RESEARCH ARTICLE

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The Effect of COVID-19 Pandemics on the Quality of Life in Children of Type 1 Diabetes Mellitus and Their Families Using Insulin Infusion Pumps

ABSTRACT

Objective: This study aimed to assess the impact of the coronavirus disease (COVID-19) pandemic on the quality of life (QOL) of children with type 1 Diabetes Mellitus (T1DM) and their families, specifically focusing on the effects of insulin infusion pumps. We also aimed to identify changes in both children's and parents' QOL during the pandemic period.

Method: This study utilized the KINDL (KINDer Lebensqualitätsfragebogen: Children's QOL) questionnaire for the children, and the World Health Organization Quality of Life (WHOQOL)-BREF Turkish Version (TR) (WHO-QOL-BREF-TR) scale for their parents. Data were collected using Google Forms, with assessments performed before and during the pandemic.

Results: The study included 61 participants, 38 of whom were female (62.3%), with a mean age of 12.7±2.9 years and a mean diabetes duration of 6.4±2.5 years. Pre-pandemic KINDL scores for "emotional health" and "school" were significantly higher than those during the pandemic (p=0.022 and p=0.002, respectively). Surprisingly, HbA1c levels improved during the pandemic compared to the pre-pandemic values (p<0.001). There were strong correlations between children's and parents' QOL before and during the pandemic (p<0.001). Parents' physical health scores on the WHOQOL-BREF decreased significantly during the pandemic (p=0.012).

Conclusion: Improvement in HbA1c levels during the pandemic warrants further investigation. Additionally, the pandemic negatively affected the emotional well-being of children and the physical health of parents, highlighting the need for more support in these areas during times of crisis.

Keywords: COVID-19 Pandemic, Type 1 Diabetes Mellitus, Infusion Pumps, Quality of Life.

COVID-19 Pandemisinin Tip 1 Diyabetes Mellitus Tanılı Çocuklar ve Ailelerinin Yaşam Kalitesi Üzerindeki Etkisi: İnsülin İnfüzyon Pompası Kullanan Hastalar

ÖZET

Amaç: Bu çalışma, COVID-19 pandemisinin Tip 1 Diyabetes Mellitus (T1DM) tanılı çocuklar ve ailelerinin yaşam kalitesi (QOL) üzerindeki etkisini, özellikle insülin infüzyon pompalarının etkisine odaklanarak incelemeyi amaçlamaktadır. Ayrıca, pandemi süresince hem çocukların hem de ebeveynlerin QOL'undaki değişiklikler tespit edilmeye çalışılmıştır.

Yöntem: Çocuklar için KINDL (KINDer Lebensqualitätsfragebogen: Çocuk Yaşam Kalitesi Anketi) ve ebeveynler için Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği (WHOQOL)-BREF Türkçe Versiyonu (TR) (WHO-QOL-BREF-TR) kullanılmıştır. Veriler Google Forms üzerinden toplanmış, değerlendirmeler pandemi öncesi ve pandemi sırasında yapılmıştır.

Bulgular: Çalışmaya katılan 61 katılımcının 38'i (%62,3) kadındı ve katılımcıların yaş ortalaması 12,7±2,9 yıl, diyabet süresi ortalaması ise 6,4±2,5 yıldı. Pandemi öncesinde KINDL'nin "duygusal sağlık" ve "okul" alt boyutlarının puanları, pandemi süresindekilerden anlamlı derecede daha yüksekti (sırasıyla p=0,022 ve p=0,002). Şaşırtıcı bir şekilde, pandemi sırasında HbA1c seviyeleri pandemi öncesine göre iyileşmiştir (p<0,001). Pandemi öncesi ve sırasında çocukların ve ebeveynlerin QOL'ları arasında güçlü korelasyonlar bulunmuştur (p<0,001). Ebeveynlerin WHOQOL-BREF üzerindeki fiziksel sağlık puanları pandemi sırasında anlamlı şekilde düşmüştür (p=0,012).

Sonuç: Pandemi süresince HbA1c seviyelerindeki iyileşme dikkate değer olup, daha fazla araştırma gerektirmektedir. Ayrıca, pandemi çocukların duygusal sağlıklarını ve ebeveynlerin fiziksel sağlıklarını olumsuz etkilemiş, bu tür kriz dönemlerinde bu alanlarda daha fazla desteğin gerekliliğine işaret etmiştir.

Anahtar Kelimeler: COVID-19 Pandemisi, Tip 1 Diyabetes Mellitus, İnfüzyon Pompaları, Yaşam Kalitesi.

INTRODUCTION

Type 1 Diabetes Mellitus (T1DM) is an autoimmune condition that leads to destruction of insulin-producing beta cells in the pancreas. This condition predominantly affects children and adolescents and requires continuous insulin therapy for survival (1). Type 1 DM accounts for 5-10% of diabetes cases worldwide (2). In Turkey, the yearly incidence of type 1 DM under the age of twenty is 10.8/100.000, and its prevalence is around 75/100.000 (3). Approximately 3% of type 1 DM cases worldwide occur in Turkey. The prevalence among girls is higher than that among boys, and the disease is most commonly diagnosed between the ages of 0-4 and 10-14 years (3). Type 1 DM mostly follows an autoimmune process, preclinical autoimmunity with beta cell destruction, clinical onset, transient remission, emergence of clinical symptoms, and occurrence of complications (4). Quality of life (QOL) is affected by the clinical course of type 1 DM and worsens with increasing hemoglobin A1c (HbA1c) levels (5).

On January 30, 2020, the World Health Organization (WHO) defined the COVID-19 infection as an "international public health emergency." Due to the spread of the virus all over the world, the severe course of the disease, and the deaths, it was accepted as a pandemic on March 11, 2020 (6). With the declaration of the disease as a pandemic, many people have been isolated to prevent its spread. Since then, various countries have started to implement regional and national restrictions to prevent the spread of the disease, increasing the possibility of stress, anxiety, and a sense of helplessness, negatively affecting the QOL of patients (7).

DM impairs emotional, spiritual, physical, and social functioning in children and adolescents. Children diagnosed with DM show more psychosocial stress, low social activity, and high behavioral problems than healthy children (8). Additionally, the Coronavirus disease-19 (COVID-19) pandemic has caused psychological mood disorders in people with chronic diseases, such as type 1 DM, and affected their QOL (9).

While studies have explored the impact of the COVID-19 pandemic on adult populations with chronic diseases, limited research has focused on the pediatric T1DM population, especially in terms of psychological well-being and QOL during the pandemic. Additionally, little is known about how the use of insulin infusion pumps influences disease management.

We hypothesize that the COVID-19 pandemic has had a mixed effect on children with T1DM, potentially improving glycemic control due to increased parental involvement, while simultaneously worsening the emotional and social aspects of their QOL due to isolation and school closures. This study aimed to contribute to the limited body of research on the impact of the COVID-19 pandemic on the QOL of children with T1DM and their families. By examining both physical (HbA1c levels) and psychological (QOL scores) outcomes, this study provides insight into how these children and their caregivers have been affected by the pandemic, and highlights areas for future intervention and support.

MATERIALS AND METHODS

Study Design: This descriptive observational study aimed to assess the effects of the COVID-19 pandemic on the QOL of children with T1DM using insulin infusion pumps and their parents. The study was conducted between January 2020 and July 2020 in two phases: before and during the pandemic, allowing for a comparison of QOL metrics across these two periods. The pre-pandemic data were collected prior to the declaration of the COVID-19 pandemic, whereas the pandemic-phase data were collected after the onset of pandemic-related restrictions. This before-and-after study design enabled us to capture any significant changes in both physical and psychological health outcomes. Ethical approval (number 2020/117, dated June 15, 2020) was obtained from the Düzce University Faculty of Medicine's Clinical Research Ethics Committee. The reporting of the study was performed according to the STROBE guideline (10).

Patients with type 1 DM at follow-up were invited to participate in this study. The KINDL QOL Scale and World Health Organization QOL Scale were used to collect data. Sociocultural, sociodemographic, and therapeutic information about individuals was obtained from the hospital patient records. As specified in the International Society for Pediatric and Adolescent Diabetes (ISPAD) guidelines (8), HbA1c levels were evaluated in three categories: good (HbA1c <7.5%), moderate (HbA1c 7.5-9%), and poor control (HbA1c> 9%). Of the invited participants, 76 responded to the lockdown. During the pandemic, these scales were uploaded to Google Drive. A group of 76 participants was created on WhatsApp, and the responsible physician informed the participants about the study and sent the study link to the phones of the patients or their parents via WhatsApp. Those who agreed to participate were included in the study. All the patients and their parents were asked to respond. The completed questionnaires were collected again using WhatsApp.

Sampling Method: The participants were selected using a non-probability convenience sampling method. The study population consisted of children aged 6–18 years who were diagnosed with T1DM and were being treated at the Pediatric Endocrine Department of Düzce University Hospital. The inclusion criteria were as follows.

1. The patient was diagnosed with T1DM by using an insulin infusion pump for at least one year.

2. No interruption in pump use exceeding one week.
3. Consent to participate: both the child and their parents or guardians.
4. The patients were aged between 6 and 18 years and received routine follow-up care.

The exclusion criteria included the presence of diabetic complications (e.g., nephropathy, retinopathy), psychiatric or chronic illnesses, or participation in similar studies. Based on these criteria, 61 children and their parents were included in the study, with data collected during two time points: pre-pandemic and during the pandemic.

Data Collection: Data collection involved two validated QOL instruments: the KINDL Children's Quality of Life Questionnaire for children (KINDer Lebensqualitätsfragebogen: Children QOL Questionnaire) scale and the World Health Organization Quality of Life (WHOQOL)-BREF Turkish Version (TR) (WHO-QOL-BREF-TR) scale for parents. Both questionnaires were adapted for online administration and were uploaded to Google Forms. Invitations to participate were sent via WhatsApp to parents and children who met the inclusion criteria. The participants were required to complete the questionnaire at two distinct time points: before the COVID-19 pandemic and once during the pandemic.

Insulin pump usage, diabetes management data, and HbA1c levels were extracted from hospital records. For each participant, HbA1c levels were evaluated before and during the pandemic. All responses were recorded electronically and subsequently analyzed for changes in QOL scores and glycemic control metrics, using HbA1c as the primary physical health indicator.

Variables: The KINDL scale was developed by Ravens-Sieberer and Bullinger in 1998 (11). It is a general-purpose QOL measurement tool specifically for young children and adolescents. KINDL has been translated into 14 languages. The questionnaire consists of 24 items and six dimensions. The scale consists of six dimensions: physical well-being, emotional well-being, self-esteem, family, friends, and school (school or kindergarten/nursery where daily activities are conducted). Each dimension consists of 4 items. While calculating the scores of the dimensions, the total QOL score, which consists of a combination of these six dimensions, was also obtained. KINDL can be used both clinically and non-clinically in healthy children and in children with chronic diseases. The KINDL QOL scale uses a five-point sequential response option ranked from 1 (never) to 5 (always). The score is calculated by summing the item responses for each dimension and converting them to a scale between 0 and 100. A high score indicates a good QOL.

The Turkish version of the World Health Organization QOL Scale (WHO QOL-BREF-TR) was evaluated using a five-point sequential response (1-5) option (12). In the evaluation of the scale, the arithmetic mean of the scores obtained from the sub-domains was calculated separately and multiplied by four to obtain the QOL score. As the subscale scores of the scale increased, QOL also increased.

Statistical Analyzes: The Statistical Package for Social Sciences program (SPSS for Windows, Version 25.0, Chicago, IL, USA) was used for statistical analysis. The survey data were collected using Google Drive and then uploaded to the SPSS software.

Results are presented as means and standard deviations or as median, minimum, and maximum values for numerical variables, while categorical data are presented as frequencies and percentages. The conformity of numerical variables to a normal distribution was evaluated using the Shapiro-Wilk test.

Statistical tests were performed based on parametric properties of the data. The independent samples t-test or Mann-Whitney U test was used to compare two independent groups, and the paired samples t-test or Wilcoxon Signed-Rank test was used to compare two dependent groups. Additionally, a marginal homogeneity test was used to compare the three categorical dependent groups. Pearson and Spearman correlation tests were used to determine the relationships between variables. A p-value of <0.05 was considered sufficient for statistical significance.

RESULTS

Of the participants, 38 (62.3%) were girls, 35 (57.4%) were adolescents aged 13-18, and 29 (47.5%) were attending secondary school. The mean age of the patients was 12.73±2.91 years, the mean diabetes duration was 6.37±2.54 years, and the mean pump usage time was 3.26±1.81 years (Table 1).

The mean age of the mothers was 38.3±5.7 years, and the mean age of the fathers was 41.0±5.4 years. Of the patients, 56 (91.8%) lived with their families, 44 (72.1%) did not work, and 50 (82.0%) lived with a nuclear family (Table 2).

All parents were alive. All fathers had a job. The pre-pandemic mean of the "Emotional health" and "School" sub-dimensions of the KINDL QOL scale was significantly higher than the mean of the pandemic period ($p=0.022$ and $p=0.002$, respectively) (Table 3).

When the Turkish version of the WHO QOL-BREF-TR findings of parents were evaluated between the two measurement points, a statistically significant difference was found only in the dimension of "physical health" ($p=0.012$) (Table 4).

Pre-pandemic HbA1c levels were significantly higher than HbA1c levels during the pandemic period ($p<0.001$) (Table 5). Positive and significant relationships were found between patients' general QOL scores, their caregivers' psychological and social relationships, and general scores in the pre-pandemic period. In addition, positive and significant relationships were found between the general QOL scores of patients during the pandemic and the general health, physical health, psychological, social relations, environment, and general scores of caregivers (Table 6).

Table 1. Descriptive characteristics of the patients

		n	**%**
Sex	Male	23	37.7
	Female	38	62.3
Age	6-7 year	3	4.9
	8-12 year	23	37.7
	13-18 year	35	57.4
Education	Preschool	1	1.6
	Primary	14	23.0
	Secondary	29	47.5
	College	17	27.9
$HbA1_C$ risk level (before pandemic) (%)	Poor	27	44.3
	Moderate	26	42.6
	Good	8	13.1
HbA1c Risk Level (during pandemic) (%)	Poor	8	13.1
	Moderate	33	54.1
	Good	20	32.8
	Mean ± SD	**Median (Min-Max)**	
Age (year)	12.73±2.91	13 (6-17)	
Diabetes duration (year)	6.37±2.54	6 (2-14)	
Pump usage (year)	3.26±1.81	3 (1-12)	
$HbA1_C$ (before pandemic) (%)	8.82±1.28	8.7 (6.30-13.30)	
HbA1c (during pandemic) (%)	7.92±1.11	7.9 (5.40-10.60)	

Poor HbA1C: Defined as HbA1C > 9%., **Moderate HbA1C**: Defined as HbA1C between 7.5% and 9%., **Good HbA1C**: Defined as HbA1C < 7.5%., **HbA1C**: Hemoglobin A1C, **SD**: Standard Deviation, **Min-Max**: Minimum and Maximum.

Table 2. Parental and Household Characteristics

		n	%
Parent relationship	Together	56	91.8
	Apart	5	8.2
Who does the patient live with?	Both	56	91.8
	With mother	1	1.6
	With father	1	1.6
	With mother-grandmother	1	1.6
	With mother-stepfather	1	1.6
	School pension	1	1.6
Mother's education status	Illiterate	1	1.6
	Primary school	22	36.1
	Secondary school	9	14.8
	High school	18	29.5
	College	3	4.9
	University	8	13.1
Father's education status	Primary school	18	29.5
	Secondary school	10	16.4
	High school	19	31.1
	College	2	3.3
	University	12	19.7
Mother's working status	Housewife	44	72.1
	Employed	17	27.9
Number of siblings	Single	5	8.2
	1	2	3.3
	2	34	55.7
	3 or more	20	32.7

Table 3. Comparison of the KINDL QOL scores of patients before and during the pandemic

		Before pandemic		During pandemic			
	n	**Mean**	**SD**	**Mean**	**SD**	**t/Z**	**p**
Physical well-being	61	68.85	17.95	69.02	20.66	-0.132	0.895[Z]
Emotional well-being	61	69.56	18.16	63.42	18.95	-2.288	**0.022[Z]**
Self-esteem	61	53.07	23.95	57.68	23.78	-1.469	0.142[Z]
Family	61	78.89	17.38	75.51	18.82	-1.653	0.098[Z]
Friends	61	75.51	18.23	75.71	19.70	-0.131	0.896[Z]
School	61	64.78	18.38	56.65	18.95	3.241	**0.002[t]**
General quality of life	61	68.45	11.43	66.47	11.65	1.499	0.139[t]
Disease	41	67.58	21.27	74.11	18.92	-1.776	0.076[Z]

[Z]: Wilcoxon Signed Rank test, [t]: Independent sample t-test, n: Number of participants, SD: Standard Deviation, KINDL (KINDer Lebensqualitätsfragebogen: Children Quality of Life Questionnaire)

Table 4. Comparison of Parents' WHO-QOL-BREF-TR Scores Before and During the Pandemic

		Before pandemic	During pandemic		
	N	**Mean**	**SD**	**Mean**	**SD**
Physical Health	61	68.55 ± 15.75	61.22 ± 16.89	2..53	0.012*
Psychological Health	61	65.84 ± 13.42	64.91 ± 14.02	0.64	0.524
Social Relationships	61	71.27 ± 14.33	69.98 ± 15.45	1.09	0.280
Environment	61	73.51 ± 13.48	72.03 ± 14.01	1.34	0.184
General Health	61	70.15 ± 12.67	68.74 ± 13.52	1.01	0.315

[Z]: Wilcoxon Signed Rank test, [t]: Independent sample t-test, n: Number of participants, SD: Standard Deviation, **WHOQOL-BREF-TR**: World Health Organization Quality of Life - Turkish Version

Table 5. Comparison of HbA1c levels regarding the pandemic

		Before pandemic		During pandemic		t	p
HbA1c (%)	Mean & SD	8.82	1.28	7.92	1.11	6.252	**<0.001**[t]
	Bad (n & %)	27	44.3	8	13.1		
HbA1c Status	Moderate (n & %)	26	42.6	33	54.1		**<0.001**[M]
	Good (n & %)	8	13.1	20	32.8		

[t]: Paired-samples T-test, [M]: Marginal homogeneity test
Poor HbA1C: Defined as HbA1C > 9%., **Moderate HbA1C**: Defined as HbA1C between 7.5% and 9%., **Good HbA1C**: Defined as HbA1C < 7.5%., **HbA1C**: Hemoglobin A1C

Table 6. Correlation between QOL questionnaire results of the patients and their parents

	General Health Status	**Physical Health**	**Psychological Health**	**Social Relationships**	**Environment**	**Overall Score**
Pre-Pandemic KINDL						
Physical Well-Being	0.230	0.115	0.269*	0.185	0.244	0.260*
Emotional Well-Being	0.352**	-0.105	0.230	0.214	0.153	0.230
Self-Esteem	-0.051	0.166	0.350**	0.137	0.013	0.174
Family	0.265*	-0.024	0.193	0.179	0.073	0.169
Friends	0.093	0.063	0.210	0.173	0.280*	0.186
School	0.116	-0.015	0.262*	0.307*	0.011	0.191
General Quality of Life	0.234	0.075	0.416**	0.332**	0.209	0.340**
Disease	0.106	-0.022	-0.084	-0.163	-0.010	-0.059
During Pandemic KINDL						
Physical Well-Being	0.287*	0.124	0.292*	-0.067	0.164	0.185
Emotional Well-Being	0.522**	0.275*	0.328**	0.381**	0.234	0.467**
Self-Esteem	0.121	0.137	0.347**	0.231	0.160	0.267*
Family	0.304*	0.377**	0.307*	0.215	0.157	0.339**
Friends	0.235	0.240	0.272*	0.244	0.315*	0.341**
School	0.194	0.051	0.057	0.045	-0.010	0.075
General Quality of Life	0.515**	0.293*	0.466**	0.334**	0.329**	0.462**
Disease	0.308*	0.209	0.216	0.175	0.217	0.274*

[1]: Pearson coefficients; [2]: Spearman coefficients; *p<0.05; **p<0.001
WHOQOL-BREF-TR: World Health Organization Quality of Life - Turkish Version., **KINDL**: Kinder Lebensqualität Fragebogen, a Quality-of-Life questionnaire for children., **Physical Health**: Refers to the overall physical well-being of Participants, **Psychological Health**: Measures emotional and psychological well-being, **Social Relationships**: Assesses the quality of relationships and social support. **Environment**: Measures satisfaction with one's surroundings, **Overall Score**: Represents a general score summarizing various aspects of quality of life.

DISCUSSION

This study assessed the impact of the COVID-19 pandemic on the QOL of children with T1DM and their parents with a specific focus on the use of insulin infusion pumps. This study contributes to the growing literature on the psychosocial and physiological effects of the pandemic in pediatric populations with chronic diseases. By examining both physical (HbA1c levels) and psychological outcomes (KINDL QOL scores), we provide insight into how the pandemic affected not only the glycemic control of children, but also their emotional well-being and school performance. Most notably, the study found a significant improvement in HbA1c levels during the pandemic alongside a decline in emotional and school-related QOL scores. These findings highlight the complex interaction between medical and psychological factors in managing T1DM during times of crisis and underscore the need for comprehensive care strategies that address both physical and mental health in pediatric populations.

In this study, the pre-pandemic means of the "Emotional health" and "School" sub-dimensions of the KINDL QOL scale were higher than the means during the pandemic period. When WHO QOL - BREF-TR findings of parents were evaluated, a significant difference was found only in the dimension of "physical health." Furthermore, pre-pandemic HbA1c levels were significantly higher than HbA1c levels during the pandemic period. In addition, positive and significant relationships were found between patients' general QOL scores, their caregivers' psychological and social relationships, and general scores in the pre-pandemic period. Finally, positive and significant relationships were found between the general QOL scores of the patients during the pandemic and the general health, physical health, psychological, social relations, environment, and general scores of the parents.

According to a study conducted in Turkey in 2006, 700 thousand children aged 0-19 years had chronic diseases (13). During the COVID-19 pandemic, those with chronic illnesses had to contend with the stress of both the disease and pandemic. A chronic disease is a situation in which the feeling of not being healthy is created. Even the idea of having a chronic illness is a source of unhappiness for children. Various psychopathologies are observed more frequently in children than in the general population (14). DM is a chronic disease that impairs the physical, emotional, and social functions of children and adolescents. Compared to healthy children, children with DM have higher psychosocial stress, lower social activity, and more behavioral disorders (15). In this study, the mean total QOL scores of children with type 1 DM were relatively lower than those reported in similar studies conducted in Turkey. In a study, the total QOL score of children with type 1 DM evaluated by KINDL was 73.9±9.1, while the total QOL score of children in the control group was 81.7±10.2 (16). In another study on the QOL of children with type 1 diabetes, the total QOL score was 77.7 (17). The general QOL score may have decreased because of the acute stress caused by the epidemic. In addition, although the questionnaires were administered face-to-face in previous studies, the fact that they were filled online in this study may have affected this result. We thought that we would encounter difficulties in the management and follow-up of the treatment of patients during the pandemic due to many factors, such as the anxiety of catching the disease, fear of dying or losing a loved one, feelings of isolation and loneliness at home, isolation from social areas such as school and friends, and staying away from physical activity. Surprisingly, there was a noteworthy improvement in HbA1c levels during the pandemic period compared to the pre-pandemic period. Supporting our results, there are publications stating that restrictions of the pandemic do not worsen HbA1c results (18,19). However, studies have also found higher HbA1c levels after quarantine (20). Arslanogu et al. (21) reported that 77.6% of 219 patients had decreased HbA1c levels (mean drop was approximately 9.71%) compared to the former test in the whole group in their study that evaluated HbA1c levels before and after the pandemic in patients with type 1 DM. Restrictive measures implemented because of the COVID-19 pandemic have led families to spend more time at home. This may have helped blood sugar monitoring to be performed better under parental control and to overcome difficulties in school snacks and nutrition. This close follow-up may have positively contributed to the success of treatment. In addition, the medical and psychological support provided by the diabetes team during all hours of the day may have contributed to this positive result. Chronic diseases negatively affect both parents and their children. Having a child with a chronic illness is stressful for parents (22,23). In addition, many problems, including the increasing financial expenses of families, tension caused by the treatment process, and decrease in social activities, contribute to this stress (24). Epidemics such as COVID-19 can cause psychological problems including family communication problems, outbursts of anger, anxiety disorders, depressive behaviors, sleep problems, and somatoform disorders (25–27). In this study, there was a decrease in the emotional health scores of the children during the pandemic. Many reasons may have contributed to this result, such as the fear of catching the disease, the illness of a family member, the worry of losing a loved one, the limitation of physical activity and psychological effects of home isolation, and the economic difficulties experienced by families. Schools were closed during the pandemic and

learning continued on the digital platform. School closure negatively affects students' mental health (28–30). In addition, the school discipline and authority disappeared. Furthermore, reliable internet connection and computer support, suitable physical conditions for homework and lessons, and access to necessary materials were not provided for many children. All of these factors may have led to a decrease in school scores during the pandemic. COVID-19 infection adversely affected QOL in the adult age group (31). The increase in the time spent at home, health concerns, increased stress-related eating disorders, decreased physical activity, and predominance of a sedentary lifestyle have adversely affected the emotional and physical health of people. Consistent with the literature, the physical health scores of parents decreased during the pandemic. In addition, the pandemic has changed people's daily routines and caused the interaction of children and parents to be experienced more intensely. Social restrictions during the pandemic caused children to spend almost all their time at home with their parents, and this situation created the potential for children to be directly affected by the attitudes and behaviors of their parents (32–34). The correlations found between the scores of adults and children in our study support those in the literature.

LIMITATIONS

Some limitations of the study are as follows: First, the research was conducted in a single center. Therefore, it is difficult to generalize our findings. Additionally, the study was conducted during the first few months of the pandemic. Further follow-up could reveal a higher burden, and thus, different results. Finally, all data were collected online, before and after the pandemic.

CONCLUSION

Children with Type 1 DM using insulin infusion pumps may need more support, especially in terms of emotional health and school success, in situations where social life is restricted, such as pandemics. It should be noted that the QOL of parents interacts with the QOL of their children, and thus, they should not neglect their physical health. More detailed studies are needed to clearly reveal the factors affecting the improvement of HbA1c levels during the pandemic.

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