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ASSESSMENT OF DIABETES MELLITUS KNOWLEDGE AMONG DIABETIC SECONDARY SCHOOL STUDENTS AT MAKKAH IN SAUDI ARABIA 2019

Mohammed Hassaan Mohdher[1], Nasser Duraymih Odis Alotaibi[2], Fahad AbdulrahmanAtiyyah Albishri[2], Hanadimfwiez al mowalad[3], Moshari Mansour Ward Alotaibi[4], HamedMashhoor Alshanbari[5], Amin Hamed Mohammed Alsalmi[4], AbdulazizAbdulrhman Allihyani[6], Ahmed MusaedHumaid Al-Ghamdi[7], MusferMasoud Ali Almajnooni[8], Bandar Mabruk Almabadi[9]

[1]Health administration specialist, Public Health, Ministry of Health, Makkah, Saudi Arabia

[2]Nursing technician, Public Health, Ministry of Health, Makkah, Saudi Arabia.

[3] Nursing technician, AlzahirHelth Care Custer, Ministry of Health, Makkah, Saudi Arabia.

[4]Health Administration, Department of services and maintenance in primary health care in Makkah, Saudi Arabia.

[5]Nursing Technician, North Makkah Health Sector, Makkah, Saudi Arabia.

[6]Nursing Technician, Ministry of Health, Makkah, Saudi Arabia.

[7]Pharmacy Technic, Al-Jumum Health Centre, Ministry of Health, Makkah, Saudi Arabia.

[8]Nursing Technician, Alkhadraa, Ministry of Health, Makkah, Saudi Arabia.

[9]Medical secretary, Public health affairs in Makkah, Saudi Arabia.

Abstract:

Background:

Saudi Arabia is considered to be one of the highest countries in the Middle East for the incidence of diabetes mellitus. Data are lacking regarding knowledge about diabetes mellitus among school students in Saudi Arabia. Diabetes mellitus is a major metabolic disorder currently affecting over 350 million people worldwide. Also, another one billion people in the world are pre-diabetic, who may eventually end up with full- blown diabetes. Type 2 diabetes mellitus is fast becoming a global epidemic and the number of individuals with diabetes in the world is expected to reach 330 million by 2030. The rate of T2DM is rapidly increasing in developing countries, particularly among younger age groups a cross-sectional study indicated that Saudi adolescents exhibited more health-related knowledge than the older population; the majority of the adolescents believed that obesity was dangerous and that regular exercise was beneficial for their health. Saudi adolescents are at a high risk of developing diabetes as many suffer from obesity, a sedentary lifestyle and hereditary diabetes. In 2004, almost a quarter (23.7%) of the Saudi population was diagnosed with T2DM; this was 10 times the number of diabetic individuals in 1980.6 The occurrence of T2DM has been linked to the high rate of overweight adults (35.5%) in the Saudi population and the number of overweight and obese Saudi adolescents is high among both genders.

Aim of the study: The study aimed to assess the knowledge of diabetes mellitus among secondary school students at the Makkah in Saudi Arabia 2019.

Method: cross sectional descriptive study conducted among secondary school students at Makkah, during the April to June, 2019, the Sample size of diabetic secondary school students. Our total participants were (500).

Results:knowledge of the participant toward diabetes mellitus study results show the majority of participant had average information were(61.0%) while weak knowledge were (31.0%) the data ranged from (4-13) by mean ±SD (9.011±2.314).

Conclusion: The level of knowledge and awareness of a considerable number of high school students regarding DM was inadequate, and some of them possessed various misconceptions about this particular chronic disease. Health authorities and school authorities in the region should offer special efforts to improve the level of knowledge and awareness of the students through regular health education campaigns.Diabetes Day should be celebrated in all schools and workshops and lectures given by professionals in collaboration with Ministry of Health on this day are recommended to increase the level of awareness of diabetes.

Keywords: Diabetes mellitus, knowledge, secondary, school, students, Saudi Arabia.

1.Introduction:

Diabetes mellitus (Type 1 and Type 2) is one of the most commonlyencountered diseases by the healthcare professionals. [1] Worldwide, it was estimated that the prevalence rate among adults was 4% in 1995 and this is expected to increase to 5.4% by 2025. Compared to other parts of the world .[2]International Diabetes Federation stated that people with diabetes is expected to increase from 171 million in 2000 to 578 million in 2030 globally.[3] In July 2020, the number of people with diabetes is calculated to be almost 463 million worldwide. [4].Saudi Arabia is considered to be one of the highest countries in the Middle East for the incidence of diabetes mellitus. Data are lacking regarding knowledge about Diabetes mellitus among secondary school students in Saudi Arabia [5]. The youth are the future of a country and are considered dynamic human capital that plays a vital role in nation-building. If students adopt sedentary lifestyles and are inclined to fast food and irregular eating habits, then there is a lot of probability of suffering from being overweight, obese, and, consequently, type 2 diabetes mellitus (T2DM) at a young age [6]. Diabetes is a silent disease; many sufferers became aware that they have diabetes only when they develop one of its life-threatening complications. Knowledge of diabetes mellitus can assist in early detection of the disease and reduce the incidence of complications. This can be achieved by improving the knowledge of the school students of the disease at early stage of life. Diabetes is a growing global health problem that affects an estimated 463 million adults worldwide [7].Low knowledge about diabetes coupled with high disease prevalence is common in low-resource countries. It is essential to evaluate and update the knowledge, education and awareness of the diabetes especially among secondary school students, because in future they are going

to avoid the diabetic complications and health problem of diabetes [8] The incidence of Type 2 diabetes mellitus has tremendously increased globally in the last 20–30 years. It is basically due to changes in people's lifestyle by introducing fast foods, carbonated and energy drinks, and reduced energy expenditure by manual hard work or regular exercise. [9] It is essential to evaluate and update the knowledge, education and awareness of the diabetes among secondary school students [10]. The Middle East has the highest prevalence of diabetes of any world region, and Saudi Arabia has one of the highest prevalence rates of any country in the Middle East. A reported 18.5 percent of Saudi Arabian adults have diabetes, and the prevalence is increasing [11]. As a response to this growing public health concern, the Saudi Arabian Ministry of Health has included a diabetes education and awareness campaign as part of its 2030 Vision initiative [12].Health-care workers play a central role in providing education about diabetes prevention, diagnosis, and management to patients and their families. Identifying possible gaps in knowledge among these rising professionals may enable improved preparation for patient care in the coming years as Saudi Arabia seeks to reduce its epidemiological and economic burden from diabetes. [13]. The study aimed to assess the level of knowledge of diabetes mellitus among secondary school students at the Makkah in Saudi Arabia.

1.2 Literature Review

The most of systematic review has shown that there is generally low knowledge among diabetic secondary school students, about the risk factors and its complications among the Saudi population and secondary school students in particular. Most diabetes mellitus patients had low to moderate knowledge scores in Riyadh, Jeddah, Al Hasa, Al-Khobar, and Mecca. Also unexpectedly, health professionals in Saudi Arabia also had low knowledge scores about diabetes mellitus especially type 2. [14]. The results of one study in the US showed that secondary school students knowledge in the diabetes was not enough and also knowledge level of different medical groups such as general practitioners, specialists, internal medicine residents and medical students had significant differences with each other [15,16]. In Bahraini study, it was reported an average knowledge of secondary students [17] similar results were reported by other secondary studies [18]. In a study from Turkey about knowledge and attitude of secondary students and teachers toward DM complications, it was found that the secondary students and teachers had adequate knowledge of diabetes mellitus complications [19].The results of one study in the Kuwait showed that Diabetes is a global issue. Kuwait is among the high prevalence countries (20%) and has been ranked 5th. This suggests that one-fifth of the studied sample would be diagnosed in the future as diabetic. Taking into consideration this high prevalence of diabetes, it is highly recommended to increase the knowledge about diabetes in young ages. [20]

Two studies carried out in the United Kingdom by Christie et al [21] and Deeb,[22] reported better education among diabetic patients improves their ability to control the disease, resulting in better patient outcomes and reduced complications. Therefore, increasing knowledge and awareness of diabetes mellitus in the population will contribute to better community health outcomes. Increased knowledge about diabetes mellitus is needed for patients to optimize their lifestyles and improve their medication habits to get the optimum benefits and delay the onset of long-term complications. Education is also essential to help diabetes mellitus patients' families cope with the necessary lifestyle modifications and provide psychological and dietary support. Therefore, improving knowledge and awareness about diabetes mellitus among secondary school students is imperative, given the prevalence of the disease in Saudi Arabia. Public health centers are considered the best place to provide health education interventions for citizens and student both with and without diabetes mellitus.According to results of study in the Kuwait, the results showed that the students had an average level of knowledge of diabetes although there were areas of shortage. Students performed best in the general knowledge section and worst in symptoms and complications of diabetes section. In this study show students scored on average more than 63.2% in each section of the questionnaire. This average was lower than expected, since students at this level are expected to have more information about diabetes.The results showed that students had good general knowledge of the disease. 89.3% knew that there are different types of diabetes affecting different ages. This could be explained by the high percentage of diabetes in Kuwait. [23]

1.3. Rationale:

There may be a gap between knowledge of bronchial asthma among childhood and also there is a high percentage of children with uncontrolled asthma and is a high knowledge deficit among the children with asthma, all this factors increase the risk of respiratory disorders, middle ear disease, dental caries, and the risk of developing lung cancer in adulthood in Saudi Arabia. Assessing specific smoke constituents or their metabolites in body liquids can give a precise data about exposure to SHS. Prevention and health promotion is one of the cornerstones in our practice, thus investing in knowledge toward management of an educational program targeting the general population and the caregivers should be implemented to correct any false beliefs regarding asthma and asthma medications.

1.4 Aim of the study:

To assess the knowledge of diabetes mellitus among secondary school students at the Makkah in Saudi Arabia 2019.

1.5 Objectives:

Assess the knowledge of diabetes mellitus among secondary school students at the Makkah in Saudi Arabia 2019.

2. Methodology:

2.1Study design:

This study is descriptive type of cross-sectional study was conducted among 500 childhood asthma applying a convenience sampling technique .

2.2. Study Area

The study has been carried out in the city of Makkah Al-Mokarramah Makkah is the holiest spot on Earth. It is the birthplace of the

Prophet Mohammad and the principal place of the pilgrims to perform Umrah and Hajj. It is located in the western area in Kingdom of Saudi Arabia and called the Holy Capital. Contains a population around 2 million. This study has been conducted in Makkah in the primary health care centers in Makkah. Saudi Arabia. An asthma knowledge questionnaire was used to measure the knowledge. During the April to June, 2019, participants were , in the western region of Saudi Arabia. And it reflects a diversified demographic profile with a considerable portion of the population comes from rural descent, while others come from an urban one. This difference translates into biological, socioeconomic and lifestyle differences in the Makkah population.

2.3. Study Population

The study has been conducted regarding childhood asthma in the primary health care centers at Makkah Mokarramah. During the April to June, 2019 the period of study in 2019

2.4 Selection criteria:

2.4.1 Inclusion criteria

- Secondary school students at Makkah.
- All nationalities

2.4.2Exclusion criteria :

No specific exclusion criteria.

2.5Sample size

Secondary school students at Makkah around.

The sample size has been calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly the Sample size is (500) the secondary school students (male and female) after official communication with the school's dean.in the Makkah and adding 10 more to decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been 500. Computer generated simple random sampling technique was used to select the study participants.

2.6 Sampling technique:

Systematic random sampling technique is adopted. After that, by using random number generator, then simple random sampling technique has been applied to select the schools. Also, convenience sampling technique will be utilized to select the participants in the study. By using systematic sampling random as dividing the total students by the required sample size; (500).

2.7 Data collection tool

The self-administered questionnaire is designed based on previous studies and frameworks to assess the level of knowledge and awareness of DM among secondary school students in Makkah. The questionnaire has been developed in English. The questions were first pre-tested and were revised and finalized after it has been pilot tested. Before completing the survey, participants were required to indicate their consent using a forced response question followed by the survey questionnaires. The survey is estimated to take 6 min to complete. To collect the information, a set of questions were constructed and developed. All questions were closed-ended, with tick boxes provided for responses; participants answered the questionnaires from the April to June, 2019 the period of study in 2019.

The questionnaire consisted of questions that

First part General and Socio demographic information. These variables included contact data (email or mobile phone number),(age, gender, Sources of information). Other variables were education level, economic level.

A questionnaire has been developed that had Socio demographic data and questions related to knowledge and awareness respectively. The two senior faculty members checked the questionnaire's validity and comprehension, and it was revised according to their suggestions. A pilot study has been conducted on 20 secondary students to check the questionnaire's understanding and responses further, and its Cronbach's alpha was 0.75. The results of the pilot study were not included in the final analysis.

The level of knowledge has been categorized into "adequate" and "inadequate" as per each topic/question, and also as per each response/answer. Data entry and analysis were carried out using the Statistical Package for the Social Sciences. Pearson's Chi-square tests were performed to explore if there is any significant association between the knowledge and awareness level of the high school students and their (i) gender, (ii) age, and (iii) level of education.

2.8 Data collection technique:

Researcher has been visits the selected secondary school after getting the approval from the ministries of health and education. The researcher has been obtained permission from secondary school director and participants.

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

2.9 Study Variables

Variables of the study

Dependent variable.

- Knowledge of diabetic secondary school students.

Independent variables.

- Age, gender, Sources of information, other variables were education level, economic level.

2.10 Data entry and analysis:

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

2.11 Pilot study

A pilot study has been conducted in the same sector due to the similarity to the target group using the same questionnaire to test the methodology of the study. As a feedback, the questionnaire has been clear and no defect has been detected in the methodology

2.12. Ethical considerations

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

2.13 Relevance & Expectations:

Knowledge among diabetic secondary school students. The researcher expects from the study, low level of Knowledge among diabetic secondary school students

2.14. Budget: Self-funded

3. Results

Table 1 Distribution of demographic data (age, gender, Level of education, economic level, Sources of information) in our study(n=500)

	N	**%**
Age		
12-14.	175	35
14-16	120	24
>16	205	41
Range	12.25-17.5	
Mean±SD	15.75±3.112	
Gender		
Female	220	44
Male	280	56
Level of education		
Intermediate	175	35
Secondary	325	65
Economic level		
Low	155	31
Medium	145	29
High	200	40
Sources of information about DM		
Booklets and brochures	55	11
Mass media	75	15
Own personal experience	140	28
Educational films	40	8
Medical education in health centers and hospitals	190	38

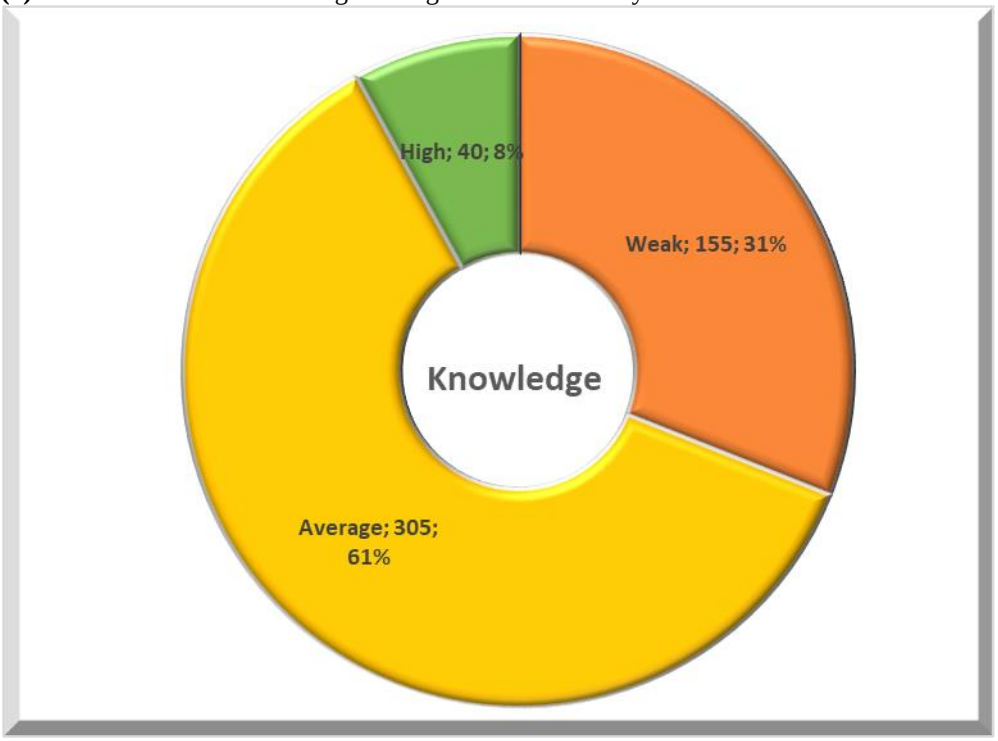
Table 1 shows that most of the participants (41.0%) were in the age group more than 16 years follow by the (35.0%)were in the age 14-16 years and the data ranged from(12.25-17.5) by mean ±SD(15.75±3.112),the majority of them were male (56.%) while female(44.0%),also regarding level of education the majority of participant are secondary level were(65.0%) while intermediate were(35.0%). Regarding the economic level, the majority of participant high economic level were (40.0%). While sources of information most of participants from Medical education in health centers and hospitals were (38.0%) while Own personal experience were (28.0%)

Table(2) Distribution of the knowledge among diabetic secondary school students

		Knowledge		**Score**	
		N	**%**	**Range**	**Mean±SD**
Weak		155	31	4-13.	9.011±2.314
Average		305	61		
High		40	8		
Total		500	100		
Chi-square	**X^2**	211.9			
	P-value	<0.001*			

Table 2 Regarding knowledge of the participant toward diabetes mellitus study results show the majority of participant had average information were(61.0%) while weak knowledge were(31.0%) the data ranged from(4-13) by mean ±SD(9.011±2.314).

Figure(1) Distribution of the knowledge among diabetic secondary school students



Table(3) Distribution of the knowledge among diabetic secondary school students and the demographic data(age, gender, Level of education, economic level)

		Knowledge						Chi-square	
		Weak		Average		High			
		N	%	N	%	N	%	X^2	P-value
Age	12-14.	95	61.29	74	47.74	6	3.87	78.550	<0.001*
	14-16	12	7.74	98	63.23	10	6.45		
	>16	48	30.97	133	85.81	24	15.48		
Gender	Female	66	42.58	126	81.29	28	18.06	11.995	0.002*
	Male	89	57.42	179	115.48	12	7.74		
Level of education	Intermediate	47	30.32	115	74.19	13	8.39	2.581	0.275
	Secondary	108	69.68	190	122.58	27	17.42		
Economic level	Low	87	56.13	59	38.06	9	5.81	67.199	<0.001*
	Medium	32	20.65	101	65.16	12	7.74		
	High	36	23.23	145	93.55	19	12.26		

Table (3) show that is a significant relation between knowledge and demographic data regarding age (increase in >16 follow by age 14-16) in the average respectively were (85.81%,63.23%), $\mathbf{X^2}$78.550 and P-value=<0.001. Regarding gender In our study a significant relation between knowledge and gender the majority of our participants were noticed in female more than male with in the average were (81.29%), $\mathbf{X^2}$11.995 and P-value= 0.002. Regarding Level of education show that no significant relation between knowledge and Level of education (increase in secondary in the average were (122.58%), $\mathbf{X^2}$2.581 and P-value=0.275. Also regarding the economic level show that a significant relation between knowledge and economic level (increase in the high income participants in the average were (93.55%), $\mathbf{X^2}$ 67.199 were and P-value=0.001.

Figure(2) Distribution of the knowledge among diabetic secondary school students and the demographic data (age, gender, Level of education, economic level)

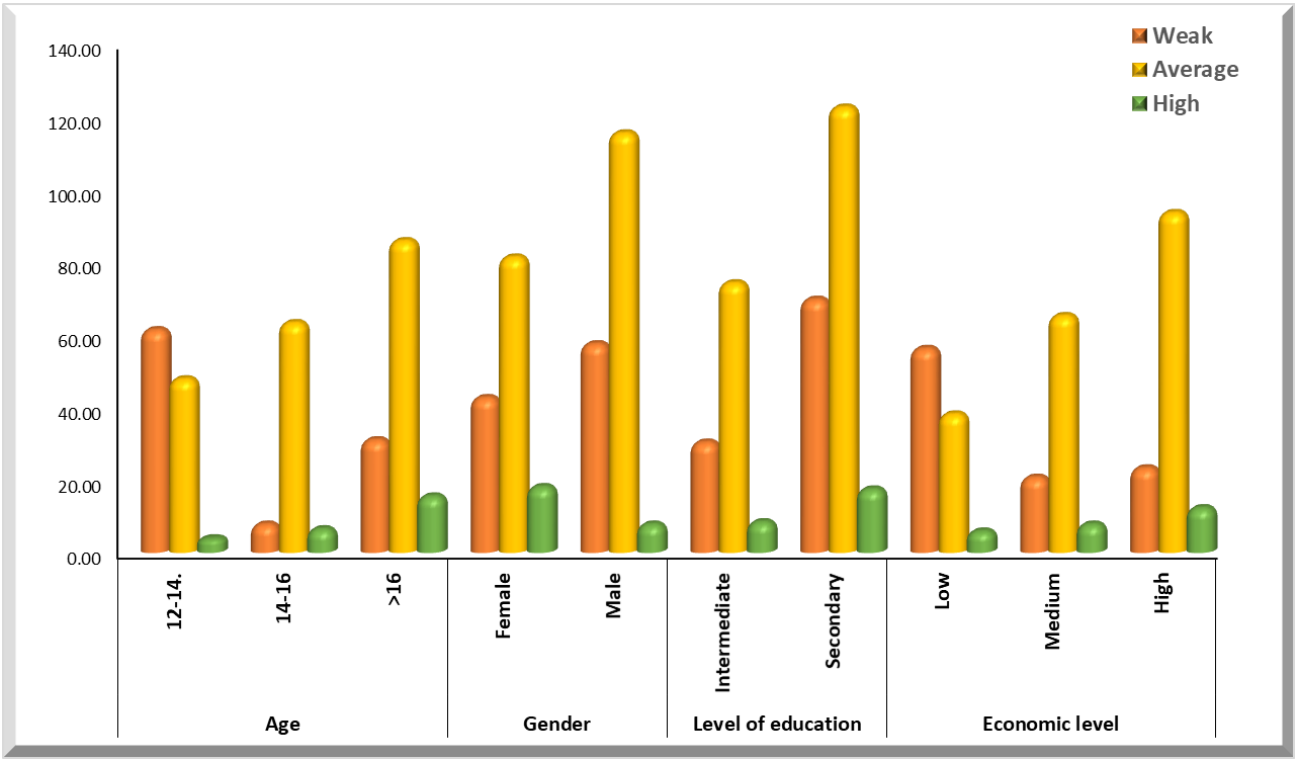
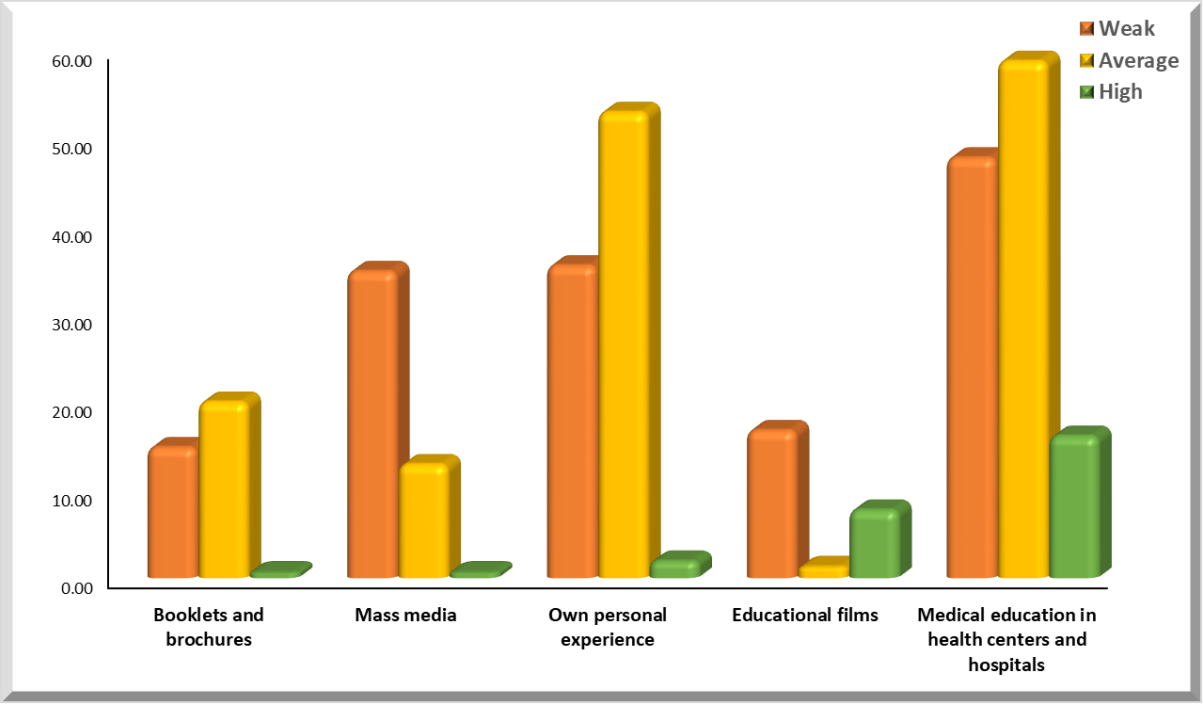


Table (4) Distribution of the knowledge among diabetic secondary school students and the Sources of information about DM (Booklets and brochures, Mass media, Own personal experience, Educational films, Medical education in health centers and hospitals)

Sources of information about DM	Knowledge						Chi-square	
	Weak		Average		High			
	N	%	N	%	N	%	X^2	P-value
Booklets and brochures	23	14.84	31	20.00	1	0.65	86.144	<0.001*
Mass media	54	34.84	20	12.90	1	0.65		
Own personal experience	55	35.48	82	52.90	3	1.94		
Educational films	26	16.77	2	1.29	12	7.74		
Medical education in health centers and hospitals	74	47.74	91	58.71	25	16.13		

Table (4) show that is a significant relation between knowledge and Sources of information about DM while X^2 86.144 and P-value= 0.001, regarding Booklets and brochures (increase in average were (20.0%). Regarding Mass media in our study the majority of our participants were noticed in average weak were (34.84%). Regarding Own personal experience show that increase in average were(52.90%), regarding the Educational films show that increase in the weak were(16.77%), regarding the Medical education in health centers and hospitals show that increase in average were(58.71%)

Figure(3) Distribution of the knowledge among diabetic secondary school students and the Sources of information about DM



4. Discussion

There may be a gap between knowledge of diabetes of diabetes all participants in our study were the students of secondary school, the study aimed to assess the knowledge of diabetes mellitus among secondary school students at the Makkah in Saudi Arabia 2019, objectives of the study to assess the level of knowledge among diabetic secondary school students.This is the first study to assess the level of knowledge among diabetic secondary school students in Makah. In the present study, the male students were more participants than female students and the large majority of participants were in the age range more than 16 years old representing of all participants, in our result show most of the participants were in the age group more than 16 years follow by the age 14-16 years the majority of them were males, also regarding level of education the majority of participant are secondary level. The economic level the majority of participant medium economic. While sources of information most of participants from Medical education in health centers flowed by while own personal experience. The highest percent of student's secondary education, while the least percent had Intermediate education degree. In a Jordanian study [24] there was dominancy in male and young age participants. A study from Turkey showed that 50% of participant students were males [25]. A study from Ghana [26] showed more prevalence of males and married teachers and those with age of 30-39 years old and 1-5 years of experience. Most of in Ghana study participants showed a moderate level of knowledge not similar to our results reported. In Bahraini study, it was reported an average knowledge and awareness of students [27]. Our study findings are similar to a number of previous study results that showed an inadequate level of knowledge and awareness of diabetes mellitus among the respondents in Saudi Arabia [28]. Al-Aboudiet al.[29] reported that 15% of the study participants in Riyadh had inadequate knowledge of DM, while 72% had moderate knowledge, the respondents in Dammam were found to obtain low scores regarding knowledge and attitudes toward diabetes mellitus. In another survey by Al Malki et al. [30], in light of this result, it is interesting to know that a similar study was done in Singapore [31], similar a Chinese study reported inadequate knowledge of diabetes and its related factors among college students. [32].In a study, Baig et al (2015) revealed similar trends of having poor knowledge regarding DM in KAU students. [33]. A study by Al-Maskari et al. among patients with diabetes mellitus reported that age and gender were related to diabetes mellitus Practices, and observed a higher Practices score among males than females ($p < 0.001$). That study also found there was a significant difference between knowledge scores of postgraduate (19.67) and undergraduate (14.74) respondent ($p < 0.001$) [34]. Similarly, a study by Islam et al. showed significant associations for all demographic variables (including diabetes mellitus status) with awareness scores [35]; Another study was carried out exclusively among secondary school students in Riyadh by Al-Mutairi et al [36].

5. Conclusion

Health authorities and school authorities in the region should offer special efforts to improve the level of knowledge through regular health education campaigns about DM, particularly for school students, school teachers, and parents of the school students. Simultaneously, incorporation of health education messages about major chronic diseases into textbooks and school curriculum will provide opportunities for increasing awareness of school students regarding DM. Our study concluded that the level of knowledge of a considerable number of high school students regarding DM was inadequate, and some of them possessed various misconceptions about this particular chronic disease.

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