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EFFECT OF TYPE 1 DIABETES MELLITUS ON CHILDREN

Alshamrani Ali[1], Amair Obidallah Aljhni[2], Adel Ahmed Bahumid[2], Ahmad ali Shata[2], Rani Naser Abumansour[1], Abdullah Mohammad alsufi[2], A. Al Zahrani[3], Abdulkarem Rasmi M Khairi[2]

1. *Department Of Paediatrics At Maternity And Children Hospital Makka, KSA*
2. *General Practitioner, Public Health in Makkah, KSA*
3. *Pediatric Consultant Endocrinology at Maternity And Children Hospital Makka, KSA*

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ABSTRACT

Background: Diabetes presenting in children or young adults and terminating in fatal ketoacidosis first appeared in the medical literature in the 19th century, but this was a very rare clinical condition. The aim of this study was to determine the effect of Type 1 diabetes mellitus on children and the role of mother's knowledge on the effect of the type 1 diabetes mellitus on children. The sample was taken from successive admissions to the outpatient diabetes clinics and impatients at Maternity & Children Hospital at Makkah which is a tertiary care. Methodology: A cross-sectional design was adopted in the present study. Results The participants were found to be between 20 to 30 years old, the majority of the participants were female comparing to male with a statistically significance of (T=-3.818, p<0.001); the majority of the participants were found to have intermediate education with a statistically significance of (F=8.540, p<0.001); the majority of the participants were had an occupation with a statistically significance of (F =4.513, p<0.001) Recommendations: The information presented in this study should be reinforced in order to promote sustained behavioural change in the community; therefore, there is a need to increase research studies on T1DM in Saudi Arabia.

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Introduction

Diabetes is a noteworthy worldwide issue because of drastically expanding around the world [1]. And, as [2] pointed out Diabetes is a major contributor to the worldwide burden of ailment. Diabetes mellitus (DM) is common all over the world, nevertheless it is more widespread (especially Type 2) in the more developed countries [3]. Type 1 diabetes may present at any age, but most commonly does so between the age of 5 years and puberty. The diagnosis is suggested by the onset in childhood or early adult life including slim build, and acute or rapid onset including the early requirement for insulin, and presentation in diabetic ketoacidosis or ketonuria. In the absence of epidemiological studies, the only sources available have been clinic series and mortality statistics. The reported death rate from diabetes for children under 15 years of age was 1.3/100,000/year in the U.S. in 1890, as compared with 3.1/100,000/year in 1920 [4]. Type 1 diabetes may also be known by a variety of other names, including:

- Insulin-dependent diabetes mellitus (IDDM)
- Juvenile diabetes
- Brittle diabetes

Corresponding Author: Zaid Hamid Mahmoud, Department of chemistry, college of science, Diyala university, Iraq, E-mail: zaidhameed_91 @ yahoo .com

- Sugar diabetes

There are two forms of type 1 diabetes:

- Idiopathic type 1. This refers to rare forms of the disease with no known causes.

- Immune-mediated diabetes. An autoimmune disorder in which the body's immune system destroys, or attempts to destroy the cells in the pancreas that produce insulin. Immune-mediated diabetes is the most common form of type 1 diabetes and is generally referred to as type 1 diabetes [5]. In pediatric type-1 diabetes mellitus (T1DM), the primary caregiver is mostly the mother. Typically, self- management education and training for the parents and their child begins with several sessions during hospitalization at the time of diagnosis, and continues over time in the context of collaborative relationship with the healthcare team [6].

Type 1 diabetes, once known as juvenile diabetes or insulin-dependent diabetes, is a chronic condition in which the pancreas produces little or no insulin. Insulin is a hormone needed to allow sugar (glucose) to enter cells to produce energy [7]. The long-term goal of diabetes care is to maintain blood glucose within or close to physiological normality, and to reduce the incidence of long-term complications of disease [6]. The Kingdom of Saudi Arabia (KSA) is the largest country in the Middle East that occupies approximately four-fifths of the Arabian Peninsula supporting a population of more than 33.3 million people, of whom 26% are under the age of 14 years. As per the Diabetes Atlas (8th edition), 35,000 children and adolescents in Saudi Arabia suffer from T1DM, which makes Saudi Arabia rank the 8th in terms of numbers of TIDM patients, and 4th country in the world in terms of the incidence rate (33.5 per 100,000 individuals) of TIDM [8]. Self-management requires that parents know how to prepare and give insulin injections, monitor blood glucose and urine ketones, record blood level values, manage diet including developing meal plans, manage exercise, and manage acute problems particularly hypoglycaemia [6]. It is important for the members of the healthcare team to know the socioeconomic status (SES) of the family, because SES of family could have both a direct and an indirect influence on metabolic control of T1DM [6]. Registry data on patients with type 1 diabetes mellitus who undergo pancreatic islet transplantation have indicated that only 8 percent are free of the need for insulin therapy [9]. The incidence of type 1 diabetes is increasing rapidly worldwide. Type 1 diabetes typically presents in childhood or early adult life. It can be distinguished from type 2 diabetes; and delayed diagnosis may result in diabetic ketoacidosis [10]. Type 1 diabetes (T1D) is one of the most prevalent chronic illnesses diagnosed in childhood occurring in 1:400-600 American children. An increasing number of young children are impacted by T1D, with 15-20% of new diagnoses occurring in children [11]. Diabetes mellitus type 1, also known as type 1 diabetes, is a form of diabetes mellitus in which very little or no insulin is produced by the pancreas . Prior to the discovery of insulin, a diagnosis of diabetes was fatal within a few weeks to months due to insulin deficiency. With the discovery of insulin, people with type 1 diabetes have been able to live productive lives for many decades. However, in 2017, the life expectancy of people with type 1 diabetes is still approximately 12 years less on average than the rest of the general population [12]. The management of children and young people with diabetes pose additional challenges in the form of emotional and psychological difficulties. Stress, in itself, may dysregulate diabetes through psycho-physiological processes or associated changes in self-management behaviours [13]. Considering Diet and activity, the management of Type 1 diabetes mellitus Insulin is the mainstay of management, but will not be fully effective without paying attention to food intake and exercise. Insulin therapy aims to imitate natural secretion of insulin from the pancreas by supplying constant background levels of insulin in conjunction with rapid peaks when food is consumed. This is most commonly achieved by multiple injections of long- and short-acting insulin, but can be more reliably obtained by continuous subcutaneous insulin delivery via a portable external device. The aim of dietary management is to balance the child's food intake with insulin dose and activity, and to keep blood glucose concentrations as close as possible to reference ranges, avoiding extremes of hyperglycemia and hypoglycemia. Exercise is also an important aspect of diabetes management. It has real benefits for a child with diabetes. Patients should be encouraged to exercise regularly. Exercise is also an important aspect of diabetes management, and it has real benefits for a child with diabetes (American Diabetes Association, 2003).

The aim of the study

1. To investigate the impact of different sociodemographic factors including the mother's age, level of education, marital status, monthly family income, and length of time since the child's diabetes diagnosis.
2. To assess the relationship between the mother's knowledge on diabetes and glycemic outcomes in children with T1DM
3. To examine the impact of SES on outcomes in children withT1DM.

Research Problem

The Kingdom of Saudi Arabia (KSA) is the largest country in the Middle East. 26% are under the age of 14 years. As per the Diabetes Atlas (8th edition), 35,000 children and adolescents in Saudi Arabia suffer from T1DM, which makes Saudi Arabia rank the 8th in terms of numbers of TIDM patients, and 4th country in the world in terms of the incidence rate (33.5 per 100,000 individuals) of TIDM. The incidence of T1DM among infants is also increasing with children as young as 6 months.

Research objectives:

1. Helping the children cope with type 1 diabetes
2. Get the parents of children familiar with diabetes, that their children enjoy the same social rights as the other children.
3. Awareness of the Nutritional risk factors on type 1 Diabetes Mellitus on children

Research hypothesis

Lack of awareness in parents about the T1DM in children

Material And Method

Research design: A cross-sectional design was adopted in the present study.

Setting: The present study was conducted at Maternity & Children Hospital in the Holy Capital, department of paediatrics which is a tertiary care.

Study Sampling: The sample of 200 questionnaires filled by a parent/guardian was used in this study.

Statistical analysis: Data was analyzed using SPSS version 20. The names of the participants were kept confidential.

Previous studies: The Kingdom of Saudi Arabia (KSA) is the largest country in the Middle East that occupies approximately four-fifths of the Arabian Peninsula supporting a population of more than 33.3 million people, of whom 26% are under the age of 14 years. As per the Diabetes Atlas (8th edition), 35,000 children and adolescents are suffering from [8].

Content Validity and reliability: The questionnaire was submitted to a panel of experts in the field to test the content validity. Modification was carried out according to the panel judgment on the clarity of sentences and appropriateness of the content.

Pilots study/pretesting

A pilot study was carried out on 10% of the sample size only, among the patients who weren't included in the actual study. The pilot study was carried out with the application of the full methodology and the analyses of the results. The method, the feasibility, and duration were assessed. No changes were made to the aforementioned methodology.

Ethical considerations

1. Permission was also obtained from the administrators of Maternity & Children Hospital at Makkah.
2. Permission was obtained from concerned authority in MOH PHC administration.
3. Individual verbal consent for the data collection was obtained from each participant.
4. All information was kept confidential.

Results

Socio-demographic details

Age

In this study, an age period of 20-40 constituted the most common period which was regarded as 2/3 of cases. Second, the age period of 40-50y represented 12.5 %, while the age period of 50-60 represented 4.5 %. It is important to say that 50% of participants were below 30-year-old. The age period ranged between 20-60.

Gender

Females in this study were 93.5% while Males constituted 6.5% of cases.

Education Level

The majority of the participants were had the intermediate level education constituting 68.00 %.

The most illustrative finding was that the participants with the primary education constituted 16.50 % of the study population.

Economic level

In this study, participants with an average economic level constituted 52.0 %. While, 30.0% of the cases had a high economic level.

Occupation

In this study, unemployed participants constituted 30.5%. While employed constituted 69.5% of the study (see table 1).

Table 1. Socio-demographic details

	N	**%**
Age		
20y < 30years	94	47.0
30y < 40years	72	36.0
40y < 50years	25	12.5
50y < 60years	9	4.5
Gender		
Male	13	6.5
Female	187	93.5
Education		
Primary	31	15.50
Intermediate	136	68.00
Secondary	33	16.50
Economic level		
Low	36	18.0
Average	104	52.0
High	60	30.0
Occupation		
Yes	139	69.5

No	61	30.5

Table 1: The general knowledge about diabetes

The testing tool included 20 objective questions about general knowledge about diabetes, the questions had answers limited to Yes, No or I do not know: these questions were analyzed using the Chi square analysis.

Most of the questions addressed the general knowledge about diabetes. There was low percentage of answer “yes” given as a correct answer. While there was a high percentage of "no" and “Don’t know” given as the incorrect answers. Table 2 represents the results of Chi square test, showing statistically significant high differences.

Table 2: The general knowledge about diabetes

			Data			Wt	%	Chi-square	
			No	I don't know	Yes			X^2	P-value
1	The cause of diabetes in children differs from that of adults.	N	139	31	30	291	48.50	117.730	0.000
		%	69.5%	15.5%	15.0%				
2	Childhood diabetes is caused by a lack of insulin supply.	N	111	44	45	334	55.67	44.230	0.000
		%	55.5%	22.0%	22.5%				
3	There many differences in the causes and treatment of disease among adults and young people.	N	127	23	50	323	53.83	87.370	0.000
		%	63.5%	11.5%	25.0%				
4	DM type 1 has increased in children	N	114	34	52	338	56.33	52.840	0.000
		%	57.0%	17.0%	26.0%				
5	Shortness of breath and an increase in the speed of the symptoms appear on diabetic children	N	117	35	48	331	55.17	58.270	0.000
		%	58.5%	17.5%	24.0%				
6	A diabetic child feels coma and anxiety	N	111	17	72	361	60.17	66.910	0.000
		%	55.5%	8.5%	36.0%				
7	Diabetes is becoming more common because of weight gain	N	109	27	64	355	59.17	50.590	0.000
		%	54.5%	13.5%	32.0%				
8	you know the prevalence of diabetes in Saudi Arabia	N	130	17	53	323	53.83	99.970	0.000
		%	65.0%	8.5%	26.5%				
9	The child needs to stay in the hospital if he has diabetes	N	126	28	46	320	53.33	81.640	0.000
		%	63.0%	14.0%	23.0%				
10	A diabetic feel thirsty and hungry	N	103	21	76	373	62.17	52.390	0.000
		%	51.5%	10.5%	38.0%				
11	You know what insulin is.	N	108	25	67	359	59.83	51.670	0.000
		%	54.0%	12.5%	33.5%				
12	Increased urination times are diabetes symptoms in children.	N	121	21	58	337	56.17	76.690	0.000
		%	60.5%	10.5%	29.0%				
13	You know the most common symptoms seen on a diabetic child.	N	114	29	57	343	57.17	56.290	0.000
		%	57.0%	14.5%	28.5%				
14	Severe thirst and drinking water in large quantities are symptoms of diabetes in children.	N	111	30	59	348	58.00	50.530	0.000
		%	55.5%	15.0%	29.5%				
15	A diabetic child feels anorexia and weight loss.	N	117	26	57	340	56.67	64.210	0.000
		%	58.5%	13.0%	28.5%				

16	Can a diabetic child grow naturally like other children?	**N**	107	17	76	369	61.50	62.710	0.000
		%	53.5%	8.5%	38.0%				
17	A diabetic child feels tired, sluggish and inactive.	**N**	109	27	64	355	59.17	50.590	0.000
		%	54.5%	13.5%	32.0%				
18	A diabetic child feels vomiting and abdominal problems.	**N**	111	29	60	349	58.17	51.430	0.000
		%	55.5%	14.5%	30.0%				
19	Obesity leads to diabetes in children.	**N**	130	27	43	313	52.17	92.170	0.000
		%	65.0%	13.5%	21.5%				
20	Is there a difference between diabetes in the urine and sugar in the blood?	**N**	119	28	53	334	55.67	66.310	0.000
		%	59.5%	14.0%	26.5%				

Table 3: Knowledge on how to prevent diabetes

The testing tool included 6 questions about preventing diabetes, the questions had answers limited to Yes, No or I do not know. These questions were analysed using the Chi square analysis. In most of the questions addressing the prevention of diabetes, there was low percentage of answer “yes”. There was a significant difference in respondents answering correctly. The other tests, which, when were combined with the results of Chi square test, a significant decrease in knowledge was indicated (See table 3).

Table 3: Knowledge about preventing diabetes

			Data			Wt	%	Chi-square	
			No	**I don't know**	**Yes**			**X^2**	**P-value**
1	Do you know the role of finger glucose testing in the diagnosis of type 1 diabetes?	**N**	119	18	63	344	57.33	76.810	0.000
		%	59.5%	9.0%	31.5%				
2	Have you ever given birth to a large child weighing 4.1 kg (9 pounds) or more?	**N**	129	27	44	315	52.50	89.590	0.000
		%	64.5%	13.5%	22.0%				
3	There are ways to prevent diabetes in Children.	**N**	122	32	46	324	54.00	70.360	0.000
		%	61.0%	16.0%	23.0%				
4	Heredity plays a role in children's diabetes.	**N**	120	25	55	335	55.83	70.750	0.000
		%	60.0%	12.5%	27.5%				
5	What is the medical cost of type 1 diabetes in the Kingdom?	**N**	120	26	54	334	55.67	69.880	0.000
		%	60.0%	13.0%	27.0%				
6	What is the relationship between the age of the mother and the vulnerability of the child to the first type of diabetes?	**N**	124	31	45	321	53.50	75.430	0.000
		%	62.0%	15.5%	22.5%				

Table 4: practical of diabetes

The testing tool included 7 questions about the practical of diabetes. The questions had answers limited to Yes, No or I do not know: these questions were analysed using the Chi square analysis.

Most of the questions addressed the practical of diabetes. There was a low percentage of answer “yes” given as a correct answer. While a high percentage said "no" and “Don’t know” as incorrect answers. The results of Chi square test, statistically significant high differences have been shown in table 4.

Table 4: practical of diabetes

	Data			Wt	%	Chi-square	
	No	**I don't know**	**Yes**			**X^2**	**P-value**

1	When a coma happens to a child can you treat?	**N**	121	28	51	330	55.00	70.390	0.000
		%	60.5%	14.0%	25.5%				
2	Do you know when a diabetic feels thirsty and hungry? What do you do?	**N**	114	29	57	343	57.17	56.290	0.000
		%	57.0%	14.5%	28.5%				
3	What is the relationship between upper respiratory infection and type 1 diabetes?	**N**	109	33	58	349	58.17	45.010	0.000
		%	54.5%	16.5%	29.0%				
4	How often do you eat vegetables or fruits?	**N**	118	30	52	334	55.67	62.920	0.000
		%	59.0%	15.0%	26.0%				
5	Do exercise regularly to reduce the complications of diabetes?	**N**	176	5	19	243	40.50	270.430	0.000
		%	88.0%	2.5%	9.5%				
6	Do you know how to protect yourself from complications?	**N**	119	36	45	326	54.33	62.230	0.000
		%	59.5%	18.0%	22.5%				
7	Do you know about the standards for medical care at the Diabetes Association in 2018?	**N**	117	38	45	328	54.67	57.370	0.000
		%	58.5%	19.0%	22.5%				

Table 5: General knowledge about diabetes

The questions addressed the General knowledge about diabetes, preventing diabetes, practices and risk factors of diabetes. The results of Chi square test indicated the decrease in knowledge about diabetes, and increased incidence of wrong answer diabetes question.

Again, there was a significant variance considering the knowledge.

In this study, considering the Total knowledge about diabetes, there was a low percentage of correct answers (8.5 %). While, there was a high percentage of incorrect answers (91.5 %).

Question asked General knowledge about diabetes there was low percentage answer correctly (High) answer 13.5 % While high percentage give incorrect answer(Average , Weak) 86.5 % the Range 20-60 mean and standard deviation was 33.98±10.17.

Considering the questions asking about the knowledge on how to prevent diabetes, there was a low percentage of correct answers (20.5%). While there was a high percentage of incorrect answers (88 %).

Regarding the questions asked about the knowledge on practices, there was a low percentage of correct answers (13.5%0. While there was a high percentage of incorrect answers (86.5 %) (See table 5).

Table 5: General knowledge about diabetes

	Weak		**Average**		**High**		**Range**	**Mean±SD**
	N	**%**	**N**	**%**	**N**	**%**		
General knowledge about diabetes	72	36.0	101	50.5	27	13.5	20-60	33.98±10.17
knowledge to prevent diabetes	94	47.0	65	32.5	41	20.5	6-18	9.87±4.03
knowledge about practices	88	44.0	85	42.5	27	13.5	7-21	11.27±3.89

knowledge about risk factor	84	42.0	115	57.5	1	.5	0-12	7.11±2.57
Total knowledge	80	40.0	103	51.5	17	8.5	35-108	62.22±16.10

Figure 1

It was noticed that the average and weak answers were high (in correct answers), while there was a low percentage of correct answers. Figure 1 below shows the detailed data.

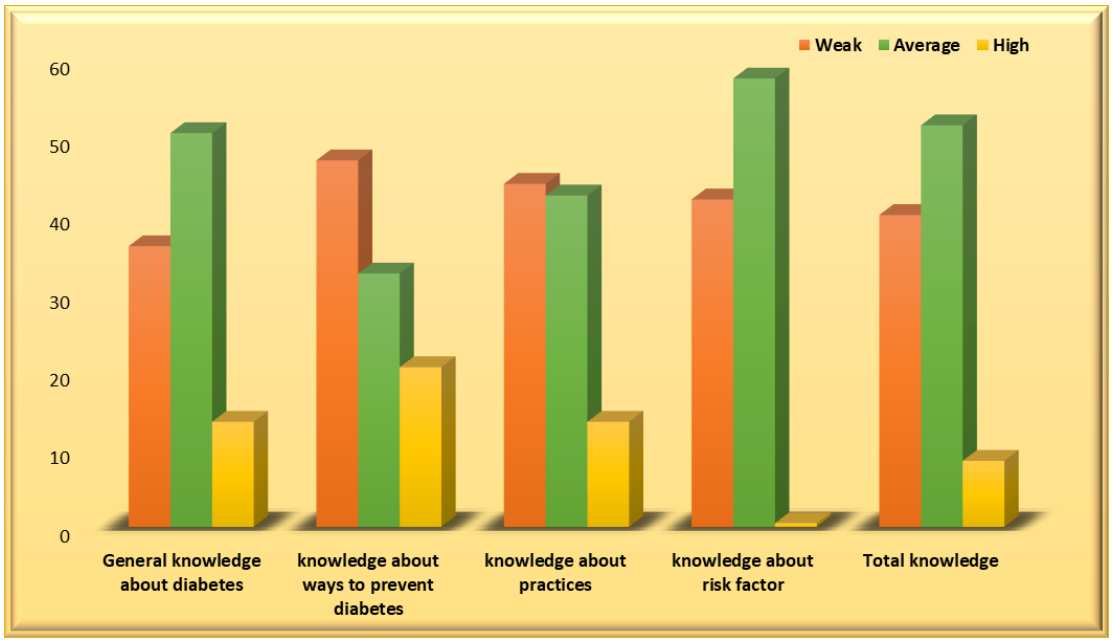

Figure 1: Bar graph represents knowledge, to prevent, practices, risk factor and Total knowledge about diabetes.

Risk Factors for Type 1 Diabetes

The respondents were asked to identify two risk factors for diabetes, given a list of four items. Table 6 contains the numeric data for this question. The choices most frequently identified on the pretest were overweight (12.5 %) and eating too much sugar (40 %), followed by family history (35. %), and the contact with a diabetic person was selected least frequently (29 %). Initially, 12.5 % of the respondents identified overweight as a risk factor which was a correct answer. Forty percent of the respondents were able to correctly identify eating too much sugar. 35. % of the respondents labelled family history, as a risk factor for diabetes. The question addressed the relationship between the increased prevalence of diabetes in the county and the increased risk.

Complications of Diabetes

The second question on the test asked the respondents to identify two long term complications of diabetes given a list of tow items. Table 6 contains the numeric data for this question. Kidney failure (27.5 %) and liver disease (34%) were selected most frequently, followed by blindness (40 %) and cancer (20%).

Treatment of Diabetes

Question 3 addressed the treatment of diabetes. Given a list of two items, the respondents were asked to identify three methods used to control diabetes. Table 6 contains the numeric data for this question. Initially, 30 % of the respondents selected diet and exercise, 25% identified pills, and 35 % selected insulin shots. 60 % percent of the respondents incorrectly identified surgery as a method to treat diabetes.

Things that lower your risk of developing diabetes

Question 4 addressed three things that you can do to lower the risk of developing diabetes. Table 6 contains the numeric data for this question. Initially, 27.5% of the respondents chose eat less sugar; 24% selected exercise regularly, 49 % selected lose weight if you are overweight,45 % selected eat carbohydrates, 35 % chose eat a balanced diet with food from all the food groups, and 15 % selected stay away from people that have diabetes. 90 % of the respondents incorrectly don't eat carbohydrates.

Table 6. Responses to questions 1- 4 of the testing tool

	N	%
1. Factors that increase the risk of developing type 2 diabetes		
a. Overweight	25	12.5
b. Eating too much sugar	80	40
c. Parent or sibling has diabetes	70	35
d. Contact with someone who has diabetes	58	29
2. What are two harmful long-term complications of diabetes?		
a. Cancer	40	20
b. Kidney failure	55	27.5
c. Liver disease	68	34
d. Blindness	80	40
3. How is diabetes treated? (Circle all that apply)		
a. Diet and exercise	60	30
b. Pills	50	25
c. Surgery	120	60
d. Insulin shots	70	35
4. Identify three things that you can do to lower your risk of developing diabetes.		
a. Eat less sugar	55	27.5
b. Exercise regularly	48	24
c. Lose weight if you are overweight	98	49
d. Don. eat carbohydrates	90	45
e. Eat a balanced diet with food from all the food groups	70	35
f. Stay away from people that have diabetes	30	15
Has anyone in your family or relatives been diagnosed with diabetes (type I or II)		
A. the mother	40	20
B. the father	30	15
C. Brothers / sisters	40	20
D. children	40	20
E. No, I do not know	50	25

Table 7 : Test was a yes or no question

Additionally, this test was a yes or no question only the question on the test was a question that asked if there is a cure for diabetes or not. There was a significant increase in respondents answering correctly, but all the other questions were answered incorrectly. The Awareness role of the Health Authority in the Kingdom for this disease was low (31.5 %0 and not at the required level of 35.5 %.

Table 7: test was a yes or no question

	N	%
Have you heard of diabetes or do you know someone who has diabetes?		
No	140	70.0
Yes	60	30.0
Is there a cure for diabetes?		
No	135	67.5
Yes	65	32.5
Type 1 diabetes used to be seen only in older adults but now children are getting it as well		
No	139	69.5
Yes	61	30.5
The increase in diabetes in the Saudi Arabia is largely due to increased body weight		
No	145	72.5
Yes	55	27.5
Over 6 million Saudi children have diabetes		
No	145	72.5
Yes	55	27.5
Awareness role of the Health Authority in the Kingdom for this disease		
Low	63	31.5
Not at the required level	70	35.0
Very good	61	30.5
Excellent	6	3.0

Table 6: Demographic data & Total knowledge

In this study, the majority of the participants were noticed to be between the age 20 to 30 with no statistically significance (F=0.381, 0.767).

In the present study, the majority of the participants were found to be female compared to the male participants with a statistical significance (T=-3.818, p<0.001).

In this study, the majority of the participants were Intermediate education standard deviation was 62.012±16.098 with a statistically significance (F=8.540, p<0.001) the primary education and secondary less than intermediate with a statistically significance.

In our study the majority of our participants were noticed Economic level Average with no a statistically significance (F=0.247,0.781)

In our study the majority of our participants were noticed Occupation with a statistically significance (F =4.513, p<0.001) the table 6 below shows the detailed data.

Table 6: Demographic data & Total knowledge

Demographic data		N	Total knowledge	T or F	ANOVA or T-test	
			Mean ± SD		Test value	P-value
Age	**20y < 30years**	94	60.957 ± 14.949	F	0.381	0.767
	30y < 40years	72	63.319 ± 16.054			
	40y < 50years	25	63.800 ± 20.027			
	50y < 60years	9	62.222 ± 17.943			
Gender	**Male**	13	50.154 ± 14.223	T	-3.818	<0.001*
	Female	187	67.711 ± 16.141			
Education	**Primary**	31	53.677 ± 14.847	F	8.540	<0.001*
	Intermediate	166	62.012 ± 16.098			
	Secondary	33	68.667 ± 32.393			
Economic level	**Low**	36	62.556 ± 17.160	F	0.247	0.781
	Average	104	62.808 ± 16.423			
	High	60	61.000 ± 15.051			
Occupation	**Yes**	139	52.662 ± 16.915	T	4.513	<0.001*
	No	61	71.213 ± 14.147			

Figure 2 Bar graph represents Age & Total knowledge

It was noticed that the majority of the participants were between the age 20 to 30 with no statistical significance (F=0.381, 0.767). Figure 2 below shows the detailed data.

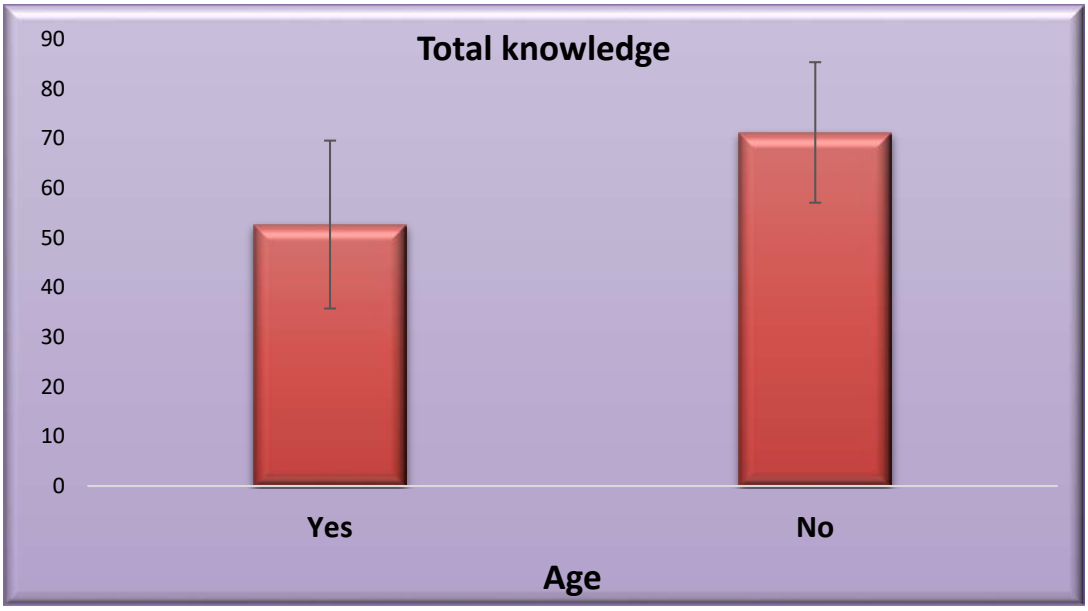

Figure 2. Bar graph represents Age & Total knowledge

Figure 3: Bar graph represents the level of education & Total knowledge

In this study, the majority of the participants were found to have intermediate education. The standard deviation was 62.012±16.098 with a statistical significance (F=8.540, p<0.001).

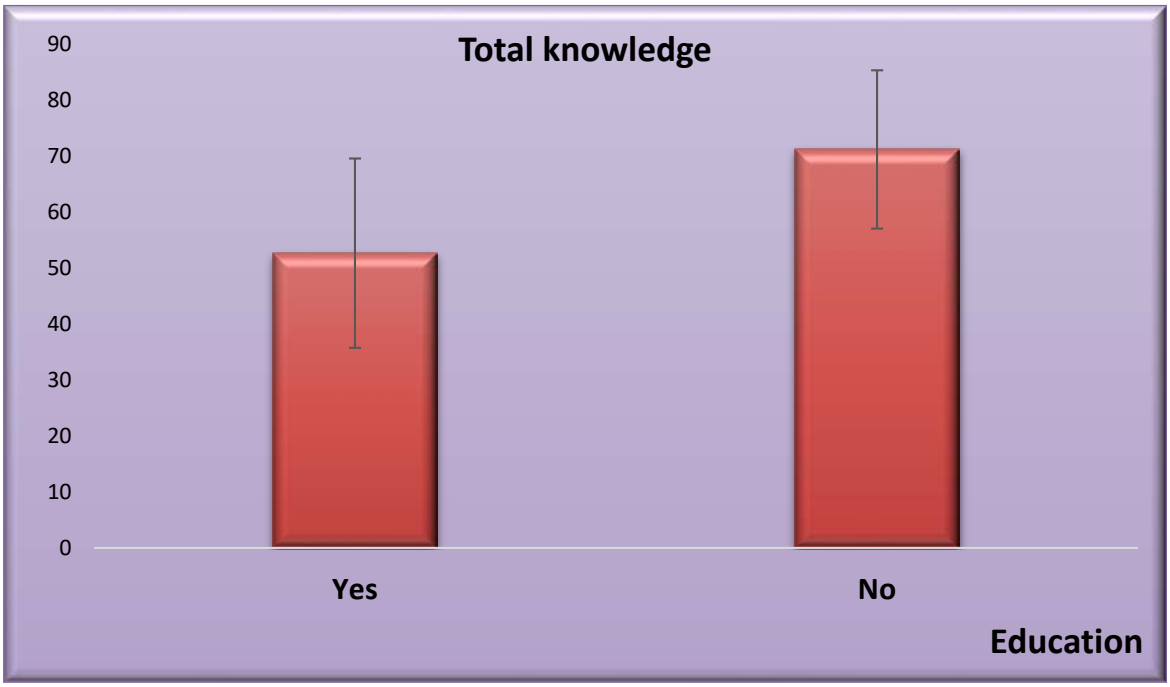

Figure 3. Bar graph represents level of education& Total knowledge

Figure 4 : Economic level & Total knowledge

In this study, the majority of the participants were noticed to be on average economic level with no statistical significance (F=0.247,0.781).

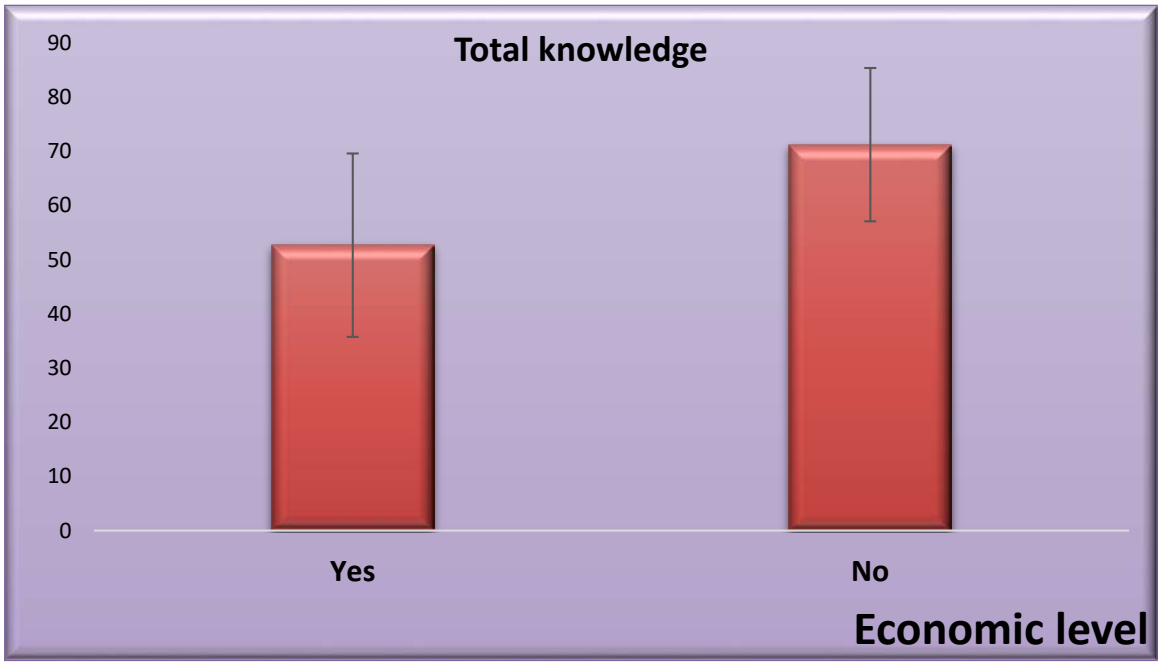

Figure 4 . Economic level&Total knowledge

Figure 5 : Gender &Total knowledge.

In the present study, the majority of the participants were found to be female rather than male with a statistical significance (T=-3.818, p<0.001).

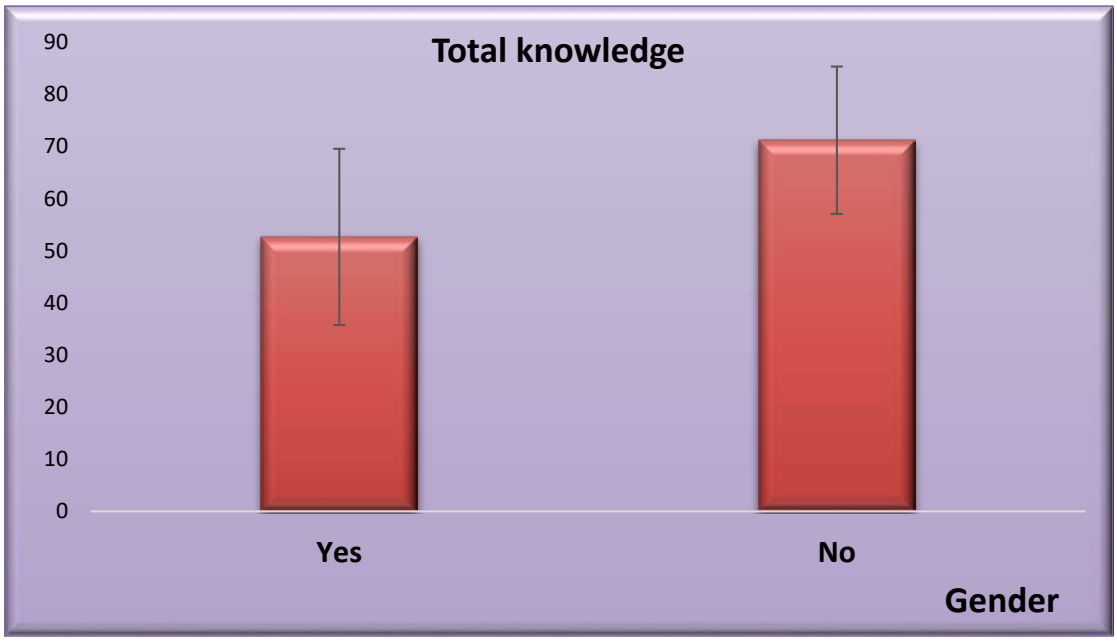

Figure 5 : Gender &Total knowledge

Figure 6 : Occupation & Total knowledge

In the current study, the majority of the participants were noticed to have occupation with a statistical significance (F =4.513, p<0.001).

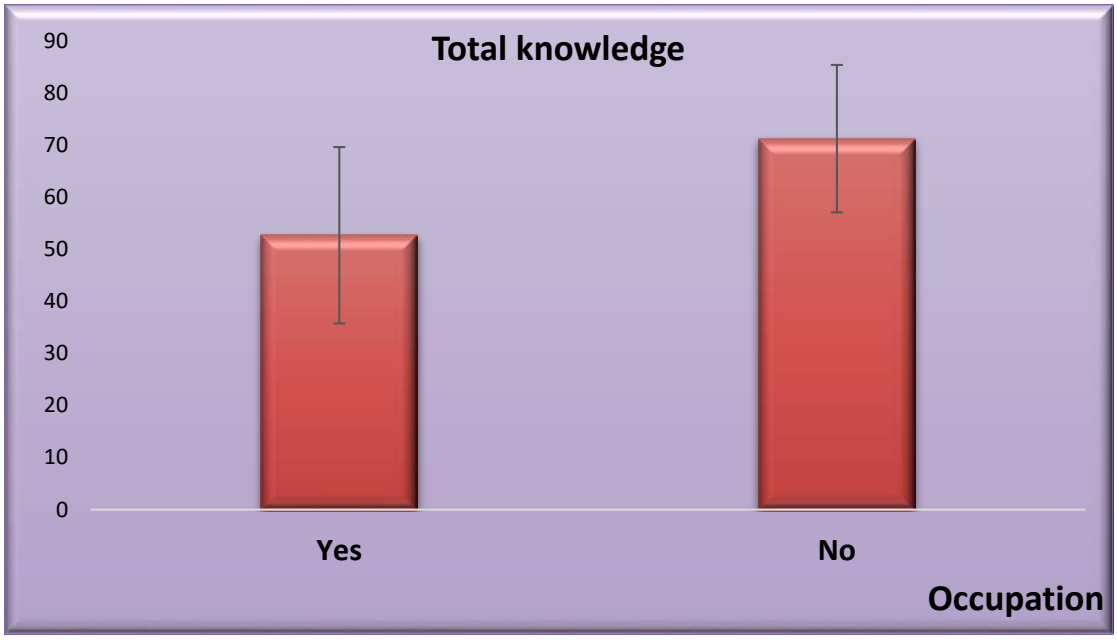

Figure 6 : Occupation & Total knowledge

Discussion

Overall, the collected and analyzed data indicated the decrease in knowledge in the participants Female's gender in this study was 93.5% while Male were 6.5% of cases. Participating in educational programs focused on general knowledge about diabetes, prevention and risk factor. Although for some questions, the correct responses there was a high decrease, there was

consistently a net gain overall. Repetition of the testing tool was probably helpful for some participants. In general, in this study, the majority of the participants were noticed to be between the age 20 to 30.

In the current study, the majority of the participants were noticed between the age of 20 to 30 with no statistical significance (F=0.381, 0.767).

In the current study, the majority of the participants were noticed to be female rather than male with a statistical significance (T=-3.818, p<0.001).

In the current study, the majority of the participants were noticed to have intermediate education, and the standard deviation was 62.012±16.098 with a statistical significance (F=8.540, p<0.001), the primary and secondary education was less than intermediate with a statistical significance.

In the current study, the majority of the participants were found to be on average level of education with no statistical significance (F=0.247,0.781).

In the present study, the majority of the participants were found to have an occupation with a statistical significance (F =4.513, p<0.001).

As the incidence of type 1 diabetes in children and adolescents increases, it becomes increasingly important to differentiate newly diagnosed type 1 from type 1diabetes. In the slender pre-pubertal child, one can confidently assume a diagnosis of type 1 diabetes. However, in the overweight adolescent, differentiating type 1 from type 2 diabetes may be difficult [14].

Conclusion

There is a dearth of meticulously conducted research on T1DM in Saudi Arabia. Considering the increasing prevalence of T1DM in Saudi Arabia, especially in infants and young children, the research interventions need to be significantly improved. Moreover, it is critical to develop appropriate management programs for controlling T1DM and allocating health resources appropriately for this condition. Research efforts should focus on achieving early diagnosis, preventing, and developing better treatment options to improve the quality of life and prognosis of the affected individuals.

Recommendations

Reinforcement of the information presented during this study is essential to promote the sustained behavioural changes in the community. Offering programs targeting specifically children and young adults have the potential to be especially beneficial if healthy habits proven to reduce the risk of diseases are established early in life. Incorporating such programs through schools has the potential to impact a large number of people, as attendance is required. . Environmental change to support healthy habits, especially at schools, is crucial to influence the behaviour change. Adequate opportunity for physical activity and healthy food choices at schools are important. Simple steps such as offering low fat milk, plenty of fruits and vegetables, and low fat food choices can help shape a child's acceptance and preference for healthy foods. Parental involvement in the education process is another critical step in facilitating behaviour change to decrease the risk factors for chronic diseases because parents serve as highly influential role models. Community-wide intervention to increase the awareness of risk factors for chronic diseases can be implemented in a variety of settings but would best be implemented with some degree of coordination, so that programs delivered at different locations and to varying age groups would reinforce the same general messages to promote health.

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