Research

Self-Perceived Health Status and Sense of Coherence in Children With Type 1 Diabetes in the West Bank, Palestine

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Abstract

Introduction: Self-perceived health status and sense of coherence (SOC) are essential constructs for capturing health outcomes in children with type 1 diabetes (T1D). This study measured self-perceived health status and SOC in children with T1D and compared them with a healthy reference group in West Bank, Palestine. **Methodology:** One hundred children with T1D aged 8 to 18 years and 300 healthy children completed PedsQL 4.0 Generic Core Scales and SOC-13 in a cross-sectional descriptive study. **Results:** All children reported acceptable self-perceived health status and low degree of SOC. In the diabetes group, high degree of SOC was associated with better self-perceived health status and more optimal metabolic control. Males in the diabetes group reported higher self-perceived health status than females. **Discussion:** The unstable political situation in Palestine may threaten SOC in children in general. Health professionals can monitor self-perceived health status and SOC to evaluate interventions aiming to improve glycemic control.

Introduction

In recent years, there has been an increased focus on well-being, daily life experiences, health status, and psychosocial factors as essential constructs for capturing health outcomes in children, including children with chronic diseases such as type 1 diabetes (T1D; Corathers, Mara, Chundi, & Kichler, 2017; Smith, Cheater, & Bekker, 2015). T1D is one of the most common endocrine and chronic diseases in childhood (Craig et al., 2014; Krzewska & Ben-Skowronek, 2016). Each year, nearly 86,000 children around the world develop T1D (International Diabetes Federation, 2015). During 2014, in the West Bank in Palestine, 144 persons between the ages of 5 and 25 years were diagnosed with T1D (Palestinian Health Information Center, 2015).

The primary goal of diabetes management is to maintain good health, with an adequate metabolic control and an acceptable quality of life (QoL). Diabetes management is complex and demanding, involving blood glucose monitoring, physical exercise, dietary planning, and frequent insulin injections (Chiang et al., 2018; Nabors & Bartz, 2013; Smart, Annan, Bruno, Higgins, & Acerini, 2014). Adhering to these activities together with the psychosocial consequences and long-term complications of the disease can lead to stressful and challenging experiences that can influence self-perceived health status, QoL, and daily life in children with T1D (Kalyva, Abdul-Rasoul, Kehl, Barkai, & Lukács, 2016).

Most of the studies about psychosocial aspects and outcome in children with T1D have been conducted in Western countries where sociocultural/political context, family dynamics, and health care systems are different than those in West Bank, Palestine. Living under challenging sociocultural norms and unstable political conditions may affect people's health (Eriksson & Lindström, 2007). It is likely that these factors have an impact on health status and psychosocial aspects. Social values, norms, and religion shape the Arab society where they are distinctly seen influencing the structure and practices of the society. In Arab Muslim societies, family is recognized to be the main unit of society and is considered the main social security system for the individual (Arabiat, Al Jabery, Abdelkader, & Mahadeen, 2013). A family's structure is traditional and patriarchal and thus, men are expected to be the head of the household, responsible for family finances and decision making (Alam, 2015; Joseph, 2010). Women's traditional roles are to be the primary caregivers of children,

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while also maintaining the household. The religious beliefs of Muslims have a powerful influence on their well-being and attitude in striving to be in good health (Attum & Shamoon, 2018). Previous studies suggested that the sociocultural and religious beliefs can influence how people perceive their illness (Arabiat et al., 2013; Elissa, Bratt, Axelsson, Khatib, & Sparud-Lundin, 2017; Elissa, Sparud-Lundin, Axelsson, Khatib, & Bratt, 2018). For example, social and cultural factors such as stigma impact the daily life of Arab children with T1D (Elissa et al., 2017). Stigma can have negative outcomes on young persons with T1D, such as impaired psychosocial well-being and avoiding self-care activities, with an effect on physical health (Brazeau et al., 2018; Elissa et al, 2017). In addition, political and unstable conditions in West Bank play a significant role in all aspects of Palestinians' lives: they restrict their movement, limit their access to education and health care facilities, disrupt daily life, create barriers that prevent them from achieving well-being, and affect their QoL (Giacaman et al., 2009; Keelan, 2016; Spellings, 2014). These political situations deteriorate the patients' health, and compromise the quality of Palestinian health care systems and health services. When the required medical services are unavailable in the West Bank, the Palestinian Ministry of Health transfers patients to Israel, East Jerusalem, Jordan, and Egypt. To enter Jerusalem and Israel, Palestinian patients and their families have to apply for special permits from the Israeli authorities, and the process of obtaining a permit is often complicated and difficult (World Health Organization, 2016). If no one from the family is granted permission, children are consequently denied access to proper care.

An important concept in relation to health and well-being is sense of coherence (SOC), which serves as a facilitator, moving people toward optimal outcomes in challenging conditions. SOC concentrates on an individual's resources and abilities to maintain health and well-being (Antonovsky, 1979), and moderates the health impact of social stressors (Eriksson & Lindström, 2007). For children with T1D in the West Bank, Palestine, SOC can be a key factor that mediates the effect of social and political conditions on their well-being and adjustment. Therefore, SOC can be assumed to have a vital role in coping with diabetes, and measuring the level of SOC might determine how children with T1D find their daily life comprehensible, manageable, and meaningful in the specific context of the West Bank, Palestine.

The aims of this study were (1) to measure self-perceived health status and SOC in children with T1D; (2) to compare these children with a healthy reference group in the West Bank, Palestine; and (3) to examine potential correlates between sociodemographic and medical characteristics.

Method

Study Design

This is an explorative cross-sectional study carried out between January 2016 and April 2017 in the West Bank, Palestine.

Sample and Setting

Study Group. A convenience sample of 100 children and adolescents was selected from two diabetes clinics and two diabetes societies that cover cities, villages, and camps in the south, north, and center of the West Bank. Patients were eligible if they were 8 to 18 years of age and had a diagnosis of T1D with duration of greater than 6 months. The exclusion criterion was the presence of additional chronic diseases or intellectual impairments.

Reference Group. A reference group consisting of 300 healthy children in the ages 8 to 18 years was recruited from six primary and middle, secondary schools from the north, south, and center of the West Bank. Children with any chronic disease and/or intellectual impairments were excluded.

Data Collection

As part of the recruitment procedure, letters including study information were sent to four diabetes clinics, diabetes societies, and six primary, middle, and secondary schools in the West Bank asking for their agreement to recruit children with T1D to take part in the study. After agreement of the heads of the diabetes clinics and diabetes societies, nurses in the diabetes clinics and staff in the diabetes societies were informed and provided with instructions about the study and questionnaire. Participants were recruited by nurses who were working in the diabetes clinics when children attended regular diabetes checkups. The nurses informed the children and their parents about the study and asked if they were willing to participate in the study. The children filled out self-reported questionnaires independently in a separate room at the outpatient clinic. Additionally, the diabetes societies had access to names and addresses of children with T1D. Participants were approached by staff from the diabetes societies by phone and informed about nature of the study. After their agreement to take part in the study, they completed the questionnaire at home under the supervision of the first author. Parents who agreed to their child's participation signed a consent form and children gave their assent.

For the reference group, school administrators were approached by the first author, and when approval for the study had been granted, heads of the schools contacted parents; the parents who agreed to their children's participation signed a consent form and children gave their assent. Children and adolescents in the reference group completed the questionnaire in the classroom under the supervision of the first author.

Measurements

Sociodemographic factors were retrieved via a sociodemographic questionnaire that encompassed questions about age, sex, and place of residence. Medical information, retrieved from patients' records, included duration of diabetes, mode

of insulin administration, and the most recent HbA1c level. According to the consensus guidelines of the International Society for Pediatric and Adolescent Diabetes, glycemic control was categorized according to three ranges of HbA1c (Diabetes Control and Complications Trial/International Federation of Clinical Chemistry standardization of HbA1c): optimal (<7.5% or 58 mmol/mol), suboptimal (7.5% to 9.0% or 58-75 mmol/mol), and high risk of metabolic complications (>9% or 75 mmol/mol; Rewers et al., 2009).

Self-perceived health status was assessed using age-appropriate versions of Arabic Pediatric Quality of Life Inventory 4.0 (PedsQL 4.0), Generic Core Scales (GCS). This instrument is applicable for healthy and chronically ill pediatric populations. The Arabic version showed sufficient reliability and validity for research purposes in public health settings for children aged 2 to 18 years (Arabiat, Elliott, Draper, & Al Jabery, 2011). PedsQL 4.0 GCS has been validated in a variety of conditions such as asthma, cancer, heart disease, rheumatology, and diabetes (Varni, Limbers, & Burwinkle, 2007). The instrument has 23 items on a 5-point Likert-type scale ranging between 0 and 4, where 0 represents *never a problem* and 4 represents *almost always a problem*. The PedsQL 4.0 scales are designed to provide a summary score in two dimensions: the Physical Health Summary Score (the Physical Functioning subscale) and the Psychosocial Health Summary Score (Emotional, Social, and School Functioning subscale; Arabiat & Al Jabery, 2013). Items are reverse scored and linearly transformed to a 0 to 100 scale (0 = 100, 1 = 75, 2 = 50, 3 = 25, 4 = 0), such that higher scores indicate better self-perceived health. The total score of a scale is the sum of all the items divided by the number of items answered on all the scales. The concept of health-related quality of life (HRQoL) is a subject of debate and there is no agreement on the definition. Some researchers have defined HRQoL as multidimensional, representing the patient's general perception of the impact of the illness and treatment on physical, psychological, and social functioning (Revicki, Kleinman, & Cella, 2014). Megari (2013) defined HRQoL in people with chronic illness as subjective, multidimensional, and dynamic. Moons, Budts, and De Geest (2006) argued that the concept of HRQoL is used frequently by researchers when they are actually referring to the self-perceived health of the patients. In addition, many HRQoL instruments are actually measuring self-perceived health status or self-reported health rather than HRQoL (Karimi & Brazier, 2016). Accordingly, in this study, PedsQL 4.0 GCS was used to assess self-perceived health (Karimi & Brazier, 2016; Moons et al., 2006).

Sense of coherence was assessed in the adolescents only (age range 13-18 years, T1D group *n* = 49, reference group *n* = 150), with the Arabic version of the questionnaire SOC-13. Children younger than 13 years were excluded because SOC scale is not developed or tested on children below that age range. The SOC scale is considered a reliable, valid, and cross-culturally applicable instrument (Eriksson & Lindström, 2005). This instrument consists of 13 items divided into three elements (subscales). The subscales are (1) Comprehensibility, which refers to the extent to which a person sees internal and external stimuli as consistent, structured, clear, and predictable (five items); (2) Manageability, which is the extent to which one perceives that one's resources are sufficient to meet life's demands (four items); and (3) Meaningfulness, measuring to what extent a person views life's demands and challenges as worthy of commitment and dedication (four items). Each item is scored on a 7-point Likert-type scale and the total score can range from 13 to 91. A high score indicates that the person has a high SOC. Proposed cutoff points for categorizing low, moderate, and high scores are ≤60, 61 to 75, and ≥76, respectively (Mendel, Bergenius, & Langius, 2001).

Data Analysis

Statistical analyses were performed by using SPSS for Windows, version 24. Frequencies, percentages, mean scores, and standard deviation were used to describe participants' characteristics. Unpaired two-group analysis for nominal data such as sex, place of residency was analyzed using chi-square tests. Clinical characteristics, such as diabetes duration, mode of insulin administration, and HbA1C level were performed using the chi-square test.

The Mann–Whitney *U* test was employed to compare age, self-perceived health status, and SOC among children with T1D and the reference group. Spearman's rank correlation coefficient test was used to assess relationship between self-perceived health status/SOC and age, sex, place of residency, and clinical characteristics such as diabetes duration, mode of insulin administration, and HbA1C. For all analyses, *p* value of ≤.05 was considered to provide statistical significance.

Ethical Considerations

This study was performed in accordance with the Declaration of Helsinki (World Medical Association, 2013). The Ethical Committee at Al-Quds University approved the study. Parents gave written informed consent and children gave their assent. Participants were informed that their participation was voluntary and all information would be treated confidentially.

Results

Characteristics of Study Group and Reference Group

The mean age for the study group was 12.5 years (*SD* = 2.7) and for the reference group 12.7 years (*SD* = 2.6). Sex was equally distributed in both groups. The mean diabetes duration was 5.6 years (*SD* = 3.0). Insulin was administered through multiple daily injections in 88.8% of the children; the remaining children used insulin pumps. The mean HbA1c was 8.8% (*SD* = 1.6) and 17% of patients had an average

Table 1. Demographic and Clinical Characteristic of the Study and Reference Group.

	Study group ($n = 100$)	Reference group ($n = 300$)	p
Age, mean years (*SD*)	12.5 (2.7)	12.7 (2.6)	.538
Sex (%)			
Female	46 (46)	147 (49)	.584
Residency (%)			
City	50 (50.5)	184 (61.3)	.147
Village	31 (31.3)	70 (23.3)	
Camp[a]	18 (18.2)	45 (15)	
Insulin administration (%)			
Injection	87 (88.8)		
Pump	11 (11.2)		
Diabetes duration, mean years (*SD*)	5.6 (3.0)		
HbA1c (DCCT, %)	8.8 (1.6)		
Glycaemic control (HbA1c, DCCT, %)			
High risk (>9%)	41 (41.4)		
Suboptimal (7.5% to 9%)	41 (41.4)		
Optimal (<7.5%)	17 (17.2)		

Note. HbA1c = glycated hemoglobin; DCCT = Diabetes Control and Complication Trial research group.
[a]Camp refers to any locality referred to as a refugee camp and administered by the United Nations Refugees and Work Agency in the Near East.

Table 2. Self-Perceived Health (PedsQL) and Sense of Coherence (SOC): Comparisons Between the Study Group and the Reference Group.

	Study group, *M* (*SD*)	Reference group, *M* (*SD*)	p
PedsQL	$n = 100$	$n = 300$	
Emotional	71.3 (20.6)	71.4 (19.2)	.884
Social	85.1 (18.2)	86.1 (16.7)	.923
School	79.0 (17.9)	78.5 (15.6)	.642
Psychosocial	78.5 (15.6)	79.1 (13.5)	.967
Physical	82.7 (17.3)	83.0 (14.2)	.588
Total score	80.0 (15.3)	80.4 (12.6)	.791
SOC	$n = 49$	$n = 150$	
Meaningfulness (4-28)	18.9 (6)	18.4 (5.3)	.505
Manageability (4-28)	18.4 (6.3)	17.6 (5.0)	.295
Comprehensibility (5-35)	20.8 (7.5)	19.2 (5.4)	.191
Total score	58.0 (16.1)	55.1 (12.1)	.145

Note. PedsQL = Pediatric Quality of Life Inventory 4.0, Generic Core Scales; SOC = SOC-13 scale. *Psychosocial* represents the sum of the items in the *Emotional, Social*, and *School Functioning* scales divided by the number of items answered.

HbA1c in the "optimal control" range, 41.4% in the "suboptimal control" range, and 41.4% in the "high risk of metabolic complications" range, for more information, see Table 1.

Self-Perceived Health and SOC

The mean PedsQoL score was 80.0 (*SD* = 15.3) in study group and 80.4 (*SD* = 12.6) in the reference group. The mean SOC score was 58 (*SD* = 16.1) in the study group and 55.1 (*SD* = 12.1) in the reference group, which places both groups in the low SOC category (scores below 61). No differences were found in self-perceived health status (PedsQL) or SOC between study group and the reference group (see

Table 2). Males in the study group reported higher self-perceived health status than females, *M* = 84.0 (*SD* = 11.44) versus 75.21 (*SD* = 17.86), *p* = .008, on the generic scale. No significant differences were found between males and females in the reference group.

Association Between Self-Perceived Health Status, Sense of Coherence, and Medical Characteristics in the Study Group

A positive correlation was found between self-perceived health status and SOC, where higher self-perceived health status was associated with higher SOC (*p* < .001), see Table 3. A

Table 3. Correlation Between Sociodemographic and Medical Characteristics, Self-Perceived Health Status (PedsQL) and Sense of Coherence (SOC) in Children and Adolescents With T1D.

	PedsQL, n = 100		SOC-13, n = 49	
Correlates	r	p	r	p
Age	.008	.935	−.058	.694
Sex (gender)	−.266	.008	.271	.059
Residency	−.214	.034	−.168	.268
Diabetes duration	−.041	.691	−.150	.325
Insulin administration	−.023	.819	−.005	.971
HbA1c	−.300	.003	−.360	.012

Note. PedsQL = Pediatric Quality of Life Inventory 4.0, Generic Core Scales; T1D = type 1 diabetes. Correlations with $p \leq .05$ were considered significant. All correlations were calculated on the total score for each instrument.

negative correlation was found between self-perceived health status and HbA1c ($p = .003$), where higher self-perceived health status was associated with a lower HbA1c (better glycemic control).

A negative correlation was also found between SOC and HbA1c ($p = .012$), where higher SOC was associated with a lower HbA1c (see Table 3).

Discussion

This study explored self-perceived health status and SOC in children and adolescents with T1D and compared the results with a reference group in the West Bank, Palestine. In view of the paucity of published findings on self-perceived health status and SOC among Palestinian and Arab children with T1D, the current study extends current knowledge. Our findings revealed no differences in self-perceived health status or SOC between the study group and the reference group. This is in line with a previous study of Turkish children and adolescents with T1D and healthy controls which also used PedsQL 4.0 GCS and found no significant difference in total scores for PedsQL between children with T1D and controls (Caferoğlu, İnanç, Hatipoğlu, & Kurtoğlu, 2016). The authors attributed this finding to the fact that children with T1D have adapted to living with a chronic disease, because of continually living with T1D for at least a year. Similarly, Emmanouilidou, Galli-Tsinopoulou, Karavatos, and Nousia-Arvanitakis (2008) reported comparable PedsQL scores among Greek children with T1D and their healthy peers. The authors explained this finding with access to good medical, educational, and social services, and to the supportive role of the Greek family in taking care of affected family members.

In contrast, in Kuwait, Abdul-Rasoul, AlOtaibi, Abdulla, Rahme, and AlShawaf (2013) used PedsQL 4.0 GCS and reported significant lower scores in children with T1D compared with a reference group. The authors attributed this finding to the impact of T1D on children and to the

associated lack of autonomy and preoccupation with chronic complications. In addition, in Jordan, Arabiat and Al Jabery (2013) found that children with chronic illnesses reported lower PedsQL scores than healthy controls, with an even lower mean for children with T1D. However, the lower scores in that study could be due to the small sample, with only 10 children with T1D, and the heterogeneity of illness categories making it difficult to compare with our findings. A systematic review by Nieuwesteeg et al. (2012) found that QoL was similar among children with T1D and healthy peers. The authors attributed this finding to the current advances in diabetes treatment regimen that might have led to decreased reports of depression among children with T1D by time. However, disease-specific psychosocial aspects, such as the negative impact of diabetes on daily functioning, diabetes-specific worries, changed health perceptions, and less satisfaction with life, were prevalent in patients with T1D (Nieuwesteeg et al., 2012).

Furthermore, the present study showed a significant correlation between sex and self-perceived health status favoring males with T1D. This is congruent with a study conducted in Jordan among adolescents with T1D, in which females reported worse overall QoL than males (Al-Akour, Khader, & Shatnawi, 2010). Similarly, a recent study in Saudi Arabia (Al-Hayek et al., 2014) reported lower HRQoL in female adolescents with T1D than in males. The lower level of HRQoL in females was attributed to the culture, as males have easier access to medical treatment than females in Saudi Arabia. Social and cultural factors in Arab countries including Palestine make it difficult for young women with T1D by preventing them from adopting necessary lifestyle changes, such as being physically active (Elissa et al., 2017). It is important that health care providers are aware of gender differences when designing health-promoting activities that could improve the health status of female children and adolescents.

Because previous studies found that lower self-perceived health status and HRQoL scores were associated with higher HbA1c levels (Frøisland et al., 2013; Ingerski, Laffel, Drotar, Repaske, & Hood, 2010), we expected to find an inverse relationship between self-perceived health status and HbA1c. In line with this, our study supports previous findings that better glycemic control is associated with better health perception (Kalyva, Malakonaki, Eiser, & Mamoulakis, 2011; Samardzic, Tahirovic, Popovic, & Popovic-Samardzic, 2016). However, in contrast to our study, Caferoğlu et al. (2016) found no relationship between HRQoL and HbA1c level, possibly due to their small sample size.

The present study found that SOC could be considered as low in both the diabetes group and the reference group (Mendel et al., 2001). One explanation for this might be that being exposed to prolonged violent conflict and living in unstable and disorganized conditions could weaken SOC in children in general (Braun-Lewensohn & Sagy, 2010). This issue merits further research. Previous studies carried out

among Israeli Jews and Israeli Arab Bedouin adolescents confirmed the negative effect on SOC of living in risk areas for political violence (Braun-Lewensohn & Sagy, 2011a, 2011b). In these studies, Arab Bedouins reported lower degree of SOC than Jewish adolescents. Lower degree of SOC among minority groups was attributed to low-socioeconomic status, frustrating and confusing environments (Braun-Lewensohn & Sagy, 2011a, 2011b). Furthermore, previous studies have confirmed that SOC scores were lower in patients with chronic diseases and linked this to negative life events and/or health deterioration (Bergman, Malm, Berterö, & Karlsson, 2011; Gauffin, Landtblom, & Räty, 2010; Merakou et al., 2013). To promote health among children in Palestine in general, health care providers and policy makers should design and implement effective intervention programs that strength SOC and its components. In light of the present study, SOC seems to be affected by living under unstable political conditions.

It is well known that an individual with a stronger SOC is more likely able to adopt appropriate strategies of control and self-care, maintain a healthy lifestyle and habits, and show adherence to medical advice (Ahola, Saraheimo, Forsblom, Hietala, & Groop, 2010; Antonovsky, 1979; Lindmark, Stegmayr, Nilsson, Lindahl, & Johansson, 2005). Adherence to self-care activities is vital in diabetes management as it can reduce both acute and long-term complications. Good glycemic control has been the primary goal of diabetes care because research evidence suggests that this significantly decreases late complications of diabetes mellitus (Diabetes Control and Complications Trial Research Group, 1986, 1993; Nathan, 2014). By improving SOC and self-perceived health status this might improve glycemic control and decrease complications associated with T1D. Our result is supported by other adult studies conducted in patients with T1D and type 2 diabetes showing higher SOC scores to be correlated with better glycemic control (Ahola et al., 2010; Cohen & Kanter, 2004). On the other hand, Shiu (2004), in a study of Chinese adults with diabetes, found no significant correlation between SOC and HbA1c. Moreover, the present study found that participants with a strong SOC perceived their health status as better. This finding has been confirmed by other researchers, as high SOC has been found to be related to high QoL (Eriksson & Lindström, 2007), and Apers et al. (2013) found SOC to be a predictor of physical, emotional, social, and school functioning domains of generic self-perceived health.

Limitations and Strengths

There is a paucity of literature that addressed SOC and self-perceived health status among children with T1D in politically unstable conditions as West Bank, Palestine. Therefore, the current study deepens our knowledge and understanding of psychosocial aspects of children with T1D. Furthermore,

we used pretested and valid questionnaires that are applicable for healthy and chronically ill pediatric populations.

Although we applied a convenience sampling, participants were recruited from a broad geographical area covering cities in the south, north, and center of the West Bank in Palestine, with different residence, age, and sex in order to be able to increase generalizability. One limitation is the cross-sectional design that limits the determination of causal direction among the investigated variables. Hence, longitudinal studies are needed to examine causal relationships and to test the potential influences of SOC and self-perceived health status in order to develop services for children with T1D. Moreover, all findings were based on self-reports and therefore subject to potential self-reporting bias. Children may also have difficulties reflecting on their own health, which can lead to overreporting or underreporting (Moksnes, Espnes, & Lillefjell, 2012). Furthermore, the generic PedsQL scale was used to assess the self-perceived health of children and adolescents with T1D; whereas other studies used the diabetes-specific scale, thus affecting comparability of the findings. Therefore, we suggest that future studies should use the diabetes-specific scale to capture diabetes-specific features. Access to such translated questionnaire was not available at the time for data collection. Moreover, sample size was limited, particularly for adolescents who completed the SOC scale, where half of the participants (the adolescents) could be included due to the questionnaire's intended population (>13 years). This may undermine the statistical power of the study.

Conclusions

Stronger SOC was associated with better self-perceived health status among children with T1D in the West Bank, Palestine. Furthermore, higher degree of SOC and self-perceived health were associated with better glycemic control in children with T1D. Furthermore, females in the T1D group reported lower self-perceived health.

Implications

Health care providers need to provide targeted interventions that could improve the health status of female children and adolescents. Lower SOC in the study and reference group highlighted the need for health care providers to develop intervention strategies that help children identify internal resources, abilities, and coping capabilities to improve self-perceived health status and well-being. Furthermore, developing and implementing effective intervention programs aiming to increase SOC and self-perceived health status this might improve glycemic control and decrease complications associated with T1D.

Declaration of Conflicting Interests

Funding

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