Original Article

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Evaluation of Knowledge and Attitude toward Diabetes among Adolescents with Diabetes Mellitus attending Diabetes and Endocrine Center in Babylon Governorate/ Iraq

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Background: Diabetes is a lifelong chronic condition becoming more common in industrialized and developing countries. People who have diabetes are more likely than those who do not to experience a wide range of illnesses. **Objectives:** to measure the knowledge and attitude among diabetic adolescents and find their relationship with socio-demographic features of patients, their families, clinical history, family history, and lifestyle features. Patient and methods: A crosssectional study carried out at a diabetic and endocrine center included 300 adolescents aged 13-19 years who were diagnosed with diabetes mellitus by clinicians and attended the center from first October 2023 to first February 2024. The data was collected by a questionnaire which included: -Socio-demographic features of the participants and their families, knowledge about the diseases, attitude of the patient toward the disease, SPSS version 26 was used to analyze data, and a P value≤ 0.05 was considered statistically significant. **Results:** The mean knowledge score is 19.8±6.1 (maximum 27, minimum1) while the mean attitude score is 3.2 ± 1.8 (maximum 5, minimum 0). Patients' mean knowledge and attitude scores were significantly higher for older age group patients, urban residents, higher levels of education, older parents, family history of the disease, longer duration of disease, and current smoking. (P< 0.05), high mean score of knowledge was found among those with retired fathers and older mothers. A higher mean attitude score was found among engaged patients. Conclusion: The result of the present study showed that about two-thirds of the participants had good knowledge scores while only half had good attitude scores. Older age, higher education, living in urban areas, living with disease for more than 5 years, having a family history of disease and smoking are significant determinants of knowledge and attitude.

Keywords: Knowledge, Attitude, Adolescent, Diabetes Mellitus.

Article Information

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INTRODUCTION

Diabetes is a lifelong chronic condition that is becoming more common in both industrialized and developing countries. People who have diabetes are more likely than those who do not to experience a wide range of illnesses. (1) Adolescence is a sensitive and crucial time in a person's life, and having diabetes at this age can have adverse effects on many aspects of their lives. (2) The level of patients' knowledge of diabetes plays an important role in the self-management of the

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disease. Patients who are well-informed about the illness are thought to be less likely to have different complications and severe exacerbations of diabetes because they have more knowledge of the nature and implications of the condition. (3)

Several researchers studied the knowledge and attitude among adult patients in Iraq (4,5,6,7) but the adolescent age group never had been studied before to our knowledge. Therefore, the current study aims to measure the knowledge and attitude toward diabetes among diabetic adolescents and find their relationship with the socio-demographic features of patients, their families 'characteristics, clinical history, family history, and lifestyle features.

PATIENTS AND METHODS

Study design setting and period: this is a cross-sectional study conducted at the diabetic and endocrine center at Marjan Medical City in Babylon Governorate, Iraq from the first of October 2023 to the first of February 2024

Study population: Adolescents aged 13–19 years who were diagnosed with diabetes mellitus by clinicians and attended the center. participants' responses were collected through direct interviews that took from 20 to 30 minutes per participant.

Sample size: 300 patients were included according to the following equation.

$$N = \frac{(z^2 * p * q)}{d^2} \, {}^{(8)}$$

Where Z equals 1.96 (at a 95% level of confidence), the proportion of poor knowledge obtained from a study conducted in Saudi Arabia is 24% ⁽⁹⁾, and the margin of error equals 0.05. This yields a minimum sample size of 280 patients.

Data collection: It was done using a questionnaire constructed by the researchers after a thorough review of research on the same

topic ^(9,10,11). The draft was assessed by a panel of reviewers (who had more than five years of experience as experts in their specialty), their suggestions were taken into account, and the final copy of the questionnaire included: Sociodemographic features of the participants and their families, clinical history, family history, and lifestyle features, knowledge about diseases, attitude of the patient toward disease BMI classified according to WHO ⁽¹²⁾ as the following: underweight <18.5, normal weight 18.5-24.9, overweight 25-29.9, and obese \geq 30 HbA1C is classified according to ADA ⁽¹³⁾ into controlled <6.5 and uncontrolled \geq 6.5.

Pilot study: Before starting to collect information, a pilot study it conducted before data collection on 20 participants at Marjan Medical City which aimed to assess the questionnaire and to find any other difficulties. Modifications were made to the questionnaire according to a pilot study. Each single interview lasted from 20 to 30 minutes per participant.

Scoring: The number of knowledge questions (29) and (5) questions for attitude, each correct answer scored 1, while a wrong or I don't response scored zero; mean scores were calculated for both knowledge and attitude.

Statistical Analysis: Data were analyzed using Statistical Package for Social Sciences (SPSS) version 26, descriptive statistics were utilized for presented: Frequencies and percentages to describe the variables, independent t-test, and ANOVA was used to compare mean knowledge and attitude with other variables. A P-value ≤ 0.05 is considered significant.

Ethical consideration: Administrative approval from Al-Furat Al-Awsat Technical University, College of Health and Medical Technology/ Kufa, and the diabetic and endocrine center at Marjan Medical City in Babylon Governorate had approved and given final permission for the researcher to conduct



the study and collect data from diabetics after verbal consent.

RESULTS

The study included 300 adolescents. More than half of 180 (60%) were in the age group of 13–15 years; females represent 165 (55%) of the participants. regarding residence; 186 (62%) were from urban areas. The results showed that 132 (44%) of the sample had primary education, respecting an occupation; most of the sample, 237 (79%), are students, concerning the subject of marital status. 275 (91.7%) were single, and 266 (88.7%) of the study subjects didn't have other chronic illnesses. In most of the cases, 286 (95.3%), didn't take any medication other than DM treatment, as presented in Table 1.

The result showed in Table 2 that more than half, 168 (56%) of the fathers and 221 (73.7%) of the mothers aged less than 50 years, 142 (47.3%) of the fathers, and 172 (57.3%) of the mothers had primary education. Regarding the occupation of parents. 137 (45.7%) of the fathers were self-employed, mostly mothers; 262 (87.3%) were housewives and 130 (43.3%) of the cases had a monthly family income: = 500000–799000 Iraqi dinars (IQD).

The majority of the patients, 296 (98.7%), had Type I DM; 123 (41%) had a family history 77 (62.6%) had a first degree and 46 (37.4%) had a second degree; and most of them, 274 (91.3%), had uncontrolled HBA1c (>6.5). 191 (63.7%) of the study subjects were diagnosed with diabetes equal to or less than five years; 291 (97%) of participants took insulin only as a treatment for DM; 265 (88.3%) of study subjects had elevated blood glucose at the time of the study; and 177 (59%) of participants measured fasted those prescribed in Table 3.

Regarding lifestyle, 187 (62.3%) had a normal BMI, 278(92.7%) of the cases were non–smokers, while only 127(42%) had physical activity, majority of those activities were football. 55 (43.3%) and 64 (50.4%) of

participants make activities for periods <60 minutes per day, as presented in Table 4.

The mean knowledge score is 19.8 ± 6.1 (maximum 27, minimum1) while the mean attitude score is 3.2 ± 1.8 (maximum 5, minimum 0). The association between patients' knowledge, attitude and socio-demographical features of participants is indicated in table 5 which shows that the mean knowledge and attitude score at age 16-19 years was higher than 13-15years (22.1±4.0 vs. 18.3±6.8 respectively) for knowledge at P-value 0.000 and $(3.6\pm1.5 \text{ vs.})$ 3.1 ± 1.9 respectively) for attitude at P-value 0.008. Patients from urban residences had mean knowledge and attitude scores higher than rural residences 20.8±5.4 vs.18.3±6.9 respectively for knowledge at P-value 0.0001 and 3.5 ± 1.7 vs.2.9±1.9 respectively for attitude at P-value 0.003. Patients who had college and institute levels of education had mean knowledge and attitude scores higher than those with lower levels of education at P-value= 0.000 and 0.002 respectively. Regarding marital status, engaged patients had a mean attitude score higher than others, while other data were not statistically significant. Table 6 shows that the mean knowledge and attitude scores were higher among patients whose fathers aged ≥ 50 years (21.5±4.8 vs.18.5±6.7, than those <50 respectively, for knowledge at P-value 0.0001 and 3.7 ± 1.6 vs. 3.0 ± 1.9 , for attitude at P-value 0.001. The same was true for the mothers' age, patients whose mothers aged ≥ 50 years had higher knowledge mean scores than patients of younger age mothers (21.8±4.3 vs. 19.1±6.5 respectively) at P-value 0.001. Regarding the occupation, patients whose fathers were retired had a mean knowledge score (22.8 ± 4.1) higher than other occupations at P-value 0,03, while other data were not statistically significant.

Table 7 shows that the mean knowledge and attitude scores for patients who had the disease for a period >5 years were higher than those who had the disease for ≤ 5 years (21.4 ± 5.4 vs. 18.9 ± 6.3 , respectively) at P-value 0.001 for

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knowledge and $(3.7 \pm 1.7 \text{ vs. } 3.1\pm 1.8, \text{respectively})$ at P-value 0.004 for attitude. Patients with a family history had a mean knowledge score higher than those who didn't have a family history (21.3 \pm 5.4 vs. 18.8 \pm 6.4, respectively) at a P-value of 0.001, while other data were not statistically significant. The smokers had mean knowledge and attitude scores higher than others at P-value =0.003 for knowledge and 0.014 for attitude, while other data were not statistically significant.

Variables	Subgroups	No.	%
Age (years)	13-15	180	60
	16-19	120	40
Sex	Male	135	45
	Female	165	55
Residence	Urban	186	62
	Rural	114	38
Level of education	Illiterate	6	2
	Read and write	13	4.3
	Primary	132	44
	Secondary	127	42.3
	Institute and college	22	7.3
Occupation	Employed	8	2.7
	Students	237	79
	Self – employed	5	1.7
	Housewife	34	11.3
	Unemployed	16	5.3
Marital status	Single	275	91.7
	Engaged	6	2
	Married	19	6.3
Chronic disease	Yes	34	11.3
	No	266	88.7
Medication	Yes	14	4.7
	No	286	95.3

Table 1: -Socio-demographical features and clinical history of participants.

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Table 2 :	Socio-demographical f	eatures of the parents	of the participants.
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Variables	Subgroups	No.	%
Age of father	<50years	168	56
	≥50years	132	44
Age of mother	<50years	221	73.7
	≥50years	79	26.3
Father's education	Illiterate	18	6
	Read and write	21	7
	Primary	142	47.3
	Secondary	56	18.7
	Institute and college	63	21
Mother education	Illiterate	16	5.3
	Read and write	27	9
	Primary	172	57.3
	Secondary	49	16.3
	Institute and college	36	12
Father occupation	Employee	118	39.3
	Self-employed	137	45.7
	Retired	24	8
	Died	21	7
Mother Occupation	Employed	35	11.7
_	Housewife	262	87.3
	Died	3	1
Monthly income	< 200000 IQD	4	1.3
-	200000- 499000 IQD	62	20.7
	500000 -799000 IQD	130	43.3
	800000- 999000 IQD	49	16.3
	≥1000000 IQD	55	18.3

 Table 3: Clinical history of the studied sample.

Variables	Subgroups	No.	%
Type of DM	Туре І	296	98.7
	Туре II	4	1.3
Family history	Yes	123	41.0
	No	177	59.0
Degree	first degree	77	62.6
_	Second degree	46	37.4
HbA1C	Controlled (<6.5)	26	8.7
	Uncontrolled (≥6.5)	274	91.3
Duration of disease	≤5year	191	63.7
	>5year	109	36.3
Treatment	OHD	3	1.0
	Insulin	291	97.0
	Combined	6	2.0
Blood glucose	Normal blood glucose	35	11.7
measurement	Elevated blood glucose	265	88.3
Type of measurement	Fasting	177	59.0
	Random	123	41.0

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Variables	Subgroups	No.	%
BMI	Underweight	57	19.0
	Normal	187	62.3
	Overweight	40	13.3
	Obese	16	5.3
Smoking	Current smoker	21	7.0
	Ex-smoker	1	0.3
	Non- smoker	278	92.7
Activity	Yes	127	42.3
	No	173	57.7
Type of activity	Bicycle	16	12.6
	Cardio	1	0.7
	Football	55	43.3
	Gym	11	8.6
	Running	22	17.3
	Swimming	1	0.7
	Walking	21	16.5
Duration of activity	<60min	64	50.4
	≥60min	63	49.6

 Table 4: Lifestyle features of participants.

Table 5: Relationship	between knowle	edge, attitude to	ward diabetes, and	l socio-demographical
features of participants	•			

Variable	Subgroup	Knowledge	p-value	Attitude	p-value
Age (years)	13-15	18.3±6.8	0.000	3.1±1.9	0.008
	16-19	22.1±4.0		3.6±1.5	
Sex	Male	19.7±6.01	0.9	3.1±1.8	0.1
	Female	19.9 ±6.2		3.4 ± 1.8	
Residence	Urban	20.8± 5.4	0.000	3.5±1.7	0.003
	Rural	18.3 ± 6.9		2.9 ± 1.9	
Level of education	Illiterate	10.3±9.1	0.000	1.7±2.6	0.002
	Read and write	20.5±5.6		3.2±1.5	
	Primary	18.2±6.3		3.0±1.9	
	Secondary	21.03±5.4		3.41±1.7	
	Institute and	24.5±2.5		4.41±1.0	
	college				
Occupation	Employed	24.8±1.8	0.202	4.0±1.2	0.508
	Student	19.8±6.1		3.3±1.8	
	Self – employed	18.4±5.5		3.4±1.3	
	Housewife	19.8±6.8		3.4±1.7	
	Un-employed	18.6±6.2		2.7±1.8	
Marital status	Single	19.6±6.2	0.2	3.2±1.8	0.003
	Engaged	23.2±4.7		4.5±0.8	
	Married	21.4±4.6		4.4±1.1	
Chronic disease	Yes	19.7±6.0	0.9	3.4± 1.8	0.8
	No	19.8 ± 6.2		3.3 ±1.8	
Medication	Yes	19.9±5.7	0.9	3.8 ± 1.7	0.3
	No	19.8 ±6.2		3.3±1.8	

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Table 6:	Relationship	between	knowledge,	attitude	toward	diabetes,	and	socio-demogra	phical
features o	of parents of pa	articipan	ts						

Variable	Subgroup	Knowledge	p-value	Attitude	p-value
Age of father	<50(year)	18.5±6.7	0.000	3.0±1.9	0.001
	≥50(year)	21.5±4.8		3.7±1.6	-
Age of mother	<50(year)	19.1± 6.5	0.001	3.2 ± 1.9	0.5
	≥50(year)	21.8 ± 4.3		3.6 ± 1.6	-
Father's education	Illiterate	20.4 ± 7.2	0.05	3.6 ± 2	0.6
	Read and write	18.9 ± 8.5		3.1 ± 1.9	-
	Primary	18.9 ± 5.5		3.2 ± 1.8	-
	Secondary	20.2 ± 6.6		3.1 ±1.8	-
	Institute and college	21.7 ± 5.4		3.6 ± 1.7	-
Mother education	Illiterate	20.6 ± 6.5	0.32	3.6 ± 1.8	0.7
	Read and write	18.5 ± 8.4		3.2 ± 2.0	-
	Primary	19.4 ± 5.8		3.2 ± 1.8	-
	Secondary	20.8 ± 6.01	_	3.3 ± 1.8	-
	Institute and college	20.9 ± 5.6	_	3.6 ± 1.7	-
Father occupation	Employee	20.1 ± 5.8	0.03	3.3 ± 1.9	0.6
	Self employed	18.9 ± 6.6		3.2 ± 1.9	-
	Retired	22.8 ± 4.1		3.7 ± 1.2	-
	Died	20.8 ± 5.5		3.3 ± 1.6	-
Mother Occupation	Employed	20.5 ± 5.9	0.6	3.6 ± 1.8	0.4
	Housewife	19.7 ± 6.2		3.2 ± 1.8	-
	Died	22.0 ± 3.5		2.3 ± 0.6	-
Monthly income	< 200000 IQD	22.0 ± 3.6	0.3	2.8 ± 2.1	0.4
	200000- 499000 IQD	19.8 ± 5.9		3.4 ±1.7	1
	500000 -799000 IQD	19.1 ± 6.7		3.1 ± 1.9	1
	800000- 999000 IQD	21.0 ± 4.8		3.6 ± 1.6	1
	≥1000000 IQD	20.4 ± 6.1		3.4 ± 1.9	

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Variable	Subgroup	Knowledge	p-value	Attitude	p-value
Trans a CDM	Torra I	10.0 . (1	0.6	22.19	0.2
Type of DM	Type I	19.8± 0.1	0.0	3.3 ± 1.8	0.2
	Type II	18.0 ± 4.1		4.5 ± 1.0	
Family history	Yes	21.3±5.4	0.001	3.5±1.7	0.072
	No	18.8±6.4		3.1±1.9	
Degree of history	First degree	21.4± 4.9	0.8	3.5 ±1.7	0.9
	Second degree	21.2 ± 6.2		3.5 ± 1.7	
HbA1C	Controlled (<6.5)	19.9 ±7.5	0.9	3.1 ± 2.0	0.5
	Uncontrolled (≥6.5)	19.8 ± 6.0		3.3 ± 1.8	
Duration of disease	≤5years	18.9 ± 6.3	0.001	3.1 ± 1.8	0.004
	>5years	21.4 ± 5.4		3.7±1.7	
Treatment	OHD	16.3 ± 2.9	0.1	4.3 ± 1.2	0.6
	Insulin	19.8 ± 6.2		3.3 ± 1.8	
	Combined	24.8 ± 1.8		3.5 ± 1.9	
Blood glucose	Normal blood glucose	20.5 ± 5.8	0.5	3.7 ±1.9	0.2
measurement	Elevated blood glucose	19.7 ± 6.2		3.2 ±1.8	
Type of	Fasting	19.7 ± 5.9	0.8	3.4 ± 1.8	0.3
measurement	Random	19.9 ± 6.5		3.2 ± 1.9	

Table 7: Relationship between knowledge, attitude toward diabetes, and disease history of participants.

Table 8: Relationship between knowledge, attitude, and lifestyle features.

Variable	Subgroup	Knowledge Mean ± SD	p-value	Attitude Mean ±SD	P-value
BMI	Underweight	19.1 ± 5.7	0.1	3.0 ± 1.9	0.3
	Normal	20.3 ± 6.0		3.4 ± 1.7	
	Overweight	19.6 ±6.9		3.4 ± 1.8	
	Obese	16.9 ± 6.6		2.9 ± 1.9	
Smoking	Current smoker	22.1 ± 4.3	0.003	4.1 ± 1.2	0.014
	Ex-smoker	2.0		0.0	
	Non- smoker	19.7±6.1		3.2 ± 1.8	
Activity	Yes	19.7 ± 6.0	0.8	3.2 ± 1.8	0.4
	No	19.9 ± 6.3		3.4 ± 1.8	
Duration of	<60min	19.5± 5.8	0.6	3.1 ± 1.7	0.8
	≥60min	20 ± 6.2		3.2 ±1.8	

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DISCUSSION

Knowledge plays a vital role in any future disease development and its early prevention detection and management of the disease ^{(14).} In the current study. patients aged 16-19 years had mean knowledge higher than younger age group. This result is consistent with a study conducted in Saudi Arabia⁽⁹⁾ where there was a significant relation between knowledge and age (patients aged >16 had higher mean knowledge compared with younger age). This can be explained by the fact that as patients grow older, their knowledge can increase for many reasons such as an increased level of education, increased accessibility to information from valid sources, and the ability to distinguish between correct and incorrect information.

Participants from urban residences had a mean knowledge score higher than those from rural, this result is similar to the result from a study in Bangladesh ⁽¹⁵⁾ which showed that place of residence was significantly associated with diabetes knowledge, the respondents of urban (38.13%) areas were more likely to have good knowledge than rural areas (14.7%). This might be due to a difference in access to information. In urban areas, there are different ways of accessing information like television, internet, and other technology Media which are not available in rural areas ⁽¹⁶⁾

Participants in the institute and college had higher mean knowledge scores compared to those with a lower level of education and these results are in agreement with a study in Saudi that found a significant relationship between education and knowledge of diabetes, that is, the higher the education level the higher the knowledge ⁽⁹⁾ This can be explained by the fact that educated patients are likely to be more aware of their disease, its complications, and ways to keep their health under control⁽¹⁷⁾. On the other hand, this could be partly attributed to the increasing age of the patients with higher educational levels.

Patients with parents aged ≥ 50 years had a mean knowledge score higher than patients with parents aged < 50 years might be illustrated by a positive relationship found between age and knowledge about the disease. As knowledge increases with age, this indicates the parents have good knowledge, and it could be because the primary responsibility for managing diabetes during childhood is shared with the parent, so that might have a positive effect on the knowledge of the adolescent ⁽¹⁸⁾

Patients with retired fathers had mean knowledge scores higher than other professions this might be because the retired fathers are freer and have more time to increase their knowledge about the disease, which in turn is reflected in their children's knowledge of the disease. Additionally, it can be interpreted as an effect of parental age.

Participants who had been diagnosed with diabetes for more than 5 years had a higher mean knowledge score than those with a duration equal to or less than 5 years. This finding could be explained by the possibility that it was the duration of illness that enhanced knowledge about the disease. Again, it could be the effect of the age of the patient as he/she grows older the duration of the disease also increases.

Participants with a family history of diabetes had a mean knowledge score higher than those without and this finding was found in a study in Saudi Arabia ⁽²⁰⁾. Family history had an impact on adolescents' knowledge of diabetes, and this may be explained by the fact that participants who had a relative with diabetes had better knowledge scores than those with no history of diabetes in the family. ⁽²¹⁾

Patients aged 16–19 years had higher mean attitude scores than the younger age group,

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which may be demonstrated by the fact that older adolescents are more concerned about the disease and are independent of their parents, so they have their attitudes toward the disease.

The study results showed that participants in urban residences had higher average attitude scores compared to those in rural residences. This may be because health facilities are mostly located in urban areas, which creates a good opportunity for DM patients to make frequent visits and communicate with health professionals. This provides an opportunity to gain more information regarding the DM and to improve their behavior. ⁽¹⁶⁾

Institute and college participants had higher mean attitude scores than those with lower educational levels, and it may be that collegeeducated patients are more likely to be interested in learning about their illness compared to uneducated patients who may be less interested in learning about their illness. ⁽¹⁷⁾

Regarding marital status, engaged participants had a mean attitude score higher than singles and married patients. This may be because the engaged person has a more positive attitude towards lifestyle modification and may receive the support provided by family and spouses. ⁽²²⁾

Patients whose fathers at aged \geq 50 had a mean attitude score higher compared to those aged <50 years This can be explained by the fact that the elderly are more aware of life, which has had a positive impact on their children in terms of taking care of the disease

Participants who had been diagnosed with diabetes for more than 5 years had higher average attitude scores compared to those whose duration of diagnosis was equal to or less than 5 years and age may play a role in supporting disease duration. ⁽¹⁹⁾ Smoking patients had higher average knowledge and attitude scores than other patients, and this indicates that

patients who have more knowledge and behavior regarding diabetes, don't need to stay away from wrong habits related to the disease.

CONCLUSIONS

The result of the present study showed about two-thirds of the participants had good knowledge scores while only half had good attitude scores. Older age, higher education, living in urban areas, living with disease for more than 5 years, having a family history of disease and smoking are significant determinants of knowledge and attitude.

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