Original Article

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_215_18

Can parents' educational level and occupation affect perceived parental support and metabolic control in adolescents with type 1 diabetes?

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Abstract:

BACKGROUND/AIM: Parents have an important role to play in supporting adolescents with type 1 diabetes mellitus (T1DM). Their education and occupation are important factors for the management of this disease. This study aimed to investigate the parental support that Iranian adolescents with T1DM experience and to examine the effect of parents' education and occupation on adolescents' perceived the parental support and metabolic control.

METHODS: This is a cross-sectional survey. The participants were 98 adolescents (aged 11–18 years) with T1DM referred to Endocrinology Clinics of Shahid Rahimi and Shahid Madani hospitals in Khorramabad, Iran, in 2016. For evaluating the adolescents' perceptions of parental support, the family version of Diabetes Social Support Questionnaire was employed. It measures in five diabetic care areas (insulin administration, blood testing, meal planning, exercise, and emotional support). Data were analyzed in SPSS version 22 software using descriptive statistics and inferential tests including Pearson correlation test, ANOVA, and independent *t*-test.

RESULTS: The parents' educational level had a significant relationship with adolescents' perceived parental support and hemoglobin A1c (HbA1c) level ($P < 0.05$). Occupation of father had no significant influence on his supportive behavior and HbA1c level in adolescents, but mother's occupation significantly influenced them ($P < 0.05$). In adolescents with higher perceived parental support, the mean HbA1c was lower.

CONCLUSIONS: Parents with higher educational level can improve the metabolic control and provide better meal planning in adolescents with T1DM.

Keywords:

Adolescent, parental support, type 1 diabetes

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Received: 14-07-2018
Accepted: 08-09-2018

Introduction

The incidence of diabetes in children and adolescents around the world is increasing. One of the most common types of diabetes in children and adolescents is type 1 diabetes mellitus (T1DM) or juvenile diabetes. It is an autoimmune disease caused by insulin deficiency resulting from the destruction of insulin-producing pancreatic beta-cells. In the case of T1DM, the disease-fighting system mistakes healthy cells in the pancreas for foreign, harmful invaders and attacks them, leaving the body unable to produce its own insulin and keep the levels of blood glucose under control. Evidence suggests that adherence to diabetes self-care regimes during adolescence is particularly poor.[1] Adolescents with T1DM show less effective metabolic control than other age groups, mostly because of biological changes beyond their control and partly because in this period of developmental transition,

How to cite this article: Baharvand P, Hormozi M. Can parents' educational level and occupation affect perceived parental support and metabolic control in adolescents with type 1 diabetes? J Edu Health Promot 2019;8:11.

psychosocial factors can militate against young people upholding their lifestyle and medical regimens.[2] Family plays an important role for diabetic self-care in children and can help them control the diseases. There is a generally accepted view of the family unit and the interactions among its members as a major factor in physiological, psychosocial, and functional outcomes of long-term care of T1DM.[3] Several studies have emphasized the need for involvement of parents in diabetes management mostly focused on the parents' performance of diabetes tasks. Families of children with T1DM are required to support the lifestyle changes that adhere to glycemic control. According to the studies, the parental involvement has been associated with better diabetes management among 10–15-year-old children[4] and better metabolic control among 12–16-years-old children.[5] The short- and long-term complications of T1DM cause serious problems in the life of children and their families and if not controlled properly, it can speed up the vascular changes and cause serious physical complications including visual, renal, cardiovascular, and neural disorders.[6]

There are several studies that have investigated the family support and metabolic control of children with T1DM in international level,[7-16] but less study in national level was found in literature.[6,17,18] On the other hand, much research has focused on advancements in the clinical management of T1DM diabetes and not much attention has been paid to the effect of parents' education and occupation. Considering these limitations and cultural and economic conditions of Iranian families, this study attempted to, first, investigate the parental support that Iranian adolescents with T1DM experience in five areas of insulin administration, blood testing, meals, exercise, and emotional support and its interaction with metabolic control (hemoglobin A1c [HbA1c]); and second, to examine the effect of parents' educational level and occupation on adolescents' perceived the parental support and metabolic control.

Methods

This is a cross-sectional study conducted on 98 adolescents with T1DM (aged 11–18 years) referred to Endocrinology Clinics of Shahid Rahimi and Shahid Madani Hospitals in Khorramabad, Iran, in 2016. They were studied based on census method (all entered into the study) and inclusion criteria which were having diabetes for at least 6 months, no obvious mental or physical health problems, and having willingness to participate in the study. For surveying participants, the family version of Diabetes Social Support Questionnaire (DSSQ) developed by La Greca and Bearman[19] was used. It has 58 items assessing adolescents' perceptions of family behaviors that are supportive for their diabetes care in five areas of insulin injection (10 items), blood sugar testing (14 items), meals (20 items), exercise (9 items), and emotional support (5 items). It is based on 6-point Likert-type scale measuring frequency of each behavior scoring as 0 = never, 1 = less than two times a month, 2 = twice a month, 3 = once a week, 4 = several times a week, or 5 = at least once a day. Cronbach's alpha coefficient for total was reported as 0.95.[19] We used the Persian version of this questionnaire. It consists of 52 items measuring insulin injection (8 items), blood sugar testing (12 items), meals (20 items), exercise (7 items), and emotional support (5 items). In its first section, the demographic characteristics such as age, educational level, and occupation of the parents as well as sex and age of patients and their diabetes duration were surveyed. The reliability and validity of Persian version has already been confirmed in the study of Heidari *et al*.[20] Its internal consistency (Cronbach's alpha) for total was evaluated and reported as more than 0.8 which is acceptable. To measure its content validity ratio (CVR) and content validity index (CVI), the questionnaire was provided to five experts in the department and they were asked to express their opinion about each items based on 3-point scale (essential, useful but unnecessary, or unnecessary). Of 52 items, one item measuring meals was deleted due to low content validity. Finally for 40 items, CVR was obtained as 0.99 and for other 11 items, it was reported as 0.6. Furthermore, CVI for all items was obtained as 0.95.

After explaining the purpose of the study to the participants and obtaining verbal and written consents from them and assuring the confidentiality of the information, the questionnaires were distributed among them. Moreover, the HbA1c test was performed to measure their average blood sugar. For this purpose, after obtaining permission from the patients and receiving a prescription form the physician for the test, the blood samples were taken from the patients. Collected data were analyzed in SPSS version 22 application using descriptive statistics (mean, standard deviation (SD), and frequency), and inferential statistics (*t*-test, one-way ANOVA, multivariate analysis, and Pearson correlation coefficient). The significance level was set as $\alpha = 0.05$.

Results

Of 98 diabetic adolescents with 11–18 years participated in the study, 42 (42.9%) were female, while 56 were male (57.1%). The average duration of disease in patients was 23.2 ± 7.1 months. Their mothers were mostly homemakers (65.3%), while their fathers were mostly self-employed (44.9%). Furthermore, most of the patients' parents had high school diploma (32.7% of mothers and 43.9% of fathers). The average age of patients' mothers and fathers were reported as 33.7 ± 4.2 and 36.64 ± 3.9, respectively. The mean ± SD of scores for adolescents'

perceptions of the parental support in five areas of diabetic care were reported as following: insulin administration (IA) = 37.21 ± 5.3; blood sugar testing (BST) = 49.88 ± 6.2; meals (M) = 74.23 ± 13.3; exercise (E) = 21.6 ± 7.3; and emotional support (ES) = 14.2 ± 6.1. The mean of total score was 199.2 ± 49.3.

Table 1: Mean, standard deviation, and relationship of each level of mother's education with perceived support and hemoglobin A1c level in adolescents

Variables	*n*	Mean±SD	Sig.	95% CI	
				Lower bound	Upper bound
IA					
Illiterate	5	31.00±1.10	0.013	30.01	32.55
Secondary school or lower	20	34.35±3.13		32.88	35.81
Junior high school	29	37.75±2.74		36.71	38.80
High school	32	39.21±7.71		36.43	42.00
Academic	12	37.91±1.92		36.69	39.14
Total	98	37.21±5.35		36.14	38.28
BST					
Illiterate	5	42.40±0.89	0.023	41.28	43.51
Secondary school or lower	20	45.50±5.31		43.01	47.98
Junior high school	29	51.86±6.08		49.54	54.17
High school	32	51.28±5.68		49.23	53.33
Academic	12	51.91±5.72		48.27	55.55
Total	98	49.89±6.28		48.63	51.15
M					
Illiterate	5	28.00±2.23	0.001	25.22	30.77
Secondary school or lower	20	58.05±27.82		45.02	71.07
Junior high school	29	80.44±18.50		73.41	87.48
High school	32	82.81±13.02		78.11	87.50
Academic	12	82.58±16.45		72.13	93.03
Total	98	74.23±23.32		69.55	78.91
E					
Illiterate	5	2.20±0.44	0.001	1.64	2.75
Secondary school or lower	20	12.65±11.15		7.42	17.87
Junior high school	29	25.34±9.95		21.55	29.13
High school	32	25.15±8.55		22.07	28.23
Academic	12	26.08±7.47		21.33	30.83
Total	98	21.60±11.37		19.32	23.88
ES					
Illiterate	5	3.00±0.27	0.035	2.95	3.78
Secondary school or lower	20	9.75±7.04		6.45	13.04
Junior high school	29	15.75±5.17		13.79	17.72
High school	32	16.06±4.14		14.56	17.55
Academic	12	17.75±3.36		15.61	19.88
Total	98	14.22±6.18		12.98	15.46
Total					
Illiterate	5	106.60±0.89	0.011	105.48	107.71
Secondary school or lower	20	160.30±53.25		135.37	185.22
Junior high school	29	214.62±42.73		198.36	230.87
High school	32	214.53±27.62		204.57	224.49
Academic	12	224.58±33.50		203.29	245.87
Total	98	199.21±49.35		189.31	209.11
HbA1c					
Illiterate	5	8.38±1.53	0.002	6.47	10.28
Secondary school or lower	20	6.96±1.67		6.17	7.75
Junior high school	29	5.87±1.29		5.38	6.36
High school	32	5.73±0.48		5.56	5.91
Academic	12	5.78±0.48		5.47	6.09
Total	98	6.16±1.31		5.90	6.43

IA=Insulin administration, BST=Blood sugar testing, M=Meals, E=Exercise, ES=Emotional support, HbA1c=Hemoglobin A1c, SD=Standard deviation, CI=Confidence interval

Effect of parents' educational level

Descriptive statistics and correlation results for examining the relationship of each levels of parents' education with their support and HbA1c level in patients are presented in Tables 1 and 2. Based on the different levels of parents' education, the mean score of their social support was different in patients. The patients with illiterate mothers as well as those whose mothers were at secondary or lower education had a lower mean score of perceived social support. The total mean score of perceived social support for them were 106.6 ± 0.89 and 160.3 ± 53.2, respectively. Also, those with fathers at secondary or lower education had a lower mean perceived social support score in all five diabetic care domains. The total mean score of perceived social support for them was 136.3 ± 44.4. The mean score of perceived social support among patients with parents at junior high school, high school, and academic (university)

Table 2: Mean, standard deviation, and relationship of each level of father's education with perceived support and hemoglobin A1c level in adolescents

Variables	*N*	Mean±SD	Sig.	95% CI	
				Lower bound	Upper bound
IA					
Secondary school or lower	12	33.08±2.64	0.043	31.40	34.76
Junior high school	28	36.28±3.63		34.87	37.69
High school	43	37.74±2.07		37.10	38.38
Academic	15	40.73±11.15		34.55	46.91
Total	98	37.21±5.35		36.14	38.28
BST					
Secondary school or lower	12	43.83±3.04	0.001	41.90	45.76
Junior high school	28	49.46±6.85		46.80	52.12
High school	43	51.16±5.71		49.40	52.92
Academic	15	51.93±6.05		48.58	55.28
Total	98	49.89±6.28		48.63	51.15
M					
Secondary school or lower	12	44.75±25.03	0.001	28.84	60.65
Junior high school	28	71.57±26.51		61.29	81.85
High school	43	83.09±10.22		79.94	86.23
Academic	15	77.40±24.45		63.85	90.94
Total	98	74.23±23.32		69.55	78.91
E					
Secondary school or lower	12	7.83±8.60	0.038	2.36	13.29
Junior high school	28	20.14±12.88		15.14	25.14
High school	43	25.32±7.68		22.96	27.68
Academic	15	24.66±11.04		18.54	30.78
Total	98	21.60±11.37		19.32	23.88
ES					
Secondary school or lower	12	6.83±6.04	0.002	2.99	10.67
Junior high school	28	12.89±6.88		10.22	15.56
High school	43	16.44±3.58		15.33	17.54
Academic	15	16.26±6.01		12.93	19.59
Total	98	14.22±6.18		12.98	15.46
Total					
Secondary school or lower	12	136.33±44.42	0.011	108.10	164.55
Junior high school	28	190.35±55.43		168.86	211.85
High school	43	216.09±29.41		207.04	225.14
Academic	15	217.66±44.97		192.76	242.57
Total	98	199.21±49.35		189.31	209.11
HbA1c					
Secondary school or lower	12	7.92±1.91	0.017	6.70	9.14
Junior high school	28	6.31±1.54		5.71	6.91
High school	43	5.70±0.45		5.56	5.84
Academic	15	5.83±0.57		5.51	6.15
Total	98	6.16±1.31		5.90	6.43

IA=Insulin administration, BST=Blood sugar testing, M=Meals, E=Exercise, ES=Emotional support, HbA1c=Hemoglobin A1c, SD=Standard deviation, CI=Confidence interval

levels was not much different from each other. It was found out that mother's and father's educational level had a significant association with all domains of social support and HbA1c level ($P < 0.05$). The mean score of IA, BST, physical activity, and ES was lower in patients with illiterate mothers and with fathers at secondary or lower level of education, while they had higher mean score of dietary regime. The HbA1c level in patients with illiterate mothers (mean = 8.6) and with fathers at secondary or lower education was higher (mean = 7.9) compared to other groups.

Effect of parents' occupation

ANOVA test was performed for evaluating the effect of father's job on his support for adolescents and their metabolic control. Table 3 presents the descriptive statistics. It can be seen that patients whose fathers were worker had the lowest mean value of perceived parental support, while those with self-employed fathers as well as those whose fathers were employees showed the highest mean value. Among areas of parental support, meal planning and emotions had the highest and lowest mean value, respectively. The mean HbA1c was lower than the mean value of all parental support dimensions. ANOVA test results are shown in Table 4. The P value was greater than the critical value (0.05); hence, it can be said that the occupation of fathers has no significant influence on HbA1c level, meals, exercise, blood glucose testing, IA, and emotions of adolescents.

Since only two types of occupations were reported for mothers by patients including homemaking ($n = 64$) and employee ($n = 34$), independent t-test was performed for assessing the effect of mother's job on her support. Descriptive statistics including sample size, mean, and SD are presented in Table 5. The mean value of parental support in each diabetic care domains was higher in patients with employee mothers, while their mean HbA1C was lower. Meal planning and ES had the highest and lowest mean value in both groups, respectively. Independent test results are shown in Table 6. P value of Levene's test for HbA1c, meals, exercise, and ES variables was less than 0.05, while for the variables of IA and BST, it was greater than 0.05; hence, we can conclude that the variance in patients with homemaker mothers is significantly different than that of patients with employee mothers in terms of HbA1c, meals, exercise, and ES, but in terms of IA and BST, there is no significant

Table 3: Descriptive statistics for testing the effect of father's job

Variables	Job	*n*	Mean±SD	95% CI	
				Lower bound	Upper bound
ES	Unemployed	5	14.20±7.25	5.18	23.21
	Self-employed	44	15.04±5.87	13.25	16.83
	Worker	17	11.05±7.10	7.40	14.71
	Employee	32	14.78±5.66	12.74	16.82
E	Unemployed	5	19.40±11.84	4.69	34.10
	Self-employed	44	22.68±10.67	19.43	25.92
	Worker	17	15.88±12.46	9.47	22.29
	Employee	32	23.50±11.17	19.47	27.52
M	Unemployed	5	73.00±27.96	38.27	107.72
	Self-employed	44	76.97±21.51	70.43	83.51
	Worker	17	64.00±28.79	49.19	78.80
	Employee	32	76.09±21.44	68.36	83.82
BST	Unemployed	5	48.60±6.46	40.57	56.62
	Self-employed	44	50.56±5.84	48.79	52.34
	Worker	17	46.94±6.55	43.57	50.31
	Employee	32	50.75±6.49	48.40	53.09
IA	Unemployed	5	36.00±3.31	31.88	40.11
	Self-employed	44	37.09±2.85	36.22	37.95
	Worker	17	34.94±3.54	33.11	36.76
	Employee	32	38.78±8.06	35.87	41.68
Total	Unemployed	5	191.20±55.67	122.07	260.32
	Self-employed	44	204.63±46.85	190.39	218.88
	Worker	17	172.82±57.01	143.50	202.13
	Employee	32	207.03±44.75	190.89	223.16
HbA1c	Unemployed	5	6.90±2.86	3.34	10.45
	Self-employed	44	6.03±1.06	5.71	6.36
	Worker	17	6.92±1.88	5.95	7.89
	Employee	32	5.83±0.63	5.60	6.06

IA=Insulin administration, BST=Blood sugar testing, M=Meals, E=Exercise, ES=Emotional support, HbA1c=Hemoglobin A1c, SD=Standard deviation, CI=Confidence interval

Table 4: ANOVA test results

Variables	Sum of squares	df	Mean square	*F*	Sig.
ES					
Between groups	209.942	3	69.981	1.882	0.138
Within groups	3495.119	94	37.182		
Total	3705.061	97			
E					
Between groups	746.969	3	248.990	1.982	0.122
Within groups	11,810.510	94	125.644		
Total	12,557.480	97			
M					
Between groups	2229.906	3	743.302	1.382	0.253
Within groups	50,557.696	94	537.848		
Total	52,787.602	97			
-					
Between groups	200.043	3	66.681	1.726	0.167
Within groups	3630.937	94	38.627		
Total	3830.980	97			
BST					
Between groups	174.454	3	58.151	2.094	0.106
Within groups	2610.046	94	27.766		
Total	2784.500	97			
Total					
Between groups	15,410.079	3	5136.693	2.186	0.095
Within groups	220,908.421	94	2350.090		
Total	236,318.500	97			
HbA1c					
Between groups	16.633	3	5.544	3.458	0.20
Within groups	150.703	94	1.603		
Total	167.336	97			

BST=Blood sugar testing, M=Meals, E=Exercise, ES=Emotional support, HbA1c=Hemoglobin A1c

difference. Hence, by looking at the *t*-test results in related rows, it can be found out that the mother's job has a significant effect on HbA1c level, meals, exercise, IA, and emotions of diabetic adolescents ($P < 0.05$) but not on their blood glucose testing ($P > 0.05$). In total, the mother's job significantly affected her supportive behavior toward adolescents with T1DM ($P < 0.001$).

Discussion

In spite of some limitations such as low numbers of adolescents with diabetes in Khorramabad which made us to use census method, and the time of gathering data (summer), this study conducted to investigate the perceived parental support and metabolic control of Iranian adolescents with T1DM. There are a few national studies in literature. Tol *et al*.[17] assessed relation between perceived social support from family and diabetes control among type 1 and 2 diabetic patients in Tehran using Perceived Social Support from Family scale. Their findings revealed that perceived social support had no significant relation with HbA1C in T1DM patients. Body mass index and marital status variables had significant relation with perceived social support from family and

Table 5: Descriptive statistics for testing the effect of mother's job

Variables	Job	*n*	Mean±SD	SEM
HbA1c	Homemaker	64	6.36±1.55695	0.19462
	Employee	34	5.81±0.49464	0.08483
IA	Homemaker	64	36.23±3.44454	0.43057
	Employee	34	39.06±7.50733	1.28750
BST	Homemaker	64	49.30±6.48975	0.81122
	Employee	34	51.03±5.80222	0.99507
M	Homemaker	64	70.62±26.20039	3.27505
	Employee	34	81.03±14.70618	2.52209
E	Homemaker	64	19.90±12.35676	1.54459
	Employee	34	24.80±8.54145	1.46485
ES	Homemaker	64	13.20±6.82474	0.85309
	Employee	34	16.14±4.18607	0.71790
Total	Homemaker	64	190.83±55.29418	6.91177
	Employee	34	215±30.51378	5.23307

IA=Insulin administration, BST=Blood sugar testing, M=Meals, E=Exercise, ES=Emotional support, HbA1c=Hemoglobin A1c, SD=Standard deviation, SEM=Standard error mean

HbA1C in both type 1 and type 2 diabetic patients; however, variables of education had no significant relation with perceived social support and HbA1C among T1DM patients. Cheraghi *et al*.[6] studied the effect of family-centered care on management of blood glucose levels in adolescents with T1DM in Hamadan and concluded that their caregivers in home-centered care could improve the diabetic adolescents' management of blood glucose levels and reduce their HbA1c levels. Rostami *et al*.[18] in exploring the support that Iranian adolescents with T1DM receive, reported that family members can help them to have a normal life and parents can empower them by improving their independence and self-care skills.

In the current study, the high mean scores obtained from the DSSQ indicated that the role of families for the adolescents was supportive. There was high level of parental social support perceived by adolescents. In the study of Gecková *et al*.,[21] Slovak adolescents also reported high social support while in the study of Yan and Sellick,[22] Chinese patients had a moderate social support. In the current study, the parents' educational level had a significant relationship with perception of parental support by adolescents; those with parents having higher educational level showed higher perceived parental support. This is consistent with the results of Gecková *et al*.[21] and Jafari *et al*.[23] The level of parent's education was one of the factors influencing the BST in adolescents. Patistea[24] also reported a positive relationship of parents' education and socioeconomic status with their coping behaviors in children; those with higher level of education and socioeconomic status were most helpful in maintaining family strength and an optimistic outlook, and they had better perception of the child's diseases. Aziz *et al*.[25]

Table 6: Independent sample *t*-test results for examining the effect of mother's job

Variables	Levene's test for equality of variances		*t*-test for equality of means						
	F	Sig.	*t*	df	Sig. (two-tailed)	Mean difference	SE difference	95% CI	
								Lower bound	Upper bound
HbA1c									
Equal variances assumed	16.076	0.000	1.977	96	0.024	0.54291	0.27465	−0.00226	1.08809
Equal variances not assumed			2.557	83.461	0.012	0.54291	0.21230	0.12068	0.96514
IA									
Equal variances assumed	0.099	0.753	−2.554	96	0.012	−2.82445	1.10598	−5.01981	−0.62909
Equal variances not assumed			−2.080	40.529	0.044	−2.82445	1.35759	−5.56712	−0.08178
BST									
Equal variances assumed	1.667	0.200	−1.304	96	0.195	−1.73254	1.32890	−4.37038	0.90531
Equal variances not assumed			−1.349	74.259	0.181	−1.73254	1.28384	−4.29050	0.82542
M									
Equal variances assumed	18.539	0.000	−2.140	96	0.035	−10.40441	4.86177	−20.05494	−0.75388
Equal variances not assumed			−2.517	95.655	0.013	−10.40441	4.13363	−18.60998	−20.19885
E									
Equal variances assumed	9.593	0.003	−2.058	96	0.042	−4.88787	2.37534	−9.60289	−0.17285
Equal variances not assumed			−2.296	89.331	0.024	−4.88787	2.12874	−9.11742	−0.65832
ES									
Equal variances assumed	21.186	0.000	−2.293	96	0.024	−2.94393	1.28370	−5.49206	−0.39581
Equal variances not assumed			−2.640	93.911	0.010	−2.94393	1.11497	−5.15776	−0.73011
Total									
Equal variances assumed	18.603	0.000	−2.361	96	0.020	−24.17188	10.23614	−44.49045	−3.85330
Equal variances not assumed			−2.788	95.819	0.006	−24.17188	8.66935	−41.38081	−6.96294

IA=Insulin administration, BST=Blood sugar testing, M=Meals, E=Exercise, ES=Emotional support, HbA1c=Hemoglobin A1c, SD=Standard deviation, CI=Confidence interval, SE=Standard error

in their study in Pakistan reported that patients with chronic diseases whose family members (especially the mother) had higher educational levels, had fewer problems, and fewer feelings of being rejected by others. According to them, the educated parents show a more appropriate response to their child's disease. In a local study, based on the results, it can be said that, in general, people with a higher level of education have a higher level of scientific understanding and not only they can communicate with children effectively but also they are more involved with issues related to the health of their children; such that in cases of illness especially chronic diseases, they pursue the test results and complications of the disease more actively; therefore, it can be expected that in these families, while controlling chronic diseases, the support will be better perceived by children. As a result, their quality of life will increase.

We observed a significant relationship between the metabolic control of adolescents and parents' educational level. This is consistent with the findings of Delavari *et al*.,[26] Foulkner and Chang,[27] and AlAgha *et al*.[28] Delavari *et al*. argued that illiteracy is one of the factors influencing the lack of metabolic control in patients. Foulkner and Chang suggested that the higher a father's education, the better blood sugar of a child is controlled. AlAgha *et al*. found out that higher educated fathers were associated with HbA1c <7% (<53 mmol/mol), while poor glycemic control was recorded in low educated fathers. Furthermore, there found no difference between HbA1c and mothers' educational level. In our study, the educational level of both mothers and fathers were associated to lower levels of HbA1c in adolescents with T1DM.

About the effect of parent's occupational status, the results of this study also showed that in adolescents with employee mothers, perceived parental support was higher except in BST area (where patients with homemaker mothers had higher mean value; maybe because their mothers had free time more than employed mothers), and their HbA1c level was lower; while the occupation of father had no significant effect on perceived parental support and metabolic control of adolescents. This is against the results of AlAgha *et al*.[28] where they showed that more professional fathers had better diabetic control on their children with T1DM, while mothers' occupation had no significant effect. Ebrahimi *et al*.[29] in their study revealed a significant association between metabolic control of diabetic patients and variables of marital status, education, occupation, income, smoking, and exercise, but it had no significant relationship with gender factor.

Conclusions

It was concluded that parents with higher educational level can improve the metabolic control and provide better meal planning in adolescents with T1DM. Given the important role of parents in managing and controlling chronic diseases including diabetes in their children, it is recommended to consider their role in achieving optimal metabolic control as well. Furthermore, it is suggested that family-centered care trainings should be carried out for those adolescents with low-educated parents in order that, by the realization of parents' involvement in treatment and care of diabetic children, the complications of this disease can be avoided.

Acknowledgments

This paper was extracted from a PhD thesis approved by the Ethics Committee of the Research Center at Lorestan University of Medical Science in Iran (Code: LUMS. REC.1395.191). The authors would like to thank the participants and all those who helped us in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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