RESEARCH
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EVALUATION OF SELF-CARE AMONG ADOLESCENT WITH DIABETES MELLITUS ATTENDING DIABETES AND ENDOCRINE CENTER IN BABYLON GOVERNORATE, IRAQ

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Abstract
Diabetes mellitus is a chronic illness that impact all aspects of the lives of individuals and their families and reduces the quality of life and can cause both acute and chronic complications that require mandatory lifestyle changes. The aim of the study was to assess self-care among diabetic adolescent and its relationship with socio-demographic features of patients, their families, disease history, and life style features. Patient and methods: Cross - sectional study carried out at a diabetic and endocrine center from October 1, 2023, to February 1, 2024 included 369 Adolescents aged 13–19 years who were already diagnosed with diabetes mellitus. Self-care was assessed using, Diabetes Self-Management Questionnaire (DSMQ), SPSS version 26 was used to analyze data and a P value≤ 0.05 considered statistically significant. Results: - more than half (56.37%) of participants had fair self -care, (27.37%) had good self- care and (16.26%) have poor self-care. The fair self-care is significantly associated (P<0.05) with younger age, female sex, self-employed, engaged students, whom parents aged less than 50 years. While good self-care was associated ((P<0.05) with family history of diabetes, non-smoker and physically active students. Conclusion: -the result of present study concluded that the high percentage of studied adolescent have moderate self -care and low percentage have good self –care
Keywords: self-care, adolescent, diabetes mellitus

Introduction

Diabetes mellitus is a chronic illness that impact all aspects of the lives of individuals and their families and reduces the quality of life and can cause both acute and chronic complications that require mandatory lifestyle changes. (1)
The prevalence of diabetes mellitus is high (2). As one of the most prevalent diseases in the world today, diabetes affects around 4000 million people worldwide (3)

the number of people living with diabetes around the world increases from time to another (4)

Adolescence is one of the sensitive and important stages of human development, and the presence of diabetes in adolescents has many complications, can effect on their lives (5)
self-care for diabetics is generally a personal factor and is affected by the person's attitudes, it is also affected by social support, and studies have shown that the availability of social support improves the patient's ability to adhere to healthy behaviors as well as his ability to deal with his disease effectively and efficiently(6)
Self-care is a way that helps young adults to be able to manage the disease and thus ease challenges in life(7)

Objective: To assess self-care among diabetic adolescents and its relationship with socio-demographic features of patients, their families, disease history, and lifestyle features.

Patient and methods: A cross-sectional study carried out at a diabetic and endocrine center from October 1, 2023, to February 1, 2024 included adolescents aged 13–19 who were already diagnosed with diabetes mellitus.

4-Sample size:- calculated using the following equations .

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

= 0.9196/0.0025
=368

$= \frac{1.96^2 * 0.397 * 0.603}{0.05^2}$

=N is the sample size, Z is the z-value (level of where confidence 95%)

p is expected prevalence (that can be obtained from same studies or a pilot study conducted by the researchers)

* the percentage of fair self- care practice that obtained from an Egyptian study was p=39.7% (9)

q (1-p) , d is the margin of error (0.05)

5-Data collection: It was done by direct interviewing patients using a questionnaire constructed by the researcher after a thorough review of research on the same topic (10,11). The draft was assessed by a panel of reviewers (who had more than five years of experience as experts in their speciality), their suggestions were taken into account, and the final copy of the questionnaire included:- Socio-demographic features of the participants and their families, disease History, Family History, and Life Style Features, Diabetes Self-Management Questionnaire(DSMQ), reliability was assessed by a pilot study on 20 participants at medical Marjan city.

*BMI defined by WHO (12) , Hba1c defined by ADA (13)

Scoring: The Total score is a global measure of diabetes self-management; it comprises all 16 items, and the answer to this item has four levels:

Applies to me very much = 3 points, Applies to me to a considerable degree= 2 points, Applies to me to some degree = 1 point and Does not apply to me' = 0 points

The DSMQ contains 7 positively and 9 negatively keyed items (negatively keyed items have to be reverse-scored so that higher values indicate more effective self-management before summing to scale scores), reverse-scored items: 5, 7, 10, 11, 12, 13,14,15 and item 16 are included in this scale only)

The total score of all items (positive and negative) was calculated out of 48, and the proportion of the score was calculated according to the following formula

$$\frac{\text{participant's score}}{48} * 100\%$$

If the proportion <50, it means poor self-care, 50-75 means fair self-care, >75 means good self-care.

6- Statistical Analysis: Data were analyzed using a statistical package for Social Sciences (SPSS) version 26. A descriptive statistic was used for presented Frequencies and Percentages. Pie chart were used to present self-care. Chi-square test This test is used for determining the association between all variables data with self-care. p-value ≤0.05 was considered statistically significant.

* Ethical consideration

Administrative approval from Al-Furat Al-Awsat Technical University, College of Health and Medical Technology/ Kufa. Furthermore, the diabetic and endocrine center (Medical Marjan City) in Babylon Governorate had approved and gave final permission for the researcher to conduct the study and collect data from patients a verbal consent.

Results:-The study included 369 adolescents, of whom 199 (53.9%) were females and 170 (46.1%) were males. More than half, 204 (55.3%) were in the age group of 13–15 years, regarding the residence; most of the cases, 236 (64%), were from urban areas. The study result showed that 172 (46.6%) of the sample had secondary education, respecting an occupation; most of the sample, 293 (79.4%), are students, concerning the subject of marital status. 334 (90.5%) were single, and 331 (89.7%) of the study subjects didn't have any chronic illnesses, Most of the cases, 355 (96.2%), didn't take any medication other than DM treatment, as presented in Table 1.

Table 1 :-socio-demographical features and clinical history of participants

Variable	Subgroups	No.	%
Age(years)	13-15	204	55.3
	16-19	165	44.7
Sex	Male	170	46.1
	Female	199	53.9
Residence	Urban	236	64
	Rural	133	36
Level of education	Illiterate	7	1.9
	Read and write	16	4.3
	Primary	146	39.6
	Secondary	172	46.6
	Institute and college	28	7.6
Occupation	Employed	9	2.4
	Student	293	79.4
	Self – employed	6	1.6
	Housewife	44	11.9
	Unemployed	17	4.6
Marital status	Single	334	90.5
	Engaged	6	1.6
	Married	29	7.9
Chronic illness	Yes	38	10.3
	No	331	89.7
Medication	Yes	14	3.8
	No	355	96.2

Table 2 illustrates the characteristics of the parents of the adolescents. The result showed that more than half 196(53.1%) of the fathers and 262 (71%) of the mothers aged less than 50 years, 164 (44.4%) of the fathers and 201 (54.5%) of the mothers had primary education, 164 (44.4%) of the fathers were self-employed, 316 (85.6%) of the mothers of participants were housewife and 157 (42.5%) of the cases had monthly family income. 500000-799000 Iraqi Dinars (IQD).

Table2:- Socio-demographical features of the parents of the participants

Variables	Subgroups	No.	%
Age of father	<50(year)	196	53.1
	≥50(year)	173	46.9
Age of mother	<50(year)	262	71
	≥50(year)	107	29
Father's education	Illiterate	21	5.7
	Read and write	26	7
	Primary	164	44.4
	Secondary	80	21.7
	Institute and college	78	21.1
Mother education	Illiterate	18	4.9
	Read and write	33	8.9
	Primary	201	54.5
	Secondary	70	19
	Institute and college	47	12.7
Father occupation	Employee	152	41.2
	Self employed	164	44.4
	Retired	27	7.3
	Died	26	7
Mother Occupation	Employed	50	13.6
	Housewife	316	85.6
	Died	3	0.8

Monthly income	< 200000 IQD	5	1.4
	200000- 499000 IQD	70	19
	500000 -799000 IQD	157	42.5
	800000- 999000 IQD	67	18.2
	≥1000000 IQD	70	19

Table 3 shows the majority of the patients 364 (98.6%) had Type I DM while only 5 (1.4%) had Type II DM, 163 (44.2%) had family history of DM (30.1% first degree and 14.1% second degree), most of them 341 (92.4%) had uncontrolled HBA1c (>6.5), 232 (62.9%) of the study subjects were diagnosed with diabetes since equal to or less than 5 years, the majority of the participants 357 (96.7%) took insulin only as a treatment for DM while 4 (1.1%) took OHD and 8 (2.2%) combination of them,322(87.3%) of study subjects had elevated blood glucose at time of the study while 47 (12.7%) had normal blood glucose.

Table 3:- Disease history of participants.

Variables	Subgroups	No.	%
Type of DM	TYPE I	364	98.6
	TYPE II	5	1.4
Family history	Yes	163	44.2
	No	206	55.8
Degree	first degree	111	30.1
	Second degree	52	14.1
HbA1C	Controlled(<6.5)	28	7.6
	Uncontrolled (≥6.5)	341	92.4
Duration of disease	≤5year	232	62.9
	>5year	137	37.1
Treatment	OHD	4	1.1
	Insulin	357	96.7
	Combined	8	2.2
Blood glucose measurement	Normal blood glucose	47	12.7
	Elevated blood glucose	322	87.3
Type of measurement	Fasting	221	59.9
	Random	148	40.1

Regarding life style of participants, BMI 229 (62.1%) had normal weight, 337(91.3%) of the cases non –smoker and more than half 211(57.2%) didn't make any activity. 86 (23.3%) of participants make activities for periods <60 minutes, as presented in Table 4.

Table 4 :- life style features of participants

Variables	Subgroups	No.	%
BMI	Underweight	73	19.8
	Normal	229	62.1
	Overweight	46	12.5
	Obese	21	5.7
Smoking	Current smoker	29	7.9
	Ex-smoker	3	0.8
	Non- smoker	337	91.3
Activity	Yes	158	42.8
	No	211	57.2
Duration of activity	<60min	86	23.3
	≥60min	72	19.5

The Figure(1) show more than half (56.37%) of participants had fair self -care , (27.37%) had good self- care and (16.26%)have poor self-care

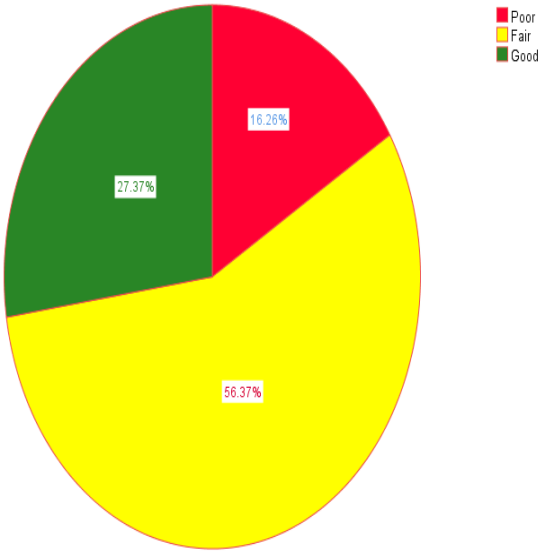

Figure (1): distribution of the participants according to the levels of self-care

The result in Table 5 shows that participants aged 16-19 years had a higher percentage of fair self-care compared with the younger age group (59.4% vs.53.9% respectively) at a p-value 0.007, females had fair self-care of 64.3%, while the males had 47.1% at p-value 0.001, the participants who read and write had more fair self –care 68.8% compared with other levels of education at p-value 0.002, the engaged participants had more fair self-care (66.7%) compared with other at p-value 0.001, self-employed had more fair self- care 66.7% compared with others at p-value 0.006 and non-significant relationship with residence, chronic illness and medication.

Table(5) relationship between self-care and socio-demographical feature , clinical history of participants.

Variables	Subgroups	Self- care			Total (N= 369) No.(%)	P-value
		Poor (n=60) No.(%)	Fair (n=208) No.(%)	Good (n=101) No.(%)		
Age group (year)	13-15	26(12.7%)	110(53.9%)	68(33.3%)	204(100%)	0.007
	16-18	34(20.6%)	98(59.4%)	33(20%)	165(100%)	
Sex	Male	29(17.1%)	80(47.1%)	61(35.9%)	170(100%)	0.001
	Female	31(15.6%)	128(64.3%)	40(20.1%)	199(100%)	
Residence	Urban	43(18.2%)	124(52.5%)	69(29.2%)	236(100%)	0.130
	Rural	17(12.8%)	84(63.2%)	32(24.1%)	133(100%)	
Level of education	Illiterate	4(57.1%)	1(14.3%)	2(28.6%)	7(100%)	0.002
	Read and write	3(18.8%)	11(68.8%)	2(12.5%)	16(100%)	
	Primary	11(7.5%)	87(59.6%)	48(32.9%)	146(100%)	
	Secondary	34(19.8%)	96(55.8%)	42(24.4%)	172(100%)	
	Institute and college	8(28.6%)	13(46.4%)	7(25%)	28(100%)	
Occupation	Employed	3(33.3%)	3(33.3%)	3(33.3%)	9(100%)	0.006
	Student	37(12.6%)	166(56.7%)	90(30.7%)	293(100%)	
	self- employed	2(33.3%)	4(66.7%)	0(0%)	6(100%)	
	Housewife	13(29.5%)	27(61.4%)	4(9.1%)	44(100%)	

	Un- employed	5(29.4%)	8(47.1%)	4(23.5%)	17(100%)	
Marital status	Single	46(13.8%)	192(57.5%)	96(28.7%)	334(100%)	0.001
	Engaged	2(33.3%)	4(66.7%)	0(0%)	6(100%)	
	Married	12(41.4%)	12(41.4%)	5(17.2%)	29(100%)	
Chronic illness	Yes	3(7.9%)	27(71.1%)	8(21.1%)	38(100%)	0.131
	No	57(17.2%)	181(54.7%)	93(28.1%)	331(100%)	
Medication	Yes	2(14.3%)	11(78.6%)	1(7.1%)	14(100%)	0.175
	No	58(16.3%)	197(55.5%)	100(28.2%)	355(100%)	

Fathers aged <50 years had more fair self-care compared with those aged ≥ 50 years (58.7% vs. 53.8%) at a p-value 0.003; mothers aged <50 years had more fair self-care compared to those aged ≥ 50 years (56.9% vs. 55.1%) at a p-value 0.001. There was a non-significant relationship between parents' education, parents' occupation, and monthly family income, as presented in Table 6.

Table 6 relationship between self –care and socio-demographic feature of parent of participants

Variables	Subgroups	Self- care			Total (N= 369) No.(%)	P-value
		Poor (n=60) No.(%)	Fair (n=208) No.(%)	Good (n=101) No.(%)		
Age of father	<50(year)	20(10.2%)	115(58.7%)	61(31.1%)	196(100%)	0.003
	≥50(year)	40(23.1%)	93(53.8%)	40(23.1%)	173(100%)	
Age of mother	<50(year)	32(12.2%)	149(56.9%)	81(30.9%)	262(100%)	0.001
	≥50(year)	28(26.2%)	59(55.1%)	20(18.7%)	107(100%)	
fathers education	Illiterate	1(4.8%)	11(52.4%)	9(42.9%)	21(100%)	0.117
	Read and write	6(23.1%)	12(46.2%)	8(30.8%)	26(100%)	
	Primary	26(15.9%)	95(57.9%)	43(26.2%)	164(100%)	
	Secondary	8(10%)	46(57.5%)	26(32.5%)	80(100%)	
	Institute and college	19(24.4%)	44(56.4%)	15(19.2%)	78(100%)	
Father occupation	Employee	24(15.8%)	88(57.9%)	40(26.3%)	152(100%)	0.246
	Self employed	21(12.8%)	94(57.3%)	49(29.9%)	164(100%)	
	Retired	8(29.6%)	12(44.4%)	7(25.9%)	27(100%)	
	Died	7(26.9%)	14(53.8%)	5(19.2%)	26(100%)	
Mothers education	Illiterate	1(5.6%)	7(38.9%)	10(55.6%)	18(100%)	0.175
	Read and write	6(18.2%)	19(57.6%)	8(24.2%)	33(100%)	
	Primary	36(17.9%)	112(55.7%)	53(26.4%)	201(100%)	
	Secondary	7(10%)	45(64.3%)	18(25.7%)	70(100%)	
	Institute and college	10(21.3%)	25(53.2%)	12(25.5%)	47(100%)	
Mother occupation	Employed	11(22%)	28(56%)	11(22%)	50(100%)	0.097
	Housewife	47(14.9%)	179(56.6%)	90(28.5%)	316(100%)	
	Died	2(66.7%)	1(33.3%)	0(0.0%)	3(100%)	
Family monthly income	< 200000 IQD	1(20%)	0(0%)	4(80%)	5(100%)	0.147
	200000- 499000 IQD	11(15.7%)	42(60%)	17(24.3%)	70(100%)	
	500000 -799000 IQD	29(18.5%)	86(54.8%)	42(26.8%)	157(100%)	
	800000- 999000 IQD	6(9%)	40(59.7%)	21(31.3%)	67(100%)	
	≥ 1000000 IQD	13(18.6%)	40(57.1%)	17(24.3%)	70(100%)	

Patients who don't have a family history have more fair self-care compared with those who do (61.7% vs. 49.7%) at a p-value 0.038. there were non-significant relationships with type of diabetes, duration of disease, last blood glucose measurement, treatment, degree of history, and HBA1c, as presented in Table 7.

Table 7 relationship between self -care and disease history, family history, and lifestyle feature

Variables	Subgroups	Self- care			Total (N= 369) No.(%)	P-value
		Poor (n=60) No.(%)	Fair (n=208) No.(%)	Good (n=101) No.(%)		
BMI	Underweight	7(9.6%)	42(57.5%)	24(32.9%)	73(100%)	0.280
	Normal	44(19.2%)	127(55.5%)	58(25.3%)	229(100%)	
	Overweight	4(8.7%)	29(63%)	13(28.3%)	46(100%)	
	Obese	5(23.8%)	10(47.6%)	6(28.6%)	21(100%)	
Smoking	Current smoker	12(41.4%)	13(44.8%)	4(13.8%)	29(100%)	0.003
	Ex-smoker	1(33.3%)	1(33.3%)	1(33.3%)	3(100%)	
	Non- smoker	47(13.9%)	194(57.6%)	96(28.5%)	337(100%)	
Activity	Yes	7(4.4%)	73(46.2%)	78(49.4%)	158(100%)	0.0001
	No	53(25.1%)	135(64.0%)	23(10.9%)	211(100%)	
Duration of activity	<60min	5(5.8%)	41(47.7%)	40(46.5%)	86(100%)	0.545
	≥60min	2((2.8%)	32(44.4%)	38(52.8%)	72(100%)	

The patients who didn't have any activity had higher fair self–care compared to those who were physically active (64.0% v.s.46.2%) at a p-value of 0.0001. Non-smokers had higher fair self-care (57.6%) compared with others at p-value 0.003, and non-significant relationship with BMI and duration of activity those presented in Table 8

Table 8 :- Relationship between self-care and life style features

Variables	Subgroups	Self- care			Total (N= 369) No.(%)	P-value
		Poor (n=60) No.(%)	Fair (n=208) No.(%)	Good (n=101) No.(%)		
Type of DM	TYPE 1	58(15.9%)	205(56.3%)	101(27.7%)	364(100%)	0.206
	TYPE 2	2(40%)	3(60%)	0(0%)	5(100%)	
Duration of disease	≤5(year)	38(16.4%)	127(54.7%)	67(28.9%)	232(100%)	0.664
	>5(year)	22(16.1%)	81(59.1%)	34(24.8%)	137(100%)	
Last blood glucose measurement	normal blood glucose	5(10.6%)	28(59.6%)	14(29.8%)	47(100%)	0.533
	elevated blood glucose	55(17.1%)	180(55.9%)	87(27%)	322(100%)	
Family history	Yes	34(20.9%)	81(49.7%)	48(29.4%)	163(100%)	0.038
	No	26(12.6%)	127(61.7%)	53(25.7%)	206 (100%)	
Degree of history	first degree	27(24.3%)	49(44.1%)	35(31.5%)	111(100%)	0.097
	second degree	7(13.5%)	32(61.5%)	13(25%)	52(100%)	
Treatment	OHD	2(50%)	2(50%)	0(0%)	4(100%)	0.127
	Insulin	56(15.7%)	200(56.0%)	101(28.3%)	357 (100%)	
	Combined	2(25%)	6(75%)	0(0%)	8(100%)	
HbA1C	Controlled (≤6.5)	7(25%)	11(39.3%)	10(35.7%)	28(100%)	0.152
	Uncontrolled (>6.5)	53(15.5%)	197(57.8%)	91(26.7%)	341(100%)	

Discussion

Self-care is essential for reducing the physical and psychological effects of diabetes, especially in developing children, to avoid or even slow the development of diabetes complications. (14)

The results of the study showed that more than half (56.37%) of participants had fair self-care, (27.37%) had good self-care and (16.26%) had poor self-care. This result is consistent with the study conducted in Al-Najaf City, Iraq (14) which revealed that the majority of students have a moderate level of self-care practice (64.32%), and in the study in Egypt (15), as 53.3% of the studied diabetic preparatory school students have fair total self-care practices.

The results of the study indicate that there is a highly significant relationship between self-care and age, sex, level of education, occupation, marital status, age of father, age of mother, family history, activity, and smoking.

Regarding age, the adolescents aged 16–19 had fair self-care compared with the younger age group. This result is in disagreement with the study in Egypt (9). That was observed that young people had fair practices in comparison with old people. The total score gained by students in the age groups of 9 years and 12–15 years (40.5% and 41.1%, respectively) was higher than the total score gained by students in the age group of 18 years or more (33.3%). This could be explained by the fact that the older the individual, the higher the level of education and the greater his knowledge of information from its right sources so, this can increase the awareness of self- care practices.

Females had fair self-care (64.3%), while males had 47.1%. This result agrees with the study in Egypt (9). It was observed that more than one third (33.8%) of the female students had good practice of insulin injection techniques as compared to about one quarter (26.5%) of the male students. This might be attributed to a fact that the females care about her health more than the male and nowadays they can get access to health information easily, also about two-third of the participants were from urban residence which increases chances for education.

The participants with lower levels of reading and writing had more fair self-care (68.8%) compared to others; this result disagrees with the results of the study (16), Patients with higher levels of education had better self-care performance. This differential between the two studies is due to the development that has occurred over time and the dependence of the majority of adolescents on TV, the internet, and social media , , social media platforms have a lot of content that is designed to educate people about a healthy lifestyle and a better quality of life and have the potential to provide a lot of information about health, health education, and awareness regarding diabetes. (17)

Regarding the occupation, self-employed participants had more fair self-care (66.7%) compared with others. This could be attributed to the fact that self-employed people are more self-reliant than others so they are more satisfied with life and self-employed individuals may experience better health due to the positive association between health and life satisfaction (18)

The participants engaged in more fair self-care (66.7%) compared with others. This might be because those patients in relationship reported lower level of illness perception and diabetic Self-management as compared to other (19)

Parents aged <50 years had more fair self-care compared with those aged ≥ 50 years. This result is in agreement with the study conducted in Al-Najaf city, Iraq (14). The father, aged <40 years, and the mother, aged <35 years, have more fair self-care compared to the other older adults. This could be explained by the fact that the effectiveness and activity of middle-aged people are stronger than those of the elderly, and thus their interest in and focus on their children is greater.

Patients who don't have a family history have more fair self-care compared with those who do (61.7% vs. 49.7%). This might be attributed to people who have inherited diabetes becoming accustomed to the disease, and thus their interest in and fear of the disease decreases, which leads to a decrease in their self-care for the disease.

The patient who didn’t have any activity had more fair self-care compared with those who did (64.0% vs. 46.2%). This could be explained by a fear of exercise-induced hypoglycemic attacks or a radical drop in blood glucose due to diabetic adolescents’ disinterest in exercise training and sports (16), or some of the families consider that a diabetic patient needs constant attention and monitoring, so avoid any activity that might cause effort or fatigue.

The non-smoker has more fair self-care (57.6%) compared with others. This could be illustrated by the fact that the Managing of diabetes is alone

consider is challenging, and smoking can make it even more so. Nicotine increases your blood sugar levels and makes them harder to handle. People with diabetes who smoke often need larger doses of insulin to keep their blood sugar close to their target levels (20)

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