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Association of Maternal Emotional Intelligence and Coping Strategies with Diabetes Management in Adolescents with Type 1 Diabetes

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ABSTRACT

Purpose: The study aimed to evaluate the association between maternal emotional intelligence and coping strategies with diabetes management in adolescents diagnosed with type 1 diabetes.

Design and Methods: A cross-sectional study was conducted with mothers of adolescents (aged 12–17 years) with type 1 diabetes (n = 75). Data collection instruments included the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF) and the Brief COPE, alongside a structured questionnaire covering diabetes management and sociodemographic factors. The primary outcome measure of diabetes management was glycosylated hemoglobin (HbA1c) levels. Data were collected via both paper-based questionnaires and an online survey in 2023.

Results: Mothers of adolescents with optimal diabetes control exhibited significantly higher scores in the sociability dimension of emotional intelligence compared to those whose children had suboptimal diabetes control ($p = 0.029$). No statistically significant association was found between coping strategies and diabetes management in adolescents with type 1 diabetes ($p > 0.05$). However, maternal emotional intelligence was positively correlated with both problem-focused (rho = 0.669, $p < 0.001$) and emotion-focused coping strategies (rho = 0.321, $p = 0.005$), while lower emotional intelligence was significantly associated with avoidant coping (rho = -0.434, $p < 0.001$).

Conclusions: The sociability dimension of maternal emotional intelligence was positively associated with optimal diabetes management in adolescents with type 1 diabetes. Higher maternal emotional intelligence predicted the use of adaptive coping strategies, specifically problem-focused and emotion-focused coping, whereas lower emotional intelligence was linked to avoidant coping strategies.

Practical Implications: Interventions aimed at enhancing the sociability aspect of emotional intelligence in mothers may improve their social functioning and, consequently, facilitate better diabetes management in their adolescent children.

Keywords: type 1 diabetes, emotional intelligence, coping strategies, diabetes management

1. INTRODUCTION

Type 1 Diabetes Mellitus (T1DM) is a chronic autoimmune disease characterized by the progressive destruction of pancreatic β-cells, resulting in insulin deficiency (American Diabetes Association, 2013). T1DM is among the most prevalent chronic conditions in pediatric populations, with over 1.2 million children and adolescents globally (aged ≤19 years) currently diagnosed (International Diabetes Federation, 2021).

Although T1DM remains incurable, it is a manageable disease that necessitates consistent self-management to mitigate serious complications, including cardiovascular disease, nephropathy, retinopathy, and peripheral neuropathy (International Diabetes Federation, 2021). Effective management requires daily insulin administration, regular blood glucose monitoring, dietary regulation (notably carbohydrate intake), and the careful adjustment

of physical activity levels. Given the psychosocial immaturity typical of childhood and adolescence, adult support—most often from parents—is essential in maintaining optimal glycemic control.

The psychological burden of T1DM affects not only the patient but also their caregivers. Research indicates that approximately 13% of adolescents with T1DM experience severe generalized anxiety, while parental anxiety is markedly higher, affecting nearly 47% of parents (Silina, 2022). The role of parents in diabetes management evolves as the child grows, becoming increasingly complex during adolescence (defined here as ages 12–17 years). A concerning finding is that only 17% of adolescents consistently meet recommended glycemic targets (Miller et al., 2015). Suboptimal diabetes management during adolescence is linked to an elevated risk of physical complications and higher incidences of psychiatric disorders in patients (Svensson et al., 2018), as well as increased rates of parental depression and distress (Rumburg et al., 2017; Capistrant et al., 2019).

Parental involvement in disease management demands substantial emotional and cognitive resources. Emotional intelligence (EI) may play a critical role in navigating the myriad challenges of T1DM management. Petrides and Furnham's (2001) trait model of EI conceptualizes EI as a set of emotional self-perceptions that include emotional awareness, regulation, and utilization – both intrapersonally and interpersonally (Petrides et al., 2018). High trait EI has been associated with the ability to withstand high-pressure situations and exert effective emotional control (Andrei et al., 2016). In the context of T1DM, higher parental EI has been correlated with improved glycemic control (Zysberg et al., 2013). It is posited that elevated parental EI facilitates better coping with the emotional demands of chronic illness care. However, recent studies have produced contradictory findings; for instance, Žilinskienė et al. (2021) reported that higher maternal EI was associated with poorer diabetes management in their children. The relationship between parental EI and glycemic control (measured via HbA1c) remains underexplored, and existing studies present inconclusive results, signaling the need for further investigation.

In addition to emotional intelligence, parental coping strategies significantly influence diabetes management outcomes. Coping strategies, as defined by Lazarus and Folkman (1984), encompass the cognitive, emotional, and behavioral efforts made to manage stressful situations. These strategies are often categorized into problem-focused (directly addressing the stressor), emotion-focused (managing emotional responses to the stressor), and avoidance-focused (evading the stressor). In the context of T1DM, parents employing problem-focused coping strategies may demonstrate more effective disease management, as indicated by better glycemic control and fewer diabetes-related complications. Conversely, avoidance-focused coping has been associated with suboptimal disease management (Mafhouz et al., 2018). However, evidence remains inconsistent. Jaser et al. (2014) found no significant association between coping strategies and diabetes outcomes, further underscoring the complexity of this relationship. Thus, a more nuanced understanding of how coping strategies interact with diabetes management is warranted.

Emotional intelligence has been shown to correlate with adaptive coping strategies, where individuals with higher EI are more adept at decomposing large, complex challenges into manageable components and developing effective solutions (Sarabia-Cobo et al., 2017). Given these adaptive capacities, high EI may facilitate improved diabetes management, yet the literature exploring this relationship is sparse.

T1DM not only imposes psychological and emotional challenges on affected children and adolescents but also on their caregivers. Given the critical role of parental emotional intelligence and coping strategies in managing these challenges, understanding their impact on disease control is of paramount importance. However, existing research presents conflicting findings, and the mechanisms underlying these associations remain poorly understood. Therefore, this study seeks to investigate the relationships between maternal emotional intelligence, coping strategies, and glycemic control in adolescents with T1DM.

2. METHODS

2.1 Design and participants

A quantitative, cross-sectional study was conducted in 2023 at the Endocrinology Clinic of Kaunas Clinics, Lithuanian University of Health Sciences (LSMU) Hospital. To increase the sample size and overcome challenges in accessing the target population, data collection was supplemented by an online survey. An invitation to participate and an anonymous questionnaire were distributed via a Facebook group specifically for parents of children with type 1 diabetes. Eligible participants were

mothers of adolescents (aged 12–17 years) who had been diagnosed with type 1 diabetes for at least one year. A total of 85 individuals completed the survey, with 75 participants meeting the inclusion criteria for analysis.

2.2 Instruments

Data were collected using an anonymous self-report questionnaire, which comprised socio-demographic information, disease management indicators, and two validated psychometric instruments:

Diabetes Management Indicator: Glycemic control was assessed using the most recent glycated hemoglobin (HbA1c) test result. In accordance with the American Diabetes Association (2021) guidelines, HbA1c values were categorized into two groups: optimal glycemic control (HbA1c < 7.0%) and poor glycemic control (HbA1c ≥ 7.1%).

Emotional Intelligence: Maternal emotional intelligence was assessed using the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF) (Petrides, 2009). This instrument comprises 30 self-report items rated on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). The TEIQue-SF measures emotional intelligence across four subscales:

- **Well-being:** Reflects a general sense of well-being and emotional regulation, including maintaining a positive outlook on life.
- **Self-control:** Measures the ability to manage impulses, resist temptations, and cope with external pressures and stress.
- **Emotionality:** Assesses the capacity to recognize and express emotions, empathize with others, and maintain interpersonal relationships.
- **Sociability:** Measures the ability to form and maintain positive social relationships, communicate effectively, and engage cooperatively in group settings.

The TEIQue-SF demonstrated good overall internal consistency (Cronbach's α = 0.869), with acceptable internal consistency across subscales (α > 0.6), except for the Sociability scale (Cronbach's α = 0.548), which exhibited adequate reliability.

Coping Strategies: Coping strategies were evaluated using the Brief COPE Inventory (Carver et al., 1997), consisting of 28 items rated on a 4-point Likert scale (1 = never, 4 = very often). The instrument categorizes coping strategies into three types:

- **Problem-focused coping:** Involves active efforts to resolve the problem.
- **Emotion-focused coping:** Aims to manage emotional responses associated with the stressor.
- **Avoidance-focused coping:** Involves attempts to avoid or ignore the problem.

For each coping strategy, subscale means were calculated, with higher scores indicating more frequent use of the respective coping strategy. The internal consistency of the Brief COPE was good (Cronbach's α = 0.815), with high internal consistency across all subscales (α ≥ 0.7).

2.3 Data analysis

Data analysis was conducted using IBM SPSS Statistics version 29. Prior to analysis, data normality was assessed through skewness and kurtosis coefficients, with values considered normally distributed if the absolute values of skewness and kurtosis were <1. Descriptive statistics were used to summarize demographic and disease management data, with absolute frequencies (N) and percentages calculated for categorical variables. For continuous variables, means (M) and standard deviations (SD) were reported for normally distributed data, while medians and interquartile ranges (IQR) were calculated for non-normally distributed variables.

Bivariate analysis was performed to evaluate associations between variables. Spearman's rank correlation coefficient was used to assess correlations between emotional intelligence, coping strategies, and diabetes management. For comparisons between glycemic control groups (optimal vs. poor management), the Student's t-test was applied to normally distributed continuous variables, while the Mann-Whitney U test was used for non-normally distributed continuous and ordinal variables. Statistical significance was determined at $p < 0.05$.

2.4 Ethical consideration

Ethical approval for this study was obtained from the Bioethics Centre. All participants provided informed consent prior to participation. Anonymity and confidentiality were ensured throughout the study, and all ethical guidelines and principles were strictly adhered to.

3. RESULTS

Table 1 describes the demographic and socio-economic characteristics of all participants and their children.

Table 1. **Distribution of participants by socio-demographic characteristics**

Variable			N	Frequency (%)
Gender	Woman		75	96.2
	Male		0	0
Marital status	Married		57	76.0
	Divorced		11	14.7
	Living alone		1	1.3
	Widowed		0	0
	Single mother		6	8
Employment status	Working		69	92.0
	Not working		6	8.0
Material situation	Very good		11	14.7
	Good		39	52.0
	Fair		23	30.7
	Poor		2	2.7
	Very bad		0	0
Gender of the child with type 1 diabetes	Daughter		33	44.0
	Son		42	56.0
Diabetes management (based on HbA1c)	Optimal		44	58.7
	Poor		31	41.3
	Mean	Standard deviation	Asymmetry	Excess
Participants' age	43.2	5.44	0.46	-0.18
Duration of illness	5.3	3.28	0.68	-0.27
	Median	Interquartile range	Asymmetry	Excess
Age of child with type 1 diabetes	14	[12 ; 16]	0.33	-1.27
HbA1c (indicator of disease control)	6.8	[6.2 ; 7.6]	1.00	1.80

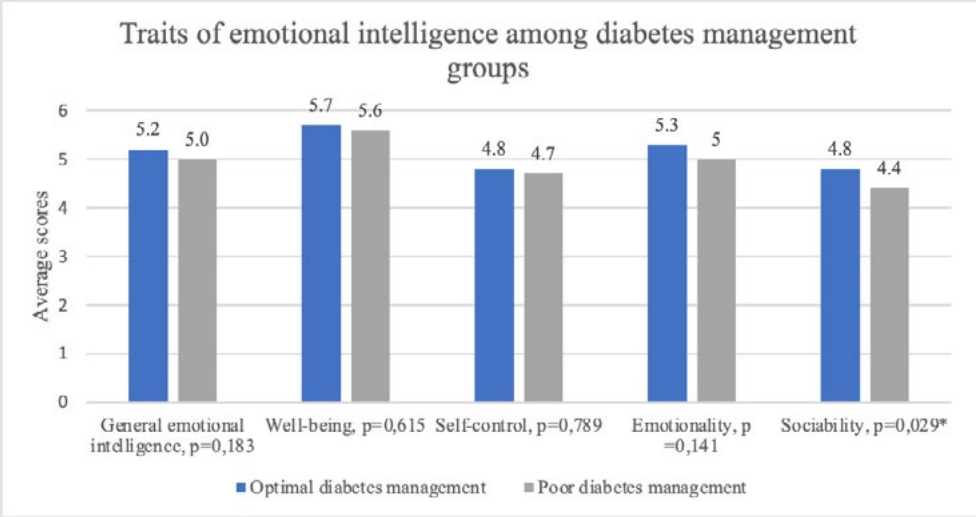
A review of the EI scores showed that mothers of adolescents with 1TDM had higher emotional intelligence than the theoretical average of 3.5. The most pronounced trait of emotional intelligence was a general sense of well-being, compared to emotionality, self-control and sociability. The least expressed trait of emotional intelligence was sociability. Detailed subscale expression rates are shown in the table. 2.

Table 2. **Trait emotional intelligence of mothers of adolescents with 1TDM**

Subscale	Mean item score	Mean scale score
General emotional intelligence	5.1 (SD = 0,70)	153.3 (SD = 21.08)
Well-being	5.6 (SD = 0,95)	33.8 (SD = 5.73)
Self-control	4.8 (SD = 0,99)	28.9 (SD = 5.96)
Emotionality	5.1 (SD = 0,90)	41.3 (SD = 7.17)
Sociability	4.6 (SD = 0,72)	27.6 (SD = 4.34

When looking at the EI between the different diabetes management groups, there was no statistically significant difference in the overall EI score between groups. However, on the subscales, parents whose child had optimal disease control had more pronounced sociability traits than parents whose child had poor disease control (see Figure 1). This means that parents whose child has optimal control of the illness are better listeners, have a more pronounced ability to interact with a variety of people and are able to have more effective interactions with others.

Figure 1. **Relationship between maternal emotional intelligence and diabetes management**



When analyzing the coping strategies most commonly used by mothers (see Table 3), the most prominent coping strategies were problem-focused and emotion-focused. The least frequently used coping strategy was the avoidance-oriented coping strategy. This indicates that when faced with stressful situations, the participants are reluctant to ignore the situation and do not try to escape from it.

Table 3. **Indicators of coping strategies among mothers of adolescents with 1TDM**

Subscale	Mean item score	Mean scale score
Problem-focused coping	2.9 (SD = 0.55)	23.6 (SD = 4.38)
Emotion-focused coping	2.3 (SD = 0.43)	27.3 (SD = 5.22)
Avoidant coping	1.7 (SD = 0.48)	13.5 (SD = 3.85)

When looking at coping strategies by diabetes management group, there were no statistically significant differences in coping strategies between diabetes management groups. The subscale scores were also not significantly different, but it can be noted that parents with a child with poor diabetes management are more likely to use avoidance-oriented coping, but this is not statistically significant. Further details are given in the table (see Table 4).

Table 4. **Differences in mean coping strategies among mothers of adolescents with 1TDM in different diabetes management groups**

Coping strategies	Diabetes management	Average rank	U	P
General coping strategies	Optimal	37.51	660.50	0.817
	Poor	38.69		
Problem-focused coping	Optimal	38.98	639.00	0.642
	Poor	36.61		
Emotion-focused coping	Optimal	38.10	677.50	0.961
	Poor	37.85		
Avoidant coping	Optimal	35.49	571.50	0.231
	Poor	41.56		

The results of the correlation analysis between EI and coping strategies showed a statistically significant correlation between total EI and coping strategies. General EI was statistically significantly correlated with coping strategies (rho = 0.280, p = 0.015). EI was negatively correlated with avoidance-focused coping strategies (rho = -0.434, p<0.001) and positively correlated with problem-focused (rho = 0.669, p<0.001) and emotion-focused (rho = 0.321, p = 0.005) coping strategies. This suggests that adaptive coping strategies, i.e., problem-oriented and emotion-oriented coping strategies, are more prevalent at higher EI scores. Conversely, the lower the EI, the more pronounced the avoidance-oriented coping strategies (see Table 5). Looking at which of the EI components were most strongly correlated with coping strategies, it is clear that the most moderate correlations (r > 0.4) were between EI traits and problem-focused coping strategies.

Table 5. **Associations between emotional intelligence and coping strategies in mothers of adolescents with 1TDM**

Emotional intelligence subscales		General coping strategies	Problem-focused coping	Emotion-focused coping	Avoidant coping
General emotional intelligence	rho	**0.280**	**0.669**	**0.321**	**-0.434**
	p	0.015*	<0.001*	0.005*	<0.001*
Well-being	rho	**0.286**	**0.544**	**0.322**	**-0.384**
	p	0.013*	<0.001*	0.005*	<0.001*
Self-control	rho	0.009	**0.503**	0.045	**-0.436**
	p	0.937	<0.001*	0.700	<0.001*
Emotionality	rho	**0.274**	**0.508**	**0.330**	**-0.287**
	p	0.017*	<0.001*	0.004*	0.013*
Sociability	rho	**0.395**	**0.523**	**0.436**	**-0.237**
	p	<0.001*	<0.001*	<0.001*	0.041*

**p<0,05*

4. DISCUSSION

Type 1 diabetes mellitus (T1DM) is a lifelong, manageable yet incurable chronic disease, primarily affecting children and adolescents. The disease imposes significant demands on the individual, often beyond the psychosocial maturity level of the child, thereby necessitating parental support. Emotional intelligence (EI) and coping strategies are thought to play a critical role in managing the challenges associated with T1DM. However, limited research has been conducted on how these factors interact with diabetes management, particularly in the context of parental involvement. The present study sought to assess the association between maternal emotional intelligence, coping strategies, and diabetes management in adolescents with T1DM.

The study results indicated that the least

expressed emotional intelligence trait among mothers of adolescents with T1DM was sociability. Sociability is crucial in the context of T1DM as it encompasses the ability to build and maintain positive relationships, communicate effectively, and cooperate with others. Effective communication with both the adolescent and the healthcare team is fundamental for achieving better diabetes management outcomes. Consistent with the study by Moore et al. (2013), the adolescent stage often leads to increased family conflicts related to diabetes management, which can negatively impact the child's glycemic control. Such conflicts arise due to the developmental challenges of adolescence, making it harder to balance the demands of the disease. Thus, the lower sociability scores among mothers may reflect difficulties in maintaining positive interactions and cooperation during this critical period.

Moreover, the study revealed that mothers whose children had optimal diabetes control exhibited significantly higher levels of sociability than mothers whose children had poor diabetes control. These findings suggest that mothers with better sociability traits are more adept at communicating, listening, and engaging with various stakeholders, leading to more effective diabetes management. Prior research, such as studies by Moore et al. (2013) and Jaser et al. (2016), has linked family conflicts about T1DM with poorer diabetes management. Ineffective communication between the parent and child, as well as with the healthcare team, can exacerbate these conflicts, ultimately affecting the quality of diabetes control. The results underscore the importance of maternal interaction and communication skills for optimal diabetes management outcomes.

In terms of coping strategies, the study found that problem-focused and emotion-focused coping were the most frequently used, while avoidance-focused coping was least expressed. Research has shown that problem-focused coping is generally more effective in managing diabetes-related stress than avoidance-focused coping (Hapunda, 2022). Consequently, mothers employing problem-focused and emotion-focused coping strategies may manage the stress associated with their child's diabetes more effectively, leading to improved emotional health and reduced risk of complications. In contrast, avoidance-focused coping can exacerbate stress and contribute to negative health outcomes for both the mother and child, as it fails to address the root causes of the problem.

Interestingly, coping strategies were not statistically significantly associated with diabetes management in this study. This finding is consistent with Jaser et al. (2014), who found no significant association between coping strategies and diabetes control in mothers of children with T1DM. However, avoidance-focused coping was observed to be most strongly associated with poorer diabetes management outcomes. This observation aligns with the study by Mahfouz et al. (2018), which found that higher use of avoidance-focused coping by mothers was linked to worse glycemic outcomes in their children. Adaptive coping strategies, such as planning and seeking emotional support, were associated with better diabetes management (HbA1c levels).

The study also found that maternal emotional intelligence was significantly associated with coping strategies. Mothers with higher emotional intelligence were more likely to use problem-focused and emotion-focused coping, while those with lower emotional intelligence were more inclined towards avoidance-focused coping. Although no prior research has directly examined the relationship between emotional intelligence and coping strategies in the context of T1DM, existing evidence supports the notion that higher emotional intelligence is associated with the use of adaptive coping strategies (Sarbia-Cobo et al., 2017).

4.1 Practical implications

Effective communication is essential for optimal diabetes management. Conflicts between parents and adolescents regarding diabetes can impede effective disease control. Therefore, fostering the sociability trait of emotional intelligence in parents could enhance communication, improve relationships, and ultimately lead to better diabetes management. It is also crucial for parents to work closely with healthcare providers to ensure the treatment plan, including insulin use and blood sugar monitoring, is tailored to the child's needs. The findings suggest that developing emotional intelligence, particularly sociability, could play a mediating role in better diabetes outcomes.

4.2 Limitations

This study has several limitations. Firstly, the sample size was relatively small. A larger sample

might reveal more pronounced differences and associations. Additionally, the sample was skewed, with more children achieving optimal diabetes control than poor control, potentially indicating that more motivated mothers participated in the study, which could have influenced the results.

Another limitation is the reliance on a self-report emotional intelligence questionnaire, which may introduce bias. Previous studies have shown that self-assessed emotional intelligence can have weaker associations with diabetes management (Zysberg et al., 2013). Self-assessment reflects subjective perceptions of one's emotional intelligence, and respondents may provide socially desirable answers rather than accurate self-evaluations (Devaux & Sassi, 2016). To mitigate these biases, future studies could incorporate objective psychometric tests, such as audiovisual tests or complex emotional scenarios, to assess emotional intelligence more accurately.

Finally, diabetes management was measured solely by HbA1c results, a traditional but potentially incomplete marker. Recent studies have questioned the reliability of HbA1c as the sole indicator of diabetes management quality (Lundholm et al., 2020). Future research should include additional measures, such as frequency of blood glucose monitoring and the percentage of time spent in the target glycemic range.

5. CONCLUSIONS

1. Mothers of adolescents with optimal diabetes management exhibited higher sociability traits in emotional intelligence compared to mothers whose children had poor diabetes management.
2. Coping strategies were not statistically significantly associated with diabetes management in mothers of adolescents with type 1 diabetes.
3. Maternal emotional intelligence was significantly associated with coping strategies. Higher emotional intelligence was linked to problem-focused and emotion-focused coping, while lower emotional intelligence was associated with avoidance-focused coping.

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