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The Effect of Parental Collaboration on Diabetes Self-efficacy, Quality of Life and HbA1c Level in Adolescents Diagnosed with Type 1 Diabetes

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What is already known on this topic?

Adolescence is a period when the child's autonomy comes to the fore and they want to be independent. Type 1 diabetes (T1D) is a chronic disease for which the adolescent patient and parent must manage care and treatment together. Parental participation in disease management in T1D has an effect on compliance, quality of life (QoL) and metabolic control.

What this study adds?

Parental collaboration did not affect the adolescent's hemoglobin A1c level. However, the QoL increased when the adolescent performs diabetes self-management with the support of their parents.

Abstract

Objective: Type 1 diabetes mellitus (T1D) is a chronic disease that is diagnosed relatively often in childhood and adolescence. However, care and metabolic control are difficult for both adolescents and their parents. Parental participation in the care and treatment process, especially when adolescents are developing autonomy and taking responsibility for self-care, affects both the adolescent's perception of autonomy and may cause difficulties in self-management. This study was conducted to determine the effect of parental support on adolescents' self-efficacy, quality of life (QoL) and glycaemic control in adolescents with T1D.

Methods: This study was descriptive and cross-sectional. Descriptive questionnaires, The Collaborative Parental Involvement Scale for Adolescents with T1D, Diabetes Management Self-efficacy Scale for Adolescents with T1D and QoL Scale in Children with Diabetes Mellitus (PedsQL 3.0) were administered to 79 adolescents with T1D. Laboratory health records were examined about participants hemoglobin A1c (HbA1c) levels measured in the last 3 months.

Results: There was no relationship between parental collaboration and adolescent's HbA1c levels. However, there was a moderate positive relationship between parental collaboration and adolescent's QoL ($p = 0.043$) and a strong positive relationship between parental collaboration and adolescent's diabetes management self-efficacy ($p < 0.001$).

Conclusion: Adolescents who self-managed diabetes with the support of both parents, especially their fathers, who were not school absentees and had regular blood glucose measurements had better QoL. There was no relationship between HbA1c levels and parental co-operation, but there was a strong relationship between parental cooperation and adolescent self-efficacy.

Keywords: Adolescent, diabetes, parental collaboration, self-efficacy, quality of life, HbA1c level

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Introduction

Type 1 diabetes (T1D) is one of the most common chronic diseases in childhood and adolescence. Adolescence is a period when care and metabolic control of T1D is difficult for both parents and adolescents (1,2,3). Management of T1D requires multidisciplinary involvement, including endocrinologists, diabetes nurses, dieticians, psychologists and the participation of the family. This is because optimal management of T1D requires adjustments in lifestyle due to the nature of the disease, which in turn requires family committment, as well as insulin treatment, blood glucose monitoring and diet. Failure to maintain metabolic control and blood glucose levels at the desired level leads to complications, and the risk of microvascular complications accelerates throughout adolescence.

Hemoglobin A1c (HbA1c) measurement in isolation is not an ideal indicator of diabetes self-management, but it is one of the most important markers of metabolic control (4). When the HbA1c value is below 5.7%, it is classified as normal or non-diabetic, and when it is between 5.7% and 6.4%, it is classified as prediabetes. In cases where the HbA1c value is 6.5% and above, diabetes is diagnosed. The Diabetes Control and Complications Trial reported that a higher mean HbA1c level was the dominant predictor of progression of diabetic retinopathy. Achieving HbA1c levels of 7% or lower with tighter control in patients with T1D has been associated with a 35-76% reduction in microvascular complications, such as retinopathy, nephropathy, and neuropathy (5). Management of blood glucose and prevention of complications are very important for a healthy and long life in adolescents with T1D (6).

While adolescence is a period when autonomy develops and the adolescent takes responsibility for self-care, the diagnosis of T1D both affects the adolescent's perception of autonomy, due to parental involvement, and leads to additional complex difficulties in self-management (6). Adolescents with T1D have difficulty in achieving metabolic control and dietary compliance due to their efforts to be accepted by their peers, to be independent from their parents, and because of psychosocial problems (7). Besides the adolescent patient's perception of the disease and its effect on life domains, parents' emotional responses, their perspective on treatment and level of knowledge may also play a role in the behaviour of the adolescent (8).

It is known that mothers whose adolescents are diagnosed with T1D experience emotions such as shock, denial, anxiety, anger and guilt with the diagnosis, just like other mothers with adolescents with chronic diseases. Mothers may experience an intense sense of loss including the loss of normality and their healthy adolescent child (3). With the effect of anxiety and loss, parents intervene in the life of the adolescent diagnosed with diabetes and conflicts may occur between the adolescent and his/her family. Conflict may cause deterioration in the relationship between parents and adolescents. However, some adolescents with T1D and their parents manage to navigate this period with fewer problems (9).

Factors affecting the adaptation of adolescents to T1D can be explained according to the Roy Adaptation model. According to this model, age, gender, duration of diabetes diagnosis, pubertal development, family environment and treatment method are individual and familial characteristics that affect adaptation. Individual and family characteristics lead to psychological responses, such as various levels of stress, anxiety, depressive symptoms, eating disorders and behavioural disorders. Individual and family characteristics and psychological responses lead to the development of coping, self-efficacy, social competence, and self-management in the adolescent and family, and ultimately, improved quality of life (QoL) and metabolic control, which are indicators of adaptation. When harmony is achieved between the patient and the family, QoL and metabolic control are present at a good level (10). Self-efficacy, which is defined as the individual's judgement of the ability to organise and execute action plans (11), determines the disease-specific behaviours of patients with chronic diseases and is important in the realization of adaptation. Adolescents with a sense of self-efficacy are more likely to achieve the targeted metabolic control, as they are more confident and take an active role in disease management (12). As parental monitoring increases, disease management and metabolic control can be better achieved (3), and parental involvement has been reported to have a positive effect on HbA1c (13). However, conflict within the family and poor parental control may result in poor glycaemic control. It is argued that diabetes self-management will be achieved by preventing parental conflict and supporting parental involvement in the adolescent period (14).

Given all this evidence, the aim of this study was to determine the effect of parental support on self-efficacy, QoL and glycemic control in adolescents with T1D.

Methods

This descriptive and cross-sectional study was conducted in the pediatric endocrinology outpatient clinic of a university hospital in western Türkiye between March 2023 and September 2023. The study was approved by the İzmir Kâtip Çelebi University Non-interventional Clinical Studies

Institutional Review Board (protocol number: 0101, date: 23.03.2023).

Participants

According to the World Health Organization's definition, adolescence is the period between the ages of 10-19 between childhood and adulthood. Adolescents with a chronological age between 11-18 years were included in this study. The number of patients between the ages of 11-18 who were followed up at the research center between the dates of the study was 198. The study sample included adolescents with T1D who were followed up in the pediatric endocrinology outpatient clinic of the hospital and met the inclusion criteria. Adolescents who were diagnosed at least six months prior to recruitment were included in the study. Twelve adolescents with a diagnosis date of less than 6 months at the time of the study were not included in the study sample. Since having another chronic disease besides diabetes may affect self-efficacy, QoL and glycemic control, adolescents with any chronic disease in addition to diabetes were not included in the sample. The number of adolescents with a chronic disease other than diabetes (2 with Celiac disease, 1 with Down syndrome and 2 with thyroid disease) is five. These five people were not included in the sample. Adolescents who met the inclusion and exclusion criteria were invited to participate in the study, and research data were collected from 79 adolescents who agreed. According to the analysis performed with the G-Power program (3.1.9.7; Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany), based on the correlation analysis between the Collaborative parental involvement scale and the PedsQL scales, the effect size of the study was 0.47. With 95% confidence interval and 5% error for correlation analysis, the posthoc achieved power was calculated to be 0.99.

Instruments

For data collection the descriptive questionnaire, Collaborative Parental Involvement Scale for Adolescents with T1D, Diabetes Management Self-Efficacy Scale for Adolescents with T1D and QoL Scale in Children with Diabetes Mellitus (PedsQL 3.0) were introduced to the adolescents and their parents. How to fill them out was explained and the adolescents and their families completed the data collection process which was conducted online. It took an around 15-20 minutes to complete the forms.

Descriptive Questionnaire: This form consists of 17 questions developed by the researchers based on the literature (1,2,3,6,7,8,15,16,17,18). Nine of the questions included sociodemographic information, such as age, gender and education level of the adolescent and parents. Eight of the questions were related to the adolescent's diabetes, including the number of years since diagnosis, the last measured HbA1c level of the adolescent, who performs diabetes follow-up and management at home, the effect of diabetes on school attendance, and information about regularity of diabetes follow-up, insulin use and blood glucose measurements.

Collaborative Parental Involvement Scale for Youth with T1D: The parental involvement scale was developed by Nansel et al. (15), and its Turkish validity and reliability was performed by Ayar et al. (16). The scale consists of 12 items and a single sub-dimension and is scored on a 1-5 scale: 1 = almost never; 2 = sometimes; 3 = often; 4 almost always; 5 = always. The scale does not have a cut-off point and the higher the score, the closer the parental involvement.

Diabetes Management Self-efficacy Scale in Adolescents with T1D: The scale was developed by Moens et al. (17), and the Turkish validity and reliability study was conducted by Ozturk et al. (18). The scale is used to determine the educational needs of adolescents or to evaluate the effectiveness of diabetes education programmes. The scale consists of 26 items ranging from 1 (strongly agree) to 5 (strongly disagree). The scale score is calculated by dividing the total self-efficacy scores by the number of items to show the strength of perceived self-efficacy for different performance levels. The lowest total score that can be obtained from the scale is 26 and the highest is 130. A higher score indicates poorer self-efficacy. The scale has four sub-dimensions, including medical treatment and nutrition (items 1, 2, 4, 5, 7, 9, 10, 11, 14, 18, 22 and 26), assessment of glycemia, adjustment of nutrition and insulin dose (items 6, 8, 12, 13, 17, 19, 21 and 25), talking about diabetes (items 23 and 24), and honesty towards oneself and others (items 3, 15, 16 and 20). The total scores that can be obtained from the sub-dimensions of the scale are minimum 12, 8, 2, 4; maximum 60, 40, 10 and 20, respectively. The Cronbach's alpha coefficient obtained by applying the scale in Turkish children was 0.85.

Quality of Life Scale in Children with Diabetes Mellitus (PedsQL 3.0): The scale was developed by Varni et al. (19) and its Turkish validity and reliability was performed by Ayar (20). This scale measures both general domains of QoL and disease-specific domains. The scale is a comprehensive, multidimensional scale with both diabetic children and proxy (parent/caregiver) reports. The PedsQL 3.0 Diabetes Scale (28 items) includes five subscales: diabetes symptoms (11 items), treatment barriers (4 items), treatment compliance (7 items), anxiety (3 items), and communication (3 items). In the scale prepared according to the five-point Likert system, 0 = never creates a problem, 1 = almost never creates a problem, 2 = sometimes creates a problem, 3 = often creates a problem and 4 = always creates a problem. In the total score calculation of the scale, a linear conversion is applied and it is converted into 0-100 points. If the answer to the question is marked as never, it receives 100 points; if it is marked as rarely, it receives 75 points; if it is marked as sometimes, it receives 50 points; if it is marked as frequently, it receives 25 points; and if it is marked as almost always, it receives 0 points. The higher the total score, the better the health-related QoL is perceived. The reliability coefficients of the subscales in the child form were 0.81 for diabetes symptoms; 0.66 for treatment barriers; 0.66 for treatment compliance; 0.63 for anxiety; and 0.77 for communication, respectively. Similarly, the reliability coefficients of the subscales in the parent form were 0.81 (diabetes symptoms), 0.68 (treatment barriers) 0.73 (treatment compliance), 0.81 (anxiety and 0.84 (communication), respectively (19,20).

Independent variables for the present study were the adolescent's gender, age, and duration of diabetes diagnosis, together with parental education level and the score of the Collaborative Parental Involvement Scale Score for Youth with T1D.

The dependent variables were the scores obtained on the QoL Scale in Children with Diabetes Mellitus (PedsQL 3.0) and the Diabetes Management Self-efficacy Scale Score in Adolescents with T1D, together with the adolescent's HbA1c level.

Statistical Analysis

Statistical Package for the Social Sciences, version 26.0 was used for statistical analyses (IBM Inc., Armonk, NY, USA). Descriptive data of adolescents and parents are given as numbers and percentages. The Student's t-test and ANOVA test were used to analyse the variables that conformed to the normal distribution. The Kruskal-Wallis followed by pair-wise Mann-Whitney U tests were used to analyse variables that did not fit the normal distribution. Spearman's correlation analysis was used in the relationship between continuous variables.

Results

The demographic and clinical characteristics of the adolescent participants and their parents are shown in Table 1. Of the adolescents, less than a third (27.8%) followed up diabetes themselves and nearly half (45.6%) reported missing school beacuse of their diabetes. Most (88.6%) went for regular check-ups, nearly all (97.5%) used regular insulin and somewhat fewer (94.9%) had regular blood glucose measurements.

Factors that did not affect QoL included the gender of the adolescent (p = 0.282), education of the mother (p = 0.521) and father (p = 0.481), diabetes education received by the adolescent and family (p = 0.926) or regular insulin use (p = 0.541) (Table 2). However, the person monitoring the diabetes (p = 0.001), history of school absenteeism (p < 0.001) and regular blood glucose measurement (p = 0.045) were found to have an effect on QoL. Thus, the

Table 1. Descriptive characteristics of the adolescent and the family (n = 79)

Characteristic	Mean ± SD (range)	
Age (years)	14.29 ± 2.86 (11-18)	
Mother age (years)	40.75 ± 6.08 (28-62)	
Father age (years)	45.71 ± 6.79 (35-67)	
Duration of diabetes (years)	5.22 ± 3.51 (1-12)	
HbA1c level (%)	8.43 ± 1.81 (5.30-13.0)	
Gender	**n**	**%**
Female	44	55.7
Male	35	44.3
Mother education level		
Primary education	32	40.5
Secondary education	15	19
High school education	20	25.3
University education and above	12	15.2
Father education level		
Primary education	28	35.4
Secondary education	13	16.5
High school education	23	29.1
University education and above	15	19
Diabetes monitoring person		
Self monitoring	22	27.8
Only mother	21	26.6
With mother	19	24.1
With mother-father-themselves*	17	21.5
School absence due to diabetes		
Yes	36	45.6
No	43	54.4
Regular insulin use status		
Yes	77	97.5
No	2	2.5
Regular blood glucose measurement status		
Yes	75	94.9
No	4	5.1

*The group in which only the father performed diabetes follow-up and the group in which adolescents, mothers and fathers performed diabetes follow-up together were combined.
min-max: minimum-maximum, HbA1c: hemoglobin A1c, SD: standard deviation

QoL of adolescents who monitored diabetes themselves without the help of their mothers, adolescents who were not absent from school and adolescents who undertook regular blood glucose measurements had a better QoL.

In terms of self-efficacy, the gender of the adolescent ($p = 0.813$), mother's ($p = 0.543$) and father's education levels ($p = 0.478$), the person monitoring the diabetes ($p = 0.478$), school absenteeism ($p = 0.148$), regular insulin use ($p = 0.818$) or regular blood glucose measurement ($p = 0.086$) had no effect. The self-efficacy scores of adolescents who monitored diabetes themselves without the help of their mothers were significantly higher than the self-efficacy scores of adolescents who monitored diabetes with the help of their mothers ($p = 0.036$) (Table 2).

Gender of the adolescent ($p = 0.322$), mother's ($p = 0.441$) and father's education levels ($p = 0.161$), the person who monitores of diabetes ($p = 0.457$), school absenteeism ($p = 0.172$), regular insulin use ($p = 0.644$) or regular blood glucose measurement ($p = 0.690$) had no effect on the collaboration of parents (Table 2).

Finally, no relationship was found between parental collaboration and adolescent's HbA1c levels. However, there was a weak positive relationship between parental collaboration and adolescent's QoL ($r = 0.228$, $p = 0.043$) and a strong positive relationship between parental collaboration and adolescent's diabetes management self-efficacy ($r = 0.614$, $p < 0.001$) (Table 3).

Table 2. The relationship between scores for QoL, self-efficacy and sociodemographic variables in adolescents (n = 79)

Characteristic	QoL scale in children with diabetes mellitus (PedsQL 3.0)		Diabetes management self-efficacy scale in adolescents with T1D		Collaborative parental involvement scale	
	x̄ ± SD	p	x̄ ± SD	p	x̄ ± SD	p
Gender						
Female	63.31 ± 17.18	0.282*	101.15 ± 19.68	0.813β	51.77 ± 11.55	0.322β
Male	58.82 ± 19.59		100.85 ± 20.59		54.14 ± 9.91	
Mother education level						
Primary education	60.99 ± 18.30	0.521¥	77.62 ± 18.13	0.543Ω	51.28 ± 9.76	0.441Ω
Secondary education	55.89 ± 16.70		73.06 ± 20.83		49.53 ± 15.47	
High school education	65.31 ± 18.11		78.95 ± 23.32		55.52 ± 10.57	
University education and above	62.56 ± 20.78		74.66 ± 19.97		56.82 ± 5.17	
Father education level						
Primary education	57.65 ± 19.27	0.481¥	73.53 ± 22.21	0.478Ω	49.75 ± 12.42	0.161Ω
Secondary education	65.52 ± 14.46		82.46 ± 11.13		56.46 ± 5.73	
High school education	60.86 ± 18.70		77.65 ± 21.95		51.47 ± 12.77	
University education and above	65.23 ± 19.03		75.86 ± 19.30		57.46 ± 4.10	
Person monitoring diabetes						
Self monitoring	70.04 ± 16.03	**0.001**¥	107.54 ± 16.53	0.478Ω	50.95 ± 10.23	0.170Ω
Only mother	49.91 ± 20.52		95.95 ± 22.33		54.80 ± 10.12	
With mother	59.49 ± 13.66		96.36 ± 22.75		49.05 ± 14.18	
With mother-father-themselves	66.17 ± 16.00		104.05 ± 15.78		57.00 ± 6.10	
School absence due to diabetes						
Yes	53.47 ± 16.40	**< 0.001***	98.00 ± 19.17	0.148β	50.72 ± 12.17	0.172β
No	67.89 ± 17.35		103.55 ± 20.47		54.58 ± 9.40	
No	60.90 ± 18.94		102.78 ± 15.26		56.57 ± 5.16	
Regular insulin use status						
Yes	61.12 ± 18.28	0.541*	100.46 ± 19.87	0.818β	52.75 ± 10.98	0.644β
No	69.19 ± 24.62		122.50 ± 10.60		55.50 ± 3.53	
Regular blood glucose measurement status						
Yes	62.27 ± 17.91	**0.045***	1.56 ± 20.21	0.086β	52.76 ± 11.08	0.690β
No	43.52 ± 18.94		91.00 ± 11.48		54.00 ± 5.47	

*Student's t-test, ¥One-way ANOVA, βMan-Whitney U test, ΩKruskal Wallis test.
T1D: type 1 diabetes mellitus, QoL: quality of life, p: statistical significance value, SD: standard deviation

Table 3. The relationship between parental collaboration and QoL, diabetes management self-efficacy and HbA1c level in adolescents (n = 79)

	QoL scale in children with diabetes mellitus (PedsQL 3.0)		Diabetes management self-efficacy scale in adolescents with T1D		HbA1c level	
	r	p	r	p	r	p
Collaborative parental involvement scale	**0.228**	**0.043**	**0.614**	**< 0.001**	-0.091	0.442

T1D: type 1 diabetes mellitus, HbA1c: hemoglobin A1c, r: Spearman's correlation coefficient (rho), p: statistical significance (probability), QoL: quality of life

Discussion

Diabetes management of adolescents with T1D is monitored by measuring HbA1c levels, which are defined as glycosylated haemoglobin levels over a period of 2-3 months. Elevated HbA1c, which is considered normal below 5.7%, is associated with microvascular complications, such as retinopathy, when it exceeds 7%. Regular monitoring of blood glucose and HbA1c levels of adolescents with T1D are indicators of adolescent self-management (4,5,21,22,23). Harrington et al. (24) (2021) conducted a study in adolescents with HbA1c values of 6.5-11% in order to evaluate the relationship between diabetes self-management of adolescents aged 13-17 years with T1D, HbA1c and depression among the psychosocial outcomes. The mean final HbA1c level of adolescents participating in this study was 8.43 ± 1.81. This level suggests the presence of problems related to diabetes management in the cohort. However, the use of a single self-reported measurement of HbA1c, which is also among the limitations of this study, is not sufficient for generalizability.

Parental involvement with adolescents with T1D is considered necessary for improved glycemic control, better compliance with the T1D management regime and better self-management (6). Parental involvement in adolescents with T1D contributed to the adaptation and self-efficacy of the adolescent (8), and parental adaptation had an effect on HbA1c control (13). QoL and self-efficacy levels of adolescents who followed up their diabetes without the help of their mothers were found to be high in the present study. The group without maternal involvement included the adolescents self-managing without parental help and adolescents with paternal involvement. It is desirable for the adolescent to take responsibility in diabetes management, and the positive effect of father involvement on self-management and life capacity may be a reflection of the patriarchal family structure and the position of the father in the family. Through a cultural approach, the participation of fathers in the diabetes management of adolescents with diabetes can be further supported.

While the quality of self-care in adolescents with T1D is associated with glycemic control, reduction in complications and increase in QoL, the management of factors that inhibit self-care results in the integration of the disease into the individual's identity level in adolescents with T1D (25). The results of the present study showed that regular insulin use had no significant effect on the increase in QoL but almost all (97%) participants reported regular insulin use, while the relationship between regular blood glucose measurement and QoL was significant.

In adolescents diagnosed with T1D, there is a significant relationship between the development of disease-specific self-management skills with a decrease in complications and HbA1c level in the process of regular health care services, training and control carried out with various supportive practices (26). Regular blood glucose monitoring stands out as an important factor for individual health management in adolescents and is associated with an increase in QoL while it is considered as self-management of adolescents (27). The present study found that regular blood glucose measurement by the adolescents had an effect on QoL so that adolescents who monitored diabetes only by themselves reported significantly higher QoL than adolescents whose diabetes was monitored only by their mothers. The QoL was higher in the group in which both parents helped monitoring diabetes with the adolescent, but there was no significant difference between the other groups. Factors such as family, peer and health care team interaction, pain, and understanding care are suggested as self-management barriers and have an impact on the QoL of adolescents with T1D. QoL is significantly associated with self-management, which is considered as self-management behaviours of adolescents (28). Families of children with chronic diseases may develop overprotective and controlling behavior patterns compared to families of children without chronic diseases. This may negatively affect personality development in children and lead to the development of an externally directed, dependent personality structure, deterioration in social relations and loss of self-esteem in adolescence. Therefore, the adolescent may show angry and aggressive behavior (29,30,31,32,33). In a study examining the relationship between parental attitudes and diabetes self-management in adolescents diagnosed with T1D, it was reported that as the protective parental attitude increased, the fasting blood glucose values of the adolescents increased (32). Increased self-management of adolescents in our study in diabetes management leads to an increase in QoL. The QoL of the adolescent decreases as family members, especially the mother, play a more active role in diabetes management. This may be attributed to the fact that families, especially mothers, have protective and controlling behaviour patterns.

In a global study conducted with young people with T1D, a decrease in HbA1c level is accepted as one of the self-management indicators and it was emphasized that the lower the HbA1c level, the higher the QoL (27). In addition, no significant relationship was found between glycemic control and QoL in studies conducted with adolescents (34,35). There was no relationship between HbA1c and QoL in the present study, in keeping with these earlier reports. However, this may be due to analysing only a single recently measured and self-reported HbA1c level. In adolescents with T1D, stigmatisation, social problems, problems experienced in school life due to factors that complicate diabetes management at school (difficulty in diabetic nutrition, inability to manage regular insulin use, inadequate physical activity) prevent diabetes management of the adolescent (36,37). Thus, QoL decreases with increased difficulty in the management of health for adolescents (34,37). Adolescents may hide the fact that they have diabetes in order to adopt the lifestyle of friends, be accepted by their peers and to avoid the prejudiced behaviours of others. For this reason, glucose monitoring and insulin injections may not be performed regularly (38). They may deliberately restrict and neglect insulin in combination with irregular eating behaviour for weight control (39). Therefore, adolescents should be questioned about whether they regularly monitor their blood glucose levels and whether they regularly administer insulin. In the present study, four adolescents reported not measuring blood glucose regularly and two adolescents reported not taking insulin regularly.

The present study found that adolescents who did not miss school reported a better QoL than those with school absenteeism. However, there was no significant relationship between school absenteeism and self-efficacy. It is a possible confounder that participants had a better QoL because they were more likely to attend school, or was it that not missing school resulted in a better QoL? It is not possible to determine causation here.

There was no significant relationship between regular blood glucose measurement and self-management. Contrary to these findings, in a qualitative study conducted with adolescents with T1D, the negative impact of not undertaking regular blood glucose measurements due to fear of injections, laziness and forgetfulness on health management was highlighted among the barriers to self-management (37). It has been shown that regular blood glucose measurement was associated with better glycemic control in adolescents with T1D (20). Similarly, the importance of regular blood glucose measurement for improved self-management has been reported in other studies (40,41).

Parents are an important factor on the QoL of adolescents with T1D (39). Parent-adolescent collaboration is important for adolescent's self-management (42) and increased adolescent self-management was associated with positive parental attitude and increased QoL of adolescents with T1D (21). Similarly, the present study found that there was a weak positive correlation between parental collaboration and adolescent's QoL.

Study Limitations

Conducting this study in a single hospital constitutes one of the limitations of the study. Since this study was conducted in a single centre and a simple sampling method was used, the representativeness and generalizability of our results may be limited. Furthermore, metabolic control was evaluated with a single, self-reported HbA1c level. This is a further limitation of our study.

Conclusion

The present study found that adolescents with T1D who followed up their diabetes themselves, adolescents who were not absent from school and those who had regular blood glucose measurements had a better QoL. Moreover, there was an inverse relationship between HbA1c levels measured at the last control and QoL. The results also showed a weak positive relationship between parental collaboration and adolescent's QoL, and a strong positive relationship between parental collaboration and adolescent's diabetes management self-efficacy. The mean HbA1c levels of the adolescents were high but ranged from normal (5.3%) to very high (13%). We believe that it would be useful to continue planning for the development of self-efficacy and self-management in adolescents and to find approaches to support more paternal participation in adolescents with T1D, as this was associated with better management and QoL in our cohort.

Ethics

Ethics Committee Approval: The study was approved by the İzmir Kâtip Çelebi University Non-interventional Clinical Studies Institutional Review Board (protocol number: 0101, date: 23.03.2023).

Informed Consent: Consent form was filled out by all participants.

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Footnotes

Authorship Contributions

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