VIA MEDICA
RESEARCH PAPER
ISSN 2450–7458
e-ISSN 2450–8187

Ewa Kobos[1], Alicja Szewczyk[2], Beata Dziedzic[1]
[1]Department of Development of Nursing, Social and Medical Sciences, Faculty of Health Sciences, Medical University of Warsaw, Warsaw, Poland
[2]Children's Memorial Health Institute, Warsaw, Poland

Perceived Loneliness in Children with and without Type 1 Diabetes: A Cross-Sectional Study

ABSTRACT

Objective: To assess perceived loneliness in children with type 1 diabetes (T1D) and children without diabetes.

Material and methods: The study comprised 165 children without and 174 children with type 1 diabetes. Children's Loneliness and Social Dissatisfaction Scale (CLS) was used to assess the sense of loneliness in children aged 10–13 years and Revised UCLA Loneliness Scale (R-UCLA) in children aged 14–17 years. Metric variables for children included: gender, age, place of residence, type of school, frequency of school absences per year, number of annual medical appointments. A χ^2 test was used to compare the study group results. The non-parametric Mann-Whitney U-test was used to assess differences in one variable between the two groups.

Results: In the group of children aged 10–13 years, overall, a slightly higher score was obtained by children without diabetes, compared to children with diabetes (p = 0.387). The R-UCLA scale, also showed a higher mean value in the group of adolescents without diabetes compared to adolescents with diabetes (p = 0.177). Adolescents without diabetes scored significantly higher on the Intimate Others subscale (p = 0.026).

Conclusions: Children with T1D had a similar perception of loneliness to children without diabetes. Clinicians working with children should assess a child's perception of loneliness during appointments. Further research is needed into the perception of loneliness in children and adolescents with and without diabetes, with commonly used measures of loneliness to enable their use in clinical practice as screening tools and to evaluate actions taken. (Clin Diabetol 2023; 12; 6: 345–352)

Keywords: type 1 diabetes, adolescents, children, loneliness

Introduction

Loneliness is often conceptualized as a subjective emotional experience resulting from a discrepancy between the interpersonal relationships we currently have with others and those we wish to have [1]. When it comes to children, this phenomenon has a disturbing aspect, because a child who feels lonely may be at a greater risk of maladaptive effects associated with emotional and social development and a general state of health [2]. Research findings confirm that loneliness in childhood and adolescence is associated with lower school liking, early dropout, anxiety, depression, peer rejection and victimization, lower self-esteem, sleep and cardiovascular disorders, and engaging in unhealthy behaviors [3, 4]. A meta-analysis of data shows that, overall, the rate of loneliness among adolescents aged 12–17 years ranges from 9.2% to 14.4% [5]. Research

Address for correspondence:
Ewa Kobos
Department of Development of Nursing
Social and Medical Sciences
27 Ciołka Street, 01-445 Warsaw
ekobos@wum.edu.pl
Clinical Diabetology 2023, 12; 6: 345–352
DOI: 10.5603/cd.96600
Received: 25.05.2023 Accepted: 28.07.2023
Early publication date: 5.10.2023

also suggests that children and adolescents were particularly vulnerable to loneliness in the COVID-19 pandemic [6, 7]. In a review of studies, loneliness was identified, after anxiety and depression, as one of the most common mental health problems. Children with mental and physical health disorders, were particularly vulnerable to the mental health effects of the COVID-19 pandemic [8].

Children who were dissatisfied with their health more frequently reported that they 'often' felt lonely (28.3%), compared to those who reported greater satisfaction (10%). Adolescents with a long-term illness or disability were significantly less likely to say they 'never or almost never' feel lonely (19.3%), compared to young people without a disability or chronic illness (44.8%) [9]. The results of empirical studies that aimed to assess the perceived loneliness in chronically ill children and adolescents are inconclusive. Some have shown no significant differences in the perceived loneliness, while others have confirmed a greater risk of loneliness in this study population [10–12]. Recent evidence has shown that young adults (16- to 18-year-olds) experience considerable loneliness, and those with a chronic illness (lasting more than twelve months) may be particularly vulnerable to experiencing loneliness [10].

In some diseases, therapy-related responsibilities may limit a child's or adolescent's participation in peer life and they may lead to experiencing loneliness or isolation. Developing strong friendships may be challenging due to symptoms, treatment, physical limitations, lower energy levels, and school absence because of medical appointments or hospitalization [10, 13, 14]. Type 1 diabetes (T1D) requires frequent insulin administration and blood glucose monitoring throughout the day, adjusting insulin treatment to one's diet and physical activity; it also involves hypoglycemic episodes, which may make it difficult for young people to have a social life. This may be particularly intensified among adolescents who hide their disease for fear of rejection and discrimination [11].

The literature review shows that the assessment of loneliness in children and adolescents with T1D has been the subject of only a few studies conducted in the 1990s. A 2017 meta-analysis of research on loneliness in children and adolescents with chronic diseases, (43 studies, only two on children with T1D), emphasized the lack of control groups in these studies [10]. A study on children with insulin-dependent diabetes mellitus (age 11.8 ± 2.3) participating in a therapeutic summer camp found higher self-rated child self-control and self-acceptance to be associated with lower self-perceived loneliness [15]. Niemcryk et al. found no association between glycated hemoglobin values and self-perceived loneliness [16]. No differences in perceived loneliness were found in the analysis of 10-year follow-up data from a cohort of children and adolescents with T1D compared to an age-matched group enrolled following an acute illness, accident or injury [17].

A systematic review of studies addressing loneliness in children and adolescents with chronic physical conditions, some of which included 'healthy' peers as a control group, found an association between the occurrence of chronic conditions and experiencing loneliness [10]. It is currently unclear whether children and adolescents with T1D feel more lonely than their peers without diabetes. The assessment of perceived loneliness is important in the treatment of children and adolescents with chronic conditions, as these feelings may have a negative impact on their psychological well-being, physical functioning, and treatment outcomes.

Aim

To assess perceived loneliness in children with and without diabetes.

Material and methods

Study design

Cross-sectional study.

Participants and procedure

The study was conducted among children and adolescents with and without diabetes who were matched for age and gender. A total of 210 children with diabetes were invited to participate in the study; 28 parents did not consent for the child to participate in the study. The analysis involved 174 correctly completed questionnaires.

In the group of children with T1D, data were collected during the child's follow-up appointment in a specialist diabetes clinic affiliated with a teaching hospital. The inclusion criteria for the study were: written consent from the parent for the child to participate in the study, at least one year's duration of diabetes, the child's age of 10–17 years, absence of other chronic diseases, at least one-month regular school attendance. In the group of children without diabetes, the research data were collected during the child's appointment in one of the two primary health care outpatient clinics to qualify for the COVID-19 vaccination. Inclusion criteria were as follows: written consent from the parent for the child to participate in the study, absence of chronic disease, age 10–17 years, at least one-month school attendance.

The interviewer, after informing the child's parents about the purpose of the study and the research

tool, obtained written parental consent for the child's participation in the study. The interviewer guided the child through the questionnaire and informed him/her how to complete it. Average time taken by the child to complete the questionnaire was approximately 10 minutes.

Data were collected between December 2021 and March 2022.

Research tools

A Polish version of the Children's Loneliness and Social Dissatisfaction Scale (CLS) was used to collect research data in a group of children aged 10–13 years. This scale has sufficiently good psychometric indicators of reliability, Cronbach's being 0.69 (tested in a study on children, mean age 11.47 ± 1.94) [2, 18]. The scale accounts for the cognitive abilities as well as the range of experiences of a child. It addresses behavior and feelings related to loneliness, i.e., perceived loneliness, a perceived lack of social skills, lack of confidence in social situations and a sense of isolation from others. The scale is used to assess perceived loneliness and social dissatisfaction in a broad school setting in children and adolescents over two weeks prior to the study [19]. The CLS scale comprises 24 items: 16 items focus on feelings of loneliness and are rated on a Likert scale from 1 (never true) to 5 (always true), while the remaining 8 items are filler items, relating to hobbies, and are not included in the analysis of the feelings of loneliness. Each answer is assigned a specific number of points (1–5), the points are added up for the overall scale. The maximum score on the scale is 80, the minimum is 16. The scale has good psychometric properties [20]. In this study, the Cronbach's alpha coefficient for the 16-item CLS scale was 0.856, while the mean correlation coefficient between scale items was 0.218. None of the items were deleted.

The Revised UCLA Loneliness Scale (R-UCLA), in a Polish version by Kwiatkowska et al., was used to assess perceived loneliness in a group of adolescents aged 14–17 years. This scale has very good reliability: Total Score = 0.92; Intimate Others = 0.90; Social Others = 0.83; Belonging and Affiliation = 0.80 (tested in a study on adolescents, mean age 15.96 ± 0.23) [21]. This scale allows to show the overall perceived loneliness as well as its three aspects, i.e., lack of close contacts with other people (Intimate Others), unsatisfactory social contacts with other people (Social Others) and a sense of belonging to a social group (Belonging and Affiliation). The R-UCLA scale comprises 20 items. Children are asked to indicate how often they experience certain situations by rating each item on a 4-point Likert-type scale. Each response is assigned a specific number of points, points are added up for questions within the 3 subscales and for the overall scale. The maximum score on the scale is 80, the minimum is 20. The higher the score on the scale, the greater the perceived loneliness [22]. The R-UCLA scale, proved to be a reliable scale in this study. The Cronbach's alpha coefficient was 0.887, the average correlation coefficient between scale items was 0.302. None of the items were deleted.

Statistical analyses

In this paper, tables were used in the descriptive analysis of the results obtained to show size, percentage, and median with the standard deviation. A χ^2 test was used to compare the results of the analyzed groups. A non-parametric Mann-Whitney U Test was used to assess differences in one variable between the two populations (groups). A significance level of $p \leq 0.05$ was established. Calculations were performed using Microsoft Excel spreadsheet and Statistica 10.0.

Ethical approval

The study was approved by the Independent Ethics Committee of the Medical University of Warsaw (registration number: AKBE/175/2020). Informed consent was obtained from all participants. This research study was conducted in accordance with the guidelines of the Declaration of Helsinki.

Results

Study group characteristics

A total of 339 children participated in the study, including 165 children without diabetes and 174 children with T1D, in two age groups: 10–13 years (N = = 186) and 14–17 years (N = 153). The mean age of the children under study was 13.3 ± 2.12, with a standard deviation of more than 15% of the mean value, indicating little age variation between the groups compared. Overall, children aged 10–13 years were slightly more numerous – 54.6%. The largest number of the surveyed children lived in a city — 71.7%, the smallest in rural areas and on the outskirts of large cities — 10.0%. Of the study participants, 84.1% of children attended public schools; 41.3% of children had a very low rate of class absenteeism, while and 24.5% experiences infrequent absences. With regard to gender and age, there were no statistically significant differences between the children with and without T1D. The average annual number of medical appointments amounted to 4.2, with a higher number of appointments in the group of children with T1D (5.7 appointments) compared with the average 2.7 appointments in the group of children without T1D (Tab. 1).

Table 1. Characteristics of Participants (N = 339)

Variables	Children without diabetes (N = 165) N (%)	Children with diabetes (N = 174) N (%)	p
Gender			
Boys	74 (44.8)	88 (50.6)	0.291
Girls	91 (55.2)	86 (49.4)	
Age			
10–13 years	97 (58.8)	88 (50.6)	0.129
14–17 years	68 (41.2)	86 (49.4)	
Place of residence			
Village	23 (13.9)	73 (42.0)	< 0.001*
City	142 (86.1)	101 (58.0)	
Type of school			
Public	127 (77.0)	158 (90.8)	< 0.001*
Integrated school	38 (23.0)	10 (5.7)	
Non-public	0 (0.0)	5 (2.9)	
Non-public integrated	0 (0.0)	1 (0.6)	
Frequency of school absences per year			
Never	24 (14.5)	9 (5.2)	< 0.001*
Hardy ever	85 (51.5)	55 (31.6)	
Rarely	33 (20.0)	50 (28.7)	
Sometimes	18 (10.9)	40 (23.0)	
Often	5 (3.0)	16 (9.2)	
Very often	0 (0.0)	4 (2.3)	
Number of annual medical appointments (mean ± SD)	2.7 ± 3.18	5.7 ± 3.48	< 0.001*

Data presented as % or mean ± SD
*Statistically significant at $p \leq 0.05$; p — statistical significance

Perceived loneliness in children aged 10–13 years

There were higher scores on most items in the CLS scale in the group of children without T1D. A statistically significant difference between the children without T1D and the children with T1D was noted only as regards the results of item 3 of the scale — "I have no one to talk to" ($p = 0.018$). The following items were verging on statistical significance: item 12 — "It is difficult to get other children to like me" ($p = 0.065$) and item 16 — "I get along with other children" ($p = 0.052$). The mean score of items 12 and 16 was higher in children without T1D compared to children with T1D (Suppl. Tab. 1).

The average CLS score in children aged 10–13 years was 27.22 ± 9.46. On average, the children without diabetes scored higher (27.38 ± 8.90), with the average among children with diabetes being 27.03±10.09. There was no statistically significant difference between the groups as regards CLS scale scores (Tab. 2).

Perceived loneliness in children aged 14–17 years

The children without diabetes scored higher on the vast majority of items in the R-UCLA scale. A statistically significant difference between the children without T1D and the children with T1D was recorded only for items: 2 — "I lack companionship" ($p = 0.029$), 13 — "There is no one who really knows me well" ($p = 0.035$) and 18 — "There are people around me, but not with me" ($p = 0.021$) (Suppl. Tab. 2).

The mean score on the R-UCLA scale in children aged 14–17 years was 34.81 points. On average, the children without T1D scored higher, with a mean score of 36.1 points, compared to the mean score of 33.8 points in children with T1D. There was a statistically significant difference between the groups regarding the scores on the Intimate Others subscale (Tab. 3).

Discussion

We found that in both, the younger and the older groups, the children without T1D felt slightly more lonely; however, these differences were not statistically significant. The reduced risk of loneliness in the children with T1D may be related to more attention and support they receive from their parents. One study found families of adolescents with T1D to exhibit notably elevated levels of family cohesion (support), a high degree of

Table 2. Differences in CLS Scale Scores between Children with and without Diabetes (Age 10–13 Years)

Scale	Group	N (%)	M ±SD	p
CLS	Children without diabetes	98 (52.7)	27.38 ± 8.90	0.387
	Children with diabetes	88 (47.3)	27.03 ± 10.09	
	Total	186 (100)	27.22 ± 9.46	

Data presented as mean ± SD or %
M — mean; p — statistical significance; SD — standard deviation

Table 3. Differences in R-UCLA Scores between Children with and without Diabetes (Age 14–17 Years)

Scale	Group	N(%)	M±SD	p
Intimate others	Children without diabetes	67 (43.8)	20.00 ± 6.12	0.026*
	Children with diabetes	86 (56.2)	17.92 ± 5.88	
	Total	153 (100)	18.83 ± 6.05	
Social others	Children without diabetes	67 (43.8)	7.54 ± 2.73	0.824
	Children with diabetes	86 (56.2)	7.31 ± 2.26	
	Total	153 (100)	7.41 ± 2.47	
Belonging and affiliation	Children without diabetes	67 (43.8)	8.57 ± 2.79	0.689
	Children with diabetes	86 (56.2)	8.57 ± 2.77	
	Total	153 (100)	8.57 ± 2.77	
R-UCLA	Children without diabetes	67 (43.8)	36.10 ± 10.35	0.177
	Children with diabetes	86 (56.2)	33.80 ± 9.25	
	Total	153 (100)	34.81 ± 9.78	

Data presented as % or mean ± SD.
*Statistically significant at $p \leq 0.05$; M — mean; p — statistical significance; SD — standard deviation

family organization and responsibility, as well as more moderate control, than families of adolescents without T1D. Adolescents raised in a supportive or cohesive family atmosphere coped better in terms of the externalization and internalization of symptoms. They also had better self-esteem compared to adolescents raised in a controlling or conflicted atmosphere. Families of children with T1D may thus balance the need for control with support [23]. In another study, the authors point to the potential for risky behavior in children suffering from T1D as a result of concurrent psychological issues. Through the manifestation of negative behaviors, young patients conveyed their feelings of loneliness and inner void. This was manifested in the deliberate use of an inappropriate diet and the administration of inappropriate insulin doses [24].

Research has shown that some families are not able to cope with the burden of T1D being diagnosed in their child. Difficulties related to the self-management of the disease may generate further psychosocial problems, especially in adolescents during puberty changes. Adolescence is considered to be the most difficult time period in terms of diabetes self-care due to the physiological and psychosocial changes taking place in the young person. As such, the parents are confronted with major challenges and often do not cope with the new situation themselves. Problems may affect the entire family, including siblings not burdened by the disease, which may lead to emotional disturbances in all family members [25].

In this study, among the adolescents without diabetes, a significantly higher perceived loneliness was found on the Intimate Others subscale. Items in this subscale refer to loneliness, feelings of exclusion, rejection, withdrawal and unsatisfactory social contacts with other people [26]. Intimate loneliness signifies the lack of close, intimate bonding with another person, such as a best friend [27]. Although children and adolescents with chronic conditions may encounter a variety of problems in their peer group, they may still have a close relationship with a friend so that they do not experience intimate loneliness [28]. A study by Stickley et al. found having at least one close friend to be a protective factor against loneliness, while victimization among peers was associated with teen loneliness [29].

A review of studies has demonstrated that in nine studies out of ten, poor peer relationships were associated with loneliness [30]. Relational loneliness is

defined as the perceived lack of a network of social relationships, e.g., a peer group [27]. In this study, the children without diabetes aged 10–13 years were significantly more likely to report a need for social support ("I have no one to talk to"), difficulty being accepted by peers ("It is difficult to get other children to like me"), and lower self-assessment of their own social competence ("I find it difficult to get along with other children"). The findings have demonstrated that self-perceived social competence and the quality and quantity of peer relationships are associated with loneliness in children and that the presence of indirect friendships revealed a statistically significant yet relatively modest connection with children's levels of loneliness [31]. Healthy adolescents in this study were significantly more likely to report that they lacked companionship, that no one really knew them well and that people were around them but not there with them.

It is difficult to relate the results obtained in our study to other studies conducted to date using the CLS/R-UCLA scales and aiming to compare children with T1D and their peers without diabetes, since there were but a few such studies in the 1990s and none of them had a control group. A study on a group of children and adolescents aged 8–18 years, where 32 study participants (matched for gender and age) had T1D and 32 had no diagnosis of a chronic disease (control group), demonstrated a positive correlation between loneliness and victimization. The loneliness subscale scores were not indicated and were not compared with the control group of children with no chronic disease. In this study, the total mean CLS loneliness scale score was 29.9 ± 14 [32]. The results align with the those of a study comparing the psychological adaptation of children with short stature and adolescents with T1D (8–19 years), where adolescents with T1D scored 29.14 ± 13.21, which is slightly higher than in our study [32, 33]. As reported in the literature, young adults (16–24 years) are more likely to report increased feelings of loneliness [13]. This study involved a larger group of sick children, the assessment of loneliness was performed in younger children, and the age range of children assessed on the CLS scale was smaller. In a study conducted in the Netherlands in a group of 1,594 healthy children (age 9.43 years), the mean CLS scale score (on a scale of 1 to 5) was 1.86 ± 0.59. The authors of the study did not indicate an overall score for the perception of loneliness along the minimum and maximum scores possible on a scale of 16–80 [34]. In contrast, in a study conducted on healthy children from rural areas, mean values for girls were 28.83 ± 9.09 and for boys 29.40 ± ± 9.37 [35]. Significantly more children with T1D living in rural areas and outskirts of cities participated in this study compared to children without diabetes. As shown in one pre-pandemic study, of children aged 10 to 15 years, just over 5% of those living in either towns or rural areas reported feeling lonely 'often' compared to 19.5% of those living in cities [36].

In a study assessing, among other things, feelings of loneliness in 48 T1D patients aged 17.5–25 years (no control group), the overall average UCLA score was 36.50 ± 11.36, which was higher than in the same study but in a group of T1D adolescents aged 14–17 years (33.80 ± 9.25), and at a corresponding level (36.1 ± ± 10.35) in the group of adolescents without diabetes [16]. Perceived loneliness was at a comparable level in a group of 500 adolescents aged 15–18 years (41.99 ± ± 8.62) in a study by Erden et al. and in a group of male (41.49 ± 10.17) and female (38.74 ± 9.84) Turkish high school adolescents (N = 394) in a study by Sahin et al. [37, 38]. Young people's self-perceived loneliness in these studies was higher than in our own study in adolescents without and with T1D. Within a group of Belgian adolescents (aged 12.36 ± 0.63) where perceived loneliness scores were compared using several scales, the study participants scored 26.94 ± 9.85 in the CLS scale and 36.15±10.90 in the UCLA scale. In this study, in the group of children without diabetes, scores on the CLS scale and the UCLA scale were similar compared to those of Maes et al. In the Maes et al. study, the perception of loneliness in adolescents was higher compared to children with T1D participating in the study [27].

Our study was conducted in the COVID-19 pandemic, at a time when children in Poland had already returned to face-to-face schooling. Nevertheless, it should be noted that previous prolonged periods of physical and social isolation due to the pandemic may have played a role in the assessment of perceived loneliness in the children with T1D and their peers. The research data provide evidence that school closure during the COVID-19 pandemic had a negative impact on experiencing loneliness by children and adolescents [39].

A better understanding of the social functioning of children and adolescents with chronic diseases such as T1D, as well as their peers without diabetes, is an area that deserves to be addressed. Providing support to foster their social relations, may make a difference to their health and well-being [11]. It is important not to overlook the social aspect in the care of the child with T1D. Further research in this area would seem reasonable so as to estimate the prevalence of the feelings of loneliness in a representative sample of children and adolescents with diabetes as a psychosocial factor that may be of importance in the metabolic control of diabetes, and in identifying risk factors for loneliness in this group of children and adolescents.

Conclusions

Children with T1D exhibited a comparable level of loneliness perception to children without diabetes. Adolescents without diabetes scored significantly higher in the Intimate Others subscale. Clinicians working with children should assess a child's perception of loneliness during appointments. Further research is needed into the perception of loneliness in children and adolescents with and without diabetes, with commonly used measures of loneliness to enable their use in clinical practice as screening tools and to evaluate actions taken.

Limitations

Our study has some limitations. It was single-center study, conducted with a small sample group of children with diabetes. The results of this study provide information about the immediate post-lockdown period and may not be generalized to a wider population. Another limitation of this study is that it did not verify family socioeconomic status or family cohesion which may be one of the factors affecting the perception of loneliness. The place of residence was significantly different between the groups. In this study, we did not assess children psychologically or their psychological well-being, and this factor may affect the perception of loneliness.

Article information

Supplementary materials

The Supplementary materials for this article can be found at https://journals.viamedica.pl/clinical_diabetology/article/view/96600

Data availability statement

Data will be available upon reasonable request from the corresponding author.

Ethics statement

The study was approved by the Independent Ethics Committee of the Medical University of Warsaw (registration number: AKBE/175/2020). Informed consent was obtained from all participants. This research study was conducted in accordance with the guidelines of the Declaration of Helsinki.

Author contributions

EK conceived the concept of the study, obtained funding, and wrote the first draft of the study. AS helped with patient recruitment, acquisition of data. EK and BD analyzed the data. All authors reviewed and edited the manuscript and approved for the submission.

Funding

No funding was secured for this study.

Conflicts of interest

The authors declare that there is no conflict of interest.

REFERENCES

1. Cacioppo JT, Hawkley LC. Loneliness. In: Leary MR, Hoyle RH. ed. Handbook of Individual Differences in Social Behavior. The Guilford Press, New York 2009: 227–240.
2. Oleś M. Psychological characteristics of children with low and high feelings of loneliness. Roczniki Psychologiczne. 2006; 9(1): 121–140.
3. Matthews T, Danese A, Caspi A, et al. Lonely young adults in modern Britain: findings from an epidemiological cohort study. Psychol Med. 2019; 49(2): 268–277, doi: 10.1017/S0033291718000788, indexed in Pubmed: 29684289.
4. Heinrich LM, Gullone E. The clinical significance of loneliness: a literature review. Clin Psychol Rev. 2006; 26(6): 695–718, doi: 10.1016/j.cpr.2006.04.002, indexed in Pubmed: 16952717.
5. Surkalim DL, Luo M, Eres R, et al. The prevalence of loneliness across 113 countries: systematic review and meta-analysis. BMJ. 2022; 376: e067068, doi: 10.1136/bmj-2021-067068, indexed in Pubmed: 35140066.
6. Houghton S, Kyron M, Hunter SC, et al. Adolescents' longitudinal trajectories of mental health and loneliness: The impact of COVID-19 school closures. J Adolesc. 2022; 94(2): 191–205, doi: 10.1002/jad.12017, indexed in Pubmed: 35353417.
7. Farrell AH, Vitoroulis I, Eriksson M, et al. Loneliness and Well-Being in Children and Adolescents during the COVID-19 Pandemic: A Systematic Review. Children (Basel). 2023; 10(2), doi: 10.3390/children10020279, indexed in Pubmed: 36832408.
8. Theberath M, Bauer D, Chen W, et al. Effects of COVID-19 pandemic on mental health of children and adolescents: A systematic review of survey studies. SAGE Open Med. 2022; 10: 20503121221086712, doi: 10.1177/20503121221086712, indexed in Pubmed: 35371484.
9. ONS. Office for National Statistics. Loneliness – What Characteristics and Circumstances are Associated with Feeling Lonely? London 2018, England: Office for National Statistics website. https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/lonelinesswhatcharacteristicsandcircumstancesareassociatedwithfeelinglonely/2018-04-10/pdf (10.07.2023).
10. Maes M, Van den Noortgate W, Fustolo-Gunnink SF, et al. Loneliness in Children and Adolescents With Chronic Physical Conditions: A Meta-Analysis. J Pediatr Psychol. 2017; 42(6): 622–635, doi: 10.1093/jpepsy/jsx046, indexed in Pubmed: 28340072.
11. Carter B, Qualter P, Dix J. Social relationships, loneliness and adolescence: The potential for disruption by chronic illness. J Child Health Care. 2015; 19(4): 421–422, doi: 10.1177/1367493515618477, indexed in Pubmed: 26715397.
12. Shute RH, Walsh C. Adolescents with chronic illnesses: school absenteeism, perceived peer aggression, and loneliness. ScientificWorldJournal. 2005; 5: 535–544, doi: 10.1100/tsw.2005.68, indexed in Pubmed: 16075150.
13. McGlone M, Long E. Are young adults with long-standing illness or disability at increased risk of loneliness? Evidence from the UK Longitudinal Household Study. J Public Health Res. 2020; 9(4): 1861, doi: 10.4081/jphr.2020.1861, indexed in Pubmed: 33409244.
14. Bailey PK, Hamilton AJ, Clissold RL, et al. Young adults' perspectives on living with kidney failure: a systematic review and thematic synthesis of qualitative studies. BMJ Open. 2018; 8(1): e019926, doi: 10.1136/bmjopen-2017-019926, indexed in Pubmed: 29326196.
15. Kager VA, Holden EW. Preliminary investigation of the direct and moderating effects of family and individual variables on the adjustment of children and adolescents with diabetes. J Pediatr

Psychol. 1992; 17(4): 491–502, doi: 10.1093/jpepsy/17.4.491, indexed in Pubmed: 1527682.
16. Niemcryk SJ, Speers MA, Travis LB, et al. Psychosocial correlates of hemoglobin Alc in young adults with type I diabetes. J Psychosom Res. 1990; 34(6): 617–627, doi: 10.1016/0022-3999(90)90105-d, indexed in Pubmed: 2290134.
17. Jacobson AM, Hauser ST, Cole C, et al. Social relationships among young adults with insulin-dependent diabetes mellitus: ten-year follow-up of an onset cohort. Diabet Med. 1997; 14(1): 73–79, doi: 10.1002/(SICI)1096-9136(199701)14:1<73::AID-DIA294>3.0.CO;2-Q, indexed in Pubmed: 9017357.
18. Oleś M. Measuring loneliness in children - The Children's Loneliness Scale (LSC) by S.R. Asher, S. Hymel, and P.D. Renshaw. In: Oleś M. ed. Selected issues in clinical and personality psychology. Diagnostic methods in the study of children and adolescents. Scientific Society of the Catholic University of Lublin, Lublin 2005: 63–79.
19. Asher S, Hymel S, Renshaw P. Loneliness in Children. Child Development. 1984; 55(4): 1456, doi: 10.2307/1130015.
20. Asher SR, Wheeler VA. Children's loneliness: a comparison of rejected and neglected peer status. J Consult Clin Psychol. 1985; 53(4): 500–505, doi: 10.1037//0022-006x.53.4.500, indexed in Pubmed: 4031205.
21. Kwiatkowska M, Rogoza R, Kwiatkowska K. Analysis of the psychometric properties of the Revised UCLA Loneliness Scale in a Polish adolescent sample. Current Issues in Personality Psychology. 2017; 6(2): 164–170, doi: 10.5114/cipp.2017.69681.
22. Russell D, Peplau LA, Cutrona CE. The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. J Pers Soc Psychol. 1980; 39(3): 472–480, doi: 10.1037//0022-3514.39.3.472, indexed in Pubmed: 7431205.
23. Missotten L, Luyckx K, Seiffge-Krenke I. Family Climate of Adolescents with and Without Type 1 Diabetes: Longitudinal Associations with Psychosocial Adaptation. Journal of Child and Family Studies. 2012; 22(3): 344–354, doi: 10.1007/s10826-012-9585-1.
24. Hacia S, Cichoń L, Nowak M, et al. [Autoaggressive behaviour with patients suffering from type 1 diabetes treated at the Clinic for Psychiatry and Psychotherapy Developmental Age--description of cases]. Psychiatr Pol. 2013; 47(5): 887–896, indexed in Pubmed: 25011234.
25. Henríquez-Tejo R, Cartes-Velásquez R. [Psychosocial impact of type 1 diabetes mellitus in children, adolescents and their families. Literature review]. Rev Chil Pediatr. 2018; 89(3): 391–398, doi: 10.4067/S0370-41062018005000507, indexed in Pubmed: 29999147.
26. Austin BA. Factorial structure of the UCLA Loneliness Scale. Psychol Rep. 1983; 53(3 Pt 1): 883–889, doi: 10.2466/pr0.1983.53.3.883, indexed in Pubmed: 6657840.
27. Maes M, Vanhalst J, Noortgate WV, et al. Intimate and Relational Loneliness in Adolescence. Journal of Child and Family Studies. 2017; 26(8): 2059–2069, doi: 10.1007/s10826-017-0722-8.
28. Andrade CJ, Alves Cd. Relationship between bullying and type 1 diabetes mellitus in children and adolescents: a systematic review. J Pediatr (Rio J). 2019; 95(5): 509–518, doi: 10.1016/j.jped.2018.10.003, indexed in Pubmed: 30391140.
29. Stickley A, Koyanagi Ai, Koposov R, et al. Loneliness and its association with psychological and somatic health problems among Czech, Russian and U.S. adolescents. BMC Psychiatry. 2016; 16: 128, doi: 10.1186/s12888-016-0829-2, indexed in Pubmed: 27146137.
30. Alsarrani A, Hunter RF, Dunne L, et al. Association between friendship quality and subjective wellbeing among adolescents: a systematic review. BMC Public Health. 2022; 22(1): 2420, doi: 10.1186/s12889-022-14776-4, indexed in Pubmed: 36564745.
31. Zhang F, You Z, Fan C, et al. Friendship quality, social preference, proximity prestige, and self-perceived social competence: interactive influences on children's loneliness. J Sch Psychol. 2014; 52(5): 511–526, doi: 10.1016/j.jsp.2014.06.001, indexed in Pubmed: 25267172.
32. Storch EA, Lewin A, Silverstein JH, et al. Peer victimization and psychosocial adjustment in children with type 1 diabetes. Clin Pediatr (Phila). 2004; 43(5): 467–471, doi: 10.1177/000992280404300508, indexed in Pubmed: 15208752.
33. Storch EA, Lewin AB, Silverstein JH, et al. Psychological adjustment of children with short stature: a comparison of clinic-referred children with short stature and type 1 diabetes mellitus. J Pediatr Endocrinol Metab. 2005; 18(4): 395–401, doi: 10.1515/jpem.2005.18.4.395, indexed in Pubmed: 15844474.
34. Geukens F, Maes M, Cillessen AHN, et al. Spotting Loneliness at School: Associations between Self-Reports and Teacher and Peer Nominations. Int J Environ Res Public Health. 2021; 18(3), doi: 10.3390/ijerph18030971, indexed in Pubmed: 33499304.
35. Xu J, Chen P. The rural children's loneliness and depression in Henan, China: the mediation effect of self-concept. Soc Psychiatry Psychiatr Epidemiol. 2019; 54(9): 1101–1109, doi: 10.1007/s00127-018-1636-5, indexed in Pubmed: 30467588.
36. ONS. Office for National Statistics. Children's and young people's experiences of loneliness: 2018 Analysis of children's and young people's views, experiences and suggestions to overcome loneliness, using in-depth interviews, the Community Life Survey 2016 to 2017 and Good Childhood Index Survey, 2018. https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/childrensandyoungpeoplesexperiencesofloneliness/2018 (10.07.2023).
37. Erdem E, Sezer Efe Y. The smartphone addiction, peer relationships and loneliness in adolescents. Encephale. 2022; 48(5): 490–495, doi: 10.1016/j.encep.2021.06.009, indexed in Pubmed: 34627619.
38. Sahin U, Adana F. Problem solving, loneliness, depression levels and associated factors in high school adolescents. Pak J Med Sci. 2016; 32(5): 1273–1278, doi: 10.12669/pjms.325.10656, indexed in Pubmed: 27882035.
39. Saulle R, De Sario M, Bena A, et al. School closures and mental health, wellbeing and health behaviours among children and adolescents during the second COVID-19 wave: a systematic review of the literature. Epidemiol Prev. 2022; 46(5-6): 333–352, doi: 10.19191/EP22.5-6.A542.089, indexed in Pubmed: 36384255.