52
Level II	703	12%	51
Level III	640	10%	47
Total	2058	34%	150

School number I (Annex III)

Levels	Total Students	Percent	Sample
Level I	383	7%	28
Level II	265	4%	19
Level III	307	5%	23
Total	955	16%	70

School number II (Annex IV)

Levels	Total Students	Percent	Sample
Level I	360	6%	26
Level II	300	5%	22
Level III	293	5%	22
Total	953	16%	70

School number III (Annex V)

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Levels	Total Students	Percent	Sample
Level I	250	4%	18
Level II	222	4%	16
Level III	198	3%	14
Total	670	11%	48

School number IV (Annex VI)

Levels	Total Students	Percent	Sample
Level I	232	4%	17
Level II	198	3%	14
Level III	177	3%	13
Total	607	10%	44

School number V (Annex VII)

Levels	Total Students	Percent	Sample
Level I	191	4%	15
Level II	169	3%	14
Level III	142	2%	11
Total	502	9%	40

School number VI (Annex VIII)

Levels	Total Students	Percent	Sample
Level I	191	4%	15
Level II	169	3%	14
Level III	142	2%	11
Total	502	9%	40

School number VI (Annex VIII)

Levels	Total Students	Percent	Sample
Level I	77	2%	7
Level II	69	1%	6
Level III	60	1%	5
Total	206	4%	18

School number VII (Annex IX)

Then a systemic random Sampling was applied to select students from each level, if one student cannot participate for any reason the next was chosen immediately to avoid the selection bias.

Data Collection: The data was collected by self-administered questionnaire pre-tested on convenient sample of 30 students, as a result of this pre-test some items were discarded and others were modified due to ambiguity of these questions.

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The questionnaire contains 28 elements and consists of four sections: 1- Personal Data. (Name not included) 2- Questions regarding to knowledge. 3- Questions regarding to attitude. 4- Questions regarding to practice.

The questions to assess the level of knowledge of students regarding to dengue were 20 questions. Correct answer for each question was assigned one mark whereas incorrect or unknown answer given zero.

The total knowledge score ranged from 0 to 20 and we classified the study sample according to their knowledge into three groups: 1- High knowledge : > mean + SD. 2- Adequate knowledge : mean - SD to mean + SD 3- Low knowledge : < mean - SD [13].

The collection of data was done by fourth year medical students in the absence of any school teachers or school personnel in classroom after taking permission to enter the schools and run the study procedures. Students were assured about confidentiality of responses and data would be used only for stated research purposes.

The researchers checked the questionnaire for completeness and then coded to facilitate its entry and analysis in computer. This was done to establish quality data management throughout the gathering process.

Data analysis

The data was checked and analyzed by using Statistical Package for Social science (SPSS version 18) software program. Descriptive statistics (mean, percentage and standard deviation) for continuous variables were calculated. Frequencies were determined for categorical variables.

The differences in age and knowledge level of the students in the secondary school between two groups were tested by students' t-test. Categorical variables were compared by Chi-square test or Fisher`s exact test when the expected frequency below 5. Mother and Father education level were rearranged to be:
1- Primary or less (include: Primary, Can read and write and Illiterate). 2- Secondary or more (include: Secondary and college graduate) P-value less than 0.05 was considered as statistically significant.
Data were presented in tables and figures by using computer application Microsoft Office 2010 (Word and Excel).

Ethical consideration

The study proposal was prepared by the researchers and was evaluated by community medicine department. Written permission was granted from ministry of education in Jeddah city through official latter to all schools included in the study then an oral permission from managers of schools as well as students was obtained before initiation of the study.

Results and Discussion

Results

The overall response rate to the questionnaires was 94% (412 out of 440 questionnaires) while the remaining (28questionnaires) were excluded from analysis either due to incorrect or missing data. the mean age of students was 17.40 and SD = 1.101 (Table 1).

222 (53.9%) of the respondents were male, while the remaining were female 190 (46.1%) (Table 1).

Age group	Gender				Total	
	Male		Female			
	Frequency	%	Frequency	%	Frequency	%
> 18	164	39.80%	176	42.71%	340	82.5%
< 18	58	14.10%	14	3.54%	72	17.5%
Total	222	53.90%	190	46.10%	412	100%
Mean ± SD	17.40 ± 1.101					

Table 1: *Distribution of the age of the students among secondary school students in Jeddah city 2014-2015.*

SD: Standard Deviation; %: Percentage

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Respondents were allowed to select more than one source for received information about dengue fever. The common source of these information was by friends 241 (58.5%), followed by TV 224 (54.4%), school 179 (43.4%) and radio 137 (33.3%). Smaller percentages reported receiving from Internet and other ways 59 (14.3%), 66 (16%) respectively (Figure 1).
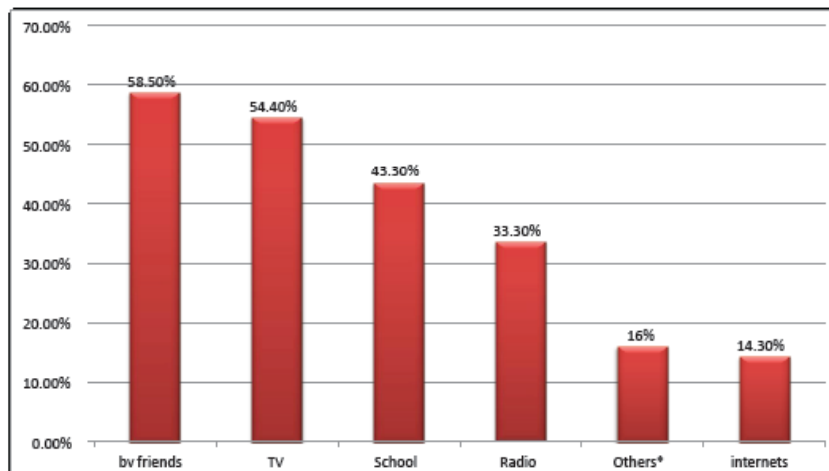

Figure 1: Distribution of students regarding to the Source of information about Dengue Fever among secondary school students in Jeddah city 2014 - 2015.

It's permissible to give more than one answer for the question.

*Others:
1. Newspapers (9%)
2. Medical Brochures (4%)
3. Medical personnel (3%)

Regarding to knowledge about curability of dengue fever only 32 (7.8%) of students answered as no specific treatment for dengue fever (Figure 2) and only 122 (29.6%) of the students knows that dengue fever may reoccur (Figure 3). Most of students have an idea that Dengue fever could be lethal with high percent about 309 (75%) of the students answers (Figure 4).
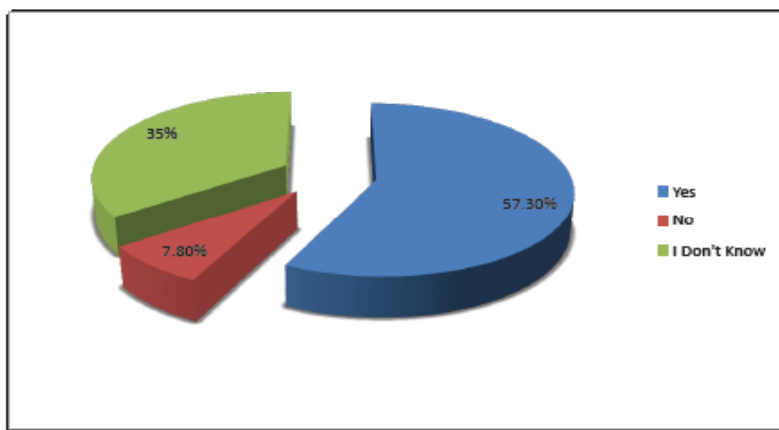

Figure 2: Distribution of students regarding to their knowledge about the Curability of the disease among secondary school students in Jeddah city 2014 - 2015.

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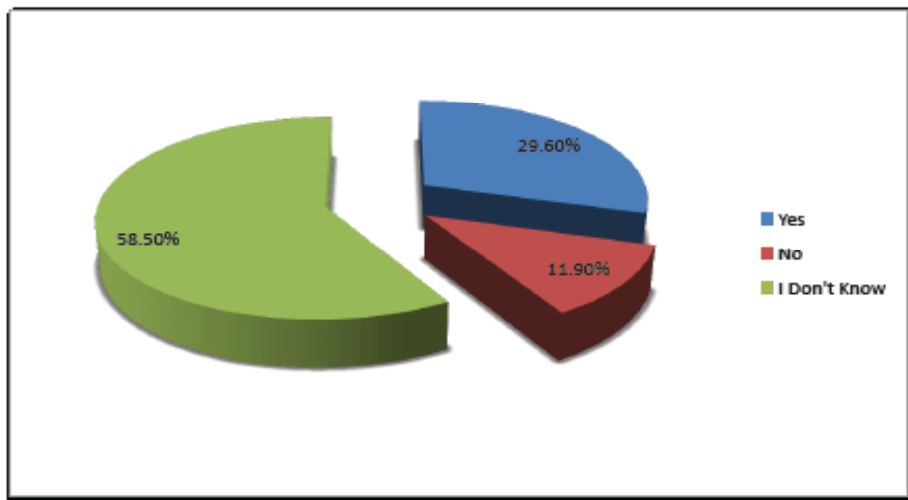
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Figure 3: Distribution of students regarding to their knowledge about the recurrency of Dengue Fever among 7 secondary school students in Jeddah city 2014 - 2015.
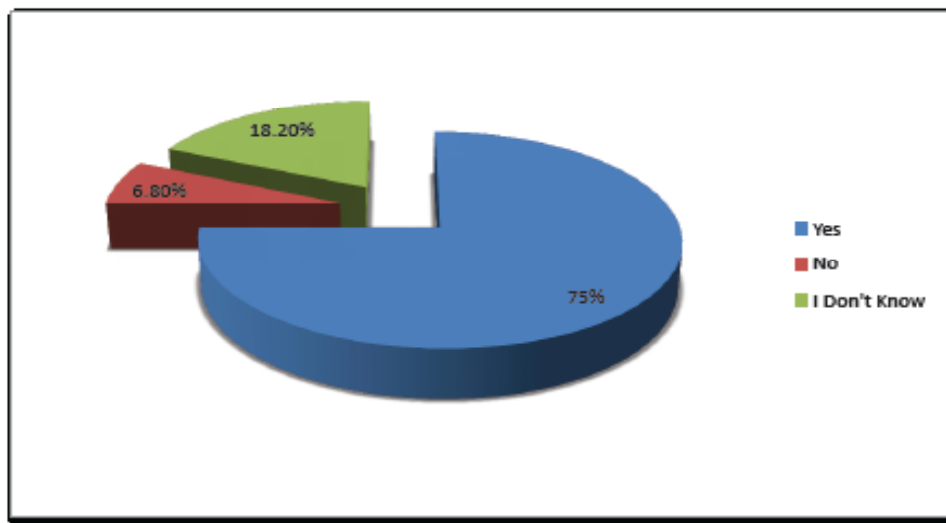

Figure 4: Distribution of students regarding to their knowledge about the Lethality of Dengue Fever among 7 secondary school students in Jeddah city 2014-2015.

Regarding to transmission of the disease from infected person to a healthy one 123 (29.9%) of the students answers were "can't be transmitted from one to another" (Figure 5).

Regarding to the knowledge of students about mosquito bite as the main method of transmission 348 (84.5%) of students agree with that, while about 36 (8.70%) of students answers were "I don't Know" (Figure 6).

Regarding to the awareness of students about risk factors for transmission of dengue fever, higher percentages were for stored house water, humid areas and rain water 244 (59.2%), 124 (30.1%) and 79 (19.2%) respectively (Figure 7).
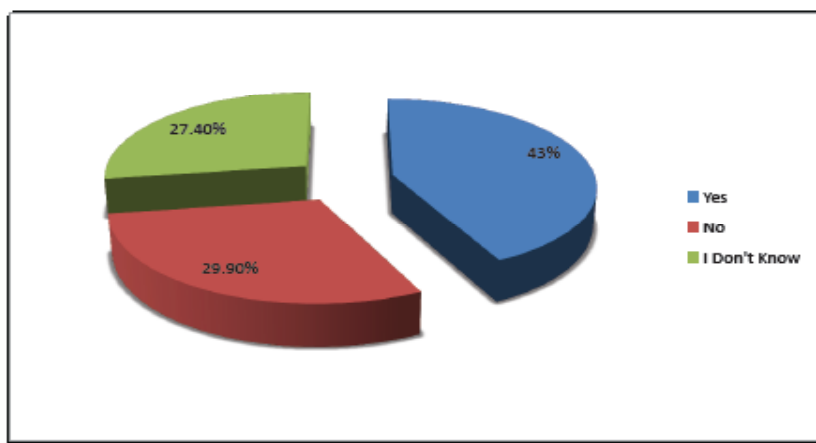
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Figure 5: *Distribution of the students regarding to their knowledge about the Transmissibility of Dengue Fever between infected individual to a healthy individual among secondary school students in Jeddah city 2014 - 2015.*
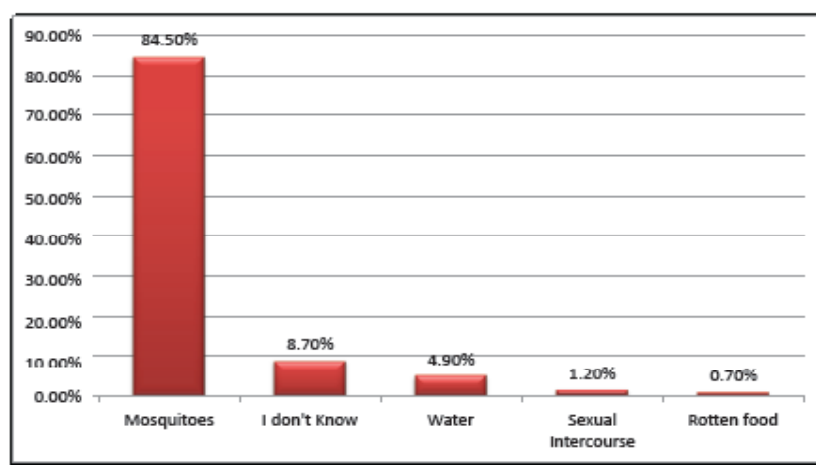

Figure 6: *Distribution of students regarding to their knowledge about the Methods of the Transmission of dengue fever among 7 secondary school students in Jeddah city 2014 - 2015.*
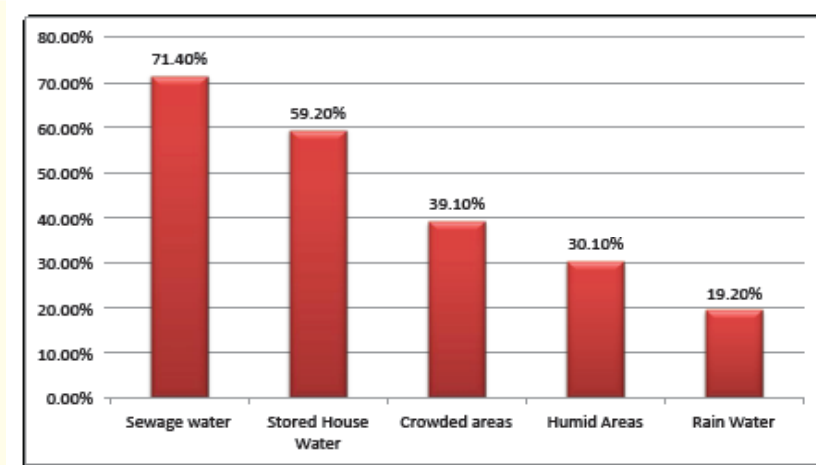

Figure 7: Distribution of students regarding to their knowledge about the risk factors for transmission of Dengue Fever among 7 secondary school students in Jeddah city 2014 - 2015.

It's permissible to give more than one answer for the question.

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Most of the students 267 (64.8%) answered that dengue fever is caused by viral mechanism (Figure 8).
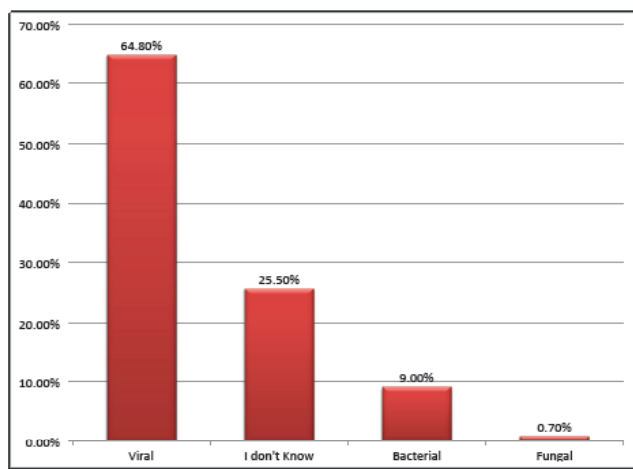

Figure 8: Distribution of students regarding to their Knowledge about causative agent of Dengue Fever among 7 secondary school students in Jeddah city 2014 - 2015.

Regarding to the main clinical features presented by the patients of dengue fever, highest percentage were for fever and headache with 379 (92%) and 293 (71.1%) respectively, and the lowest percentage were for skin rash and hemorrhage with 109 (29.5%) 82 (19.9%) respectively (Table 2).

Symptoms	Frequency	Percentage
Fever	379	92%
Nausea	214	54.9%
Discomfort	250	60.7%
Headache	293	71.1%
Skin Rash	109	26.5%
Hemorrhage	82	19.9
Vomiting	140	34%
Dizziness	195	47.3%
Muscular pain	243	59%
Others*	36	8.7%

Table 2: Distribution of the students regarding to their knowledge about symptoms of Dengue Fever among 7 secondary school students in Jeddah city 2014 - 2015.

It's permissible to give more than one answer for the question.
***others:** 1- Abdominal Pain (frequency 14 = 3.40%). 2- Diarrhea (frequency 11= 2.66%).*
3- Sore Throat (frequency 9 = 2.18%). 4- Blood Urine (frequency 3 = 0.72%)

According to research-based evidence, we classified the level of knowledge into high, adequate and low knowledge and we found most of students have the adequate knowledge toward the dengue fever with 274 (66.5%) (Table 3).

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	Frequency	Percentage
High Knowledge	70	16.9%
Adequate Knowledge	274	66.5%
Low Knowledge	68	16.5%

Table 3: Distribution of the scores of the knowledge of the students regarding Dengue Fever in Jeddah city 2014 - 2015.

Mean (SD) = 9.52 ± 3.07

Students T-Test was used to investigate the difference of students' knowledge which was item in this test as high and adequate knowledge and low knowledge which we found the P-value = 0.073 and result of T-test = 1.79 (Table 4).

Level of Knowledge		Mean ± SD	t	df	p-value
	High and Adequate	17.35 ± 1.10			
	Low	17.61 ± 1.06			
Age			1.79	409	0.073

Table 4: Comparison of students with high, adequate and low level of knowledge based on their age by using Student t-test in Jeddah city in 2014 - 2015.

SD: Standard deviation; df: Degree of freedom

Chi- Square test was used to investigate the association between categorical variables. The test showed Gender, Address, Father Education and Mother education was statically different regarding to the level of knowledge (P-Value = 0.000, 0.602, 0.016, 0,102, respectively (Table 5).

Variable		High and Adequate Level of Knowledge (%)	Low Level of Knowledge (%)	χ2	p-value
Gender	Male	169 (76.72%)	53 (23.87%)		
	Female	175 (92.10%)	15 (7.90%)	19.14	0.000*
Address	Rural area	24 (80%)	6 (20%)		
	City	320 (83.76%)	62 (16.23%)	0.388	0.602
Father Education Level	Primary or less	123 (77.84%)	35 (22.15%)		
	Secondary or more	220 (86.61%)	34 (13.38%)	5.84	0.016*
Mother Education Level	Primary or less	250 (81.69%)	56 (18.13%)		
	Secondary or more	94 (88.67%)	12 (11.32%)	2.67	0.102

Table 5: Comparison of students with high, adequate and low level of knowledge by using Chi- square or Fisher's Exact Test (for nominal variables) in Jeddah city in 2014 - 2015:

*: Significant; X²: Chi-square; Underlined p-value: estimated by Fisher's Exact Test

Regarding to the attitude toward dengue fever patients, we found 309 (75.2%) disagree to live with these patients (Table 6).

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Variables		Frequency	Percentage
Living with the Patient*	Agree	102	24.8%
	Disagree	310	75.2%
Refer to the treatment*	Agree	347	84.2%
	Disagree	65	15.8%
Isolation from others*	Agree	100	24.3%
	Disagree	312	75.7%

Table 6: Distribution of the students regarding to their attitude toward Dengue Fever in Jeddah city 2014 - 2015.

* : there is a third option "I don't care" we don't mention it because the percentage was 0% in all attitude question

374 (84.2%) agree to refer the patients to the treatment (Table 6) and 312 (75.7%) disagree to isolate the patients from other people (Table 6).

Regarding to practical methods for prevention of dengue fever we found that about 393 (95.4%) of the students prefer covering water containers and 374 (90.8%) of them fill the swamps and stagnated water (Table 7).

Variable		Frequency	Percentage
Containers Covering	Yes	393	95.4%
	No	19	4.6%
Drainage of more than 1 week stored water	Yes	290	70.4%
	No	122	29.6%
Drainage of more than 1 week exposed water	Yes	370	89.8%
	No	42	10.2%
Filing of swamps and stagnated water	Yes	374	90.8%
	No	38	9.2%
Spraying with Pesticides	Yes	375	91%
	No	37	9%
Mosquito net	Yes	214	51.95%
	No	198	48.05%
Mosquito repellent creams	Yes	241	58.50%
	No	171	41.50%

Table 7: Distribution of the students regarding to their practical methods for prevention of Dengue Fever in Jeddah city 2014 - 2015.

Discussion

The study focused on the knowledge, attitude and practice about dengue fever among secondary school students, so it will put some light on this subject.

Knowledge: In this study, all respondents had heard about dengue fever. On other studies conducted in Kuala Lumpur, India and Brazil the percentage of respondents who had heard about dengue fever were 98.5%, 90% and 78% respectively [10-12]. This difference could be explained by the outbreak of the disease in the recent years especially in our community.

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In the present study, the friends were the most important source of information followed by television, this result correlate with previous data gathered here in KSA, and other one from Kuala Lumpur [10,13].

The current study demonstrates that the majority of the respondents had an adequate knowledge about dengue fever. 43% of respondents knew that Dengue Fever is infectious disease, this result is similar to the previous research conducted here in KSA [13], while corresponding rate reported from Pakistan was much higher (84%) [14], this may be attributed to recent re-emergence of Dengue Fever in Jeddah, compared to the countries where the disease has been endemic for decades.

The majority of target population (84.5%) correctly identified mosquitos' bites as transmission route of the disease. A slightly better rate (95.8%) was obtained from Hong Kong perhaps because of public dissemination of information about Dengue Fever in Hong Kong for a period of 3 months prior to the study [15]. In contrast, lower percentage of correct answers than these of present study were reported from Philippines (68.7%) [16] and Brazil (60.8%) [12].

Regarding to personal and family factors associated with students' knowledge score, we found that the knowledge scores increased with paternal level of education (p-value = 0.016) which agrees existing work elsewhere [14]. This may be because the fathers act as a reliable source of information for their children. So, the paternal knowledge act as an important predictor related to high knowledge of their children. This result is inconsistent with the previous study conducted here in KSA where the level of the mother education was significant [13]. This may be of cultural aspects regarding to abandon of female education and concentrate on male education.

In this report we found that, the main predictor related to the high knowledge score was found to be the gender of the respondent (p-value = 0.00). The female students has higher knowledge score than male students, this may be related to the more time which the female students spent watching TV as the TV is the main source about Dengue Fever and this inconsistence with other studies [14,17].

Attitude: A gap was seen between Knowledge and attitude toward dengue fever, about 75% of respondents disagree to live with Patient of dengue fever and 24% said that the dengue patient must be isolated from the community. The majority of the respondents agreed with dengue fever treatment and control measure. This result is similar to the previous study conducted here in KSA [13].

Practice: Results of the current study show that the use of insecticides, emptying or covering unused containers was the most commonly reported prevention practices. Similar findings from Pakistani study found that mosquitos' sprays were considered the most common choices for prevention [14]. In Brazil, elimination of water containers was the most efficient means of control of Dengue Fever according to 73% of people [12], also the previous study conducted here in KSA [13].

Limitations: Firstly, Due to time and resource limitation, the study has been conducted only in 7 public schools and hence it may not be a representation of the whole secondary schools.

Secondly, there might be errors in the interviewing stage. Different interviewers tend to phrase questions differently which may influence the response. Interviewers may be forced to explain and rephrase in different way, thus this action might indirectly give clue to the respondents.

Thirdly, due to the hospitality of the students, interviewers were regarded as guest. Therefore, respondents may tend to agree with the interviewers when asked attitudinal questions, in order to please the interviewers.

In future, more studies should be conducted to evaluate knowledge, attitude and practice about dengue fever in these populations.

Conclusion

Results of this study showed:

• All the respondents' students had heard about dengue fever.

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- The overall knowledge of students about dengue fever was 16% had high knowledge and 64% had adequate knowledge.
- Relatives, friends and TV were the main source of information about Dengue Fever.
- The higher knowledge scores were greatest among female students and these with higher paternal education.
- Although general attitude of students toward dengue fever patient was good, (24%) of students think that patient with dengue fever must be isolated.
- In general, most of students follow the preventive measure for protection of dengue fever, which correlate with their level of knowledge.

Recommendations

Based on the result of our study, the following recommendations were made:

- Emphasize the use of television as the mass media information campaign because it is one of the main sources of information.
- Increase description of the habits of *Aedes* mosquitoes, focusing on the usual time, biting and possible breeding sites of the *Aedes* mosquitoes.
- Storing water is obviously widespread and might be difficult to eradicate. It might be a good idea to emphasize methods of protecting stored water from mosquitoes by covering it, changing it frequently or adding abate.
- Cooperative community action could also be emphasizing as a control program that uses young people rather than adults within the community.
- Health education by health personnel played an important role in disseminating Dengue Fever information and prevention methods.

Conflict of Interest

No conflict of interest.

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