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Original Research

Factors Associated with Parenting Stress in Parents of Children: A Cross-Sectional Study

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Abstract

Background: Type 1 Diabetes requires complex lifelong care, increasing parental stress. The COVID-19 pandemic exacerbated this burden by disrupting healthcare, limiting social support, and causing financial strain.

Methods: This study used an analytical cross-sectional design. Consecutive sampling was conducted among parents of children with Type 1 Diabetes (T1D) who were members of IKADAR Indonesia. This study involved 136 parents who met the inclusion criteria. Data were analyzed using the Mann–Whitney U test, the Kruskal–Wallis test, Spearman's correlation, Pearson's correlation, and multivariate linear regression to identify factors associated with parenting stress. Data were collected using validated instruments, including the Pediatric Inventory for Parents (PIP), Multidimensional Scale of Perceived Social Support (MSPSS), Ways of Coping Questionnaire (WCQ), and a researcher-developed questionnaire on healthcare challenges during the COVID-19 pandemic.

Results: Economic status, marital status, challenges with the healthcare system during the COVID-19 pandemic, social support, and parental coping mechanisms were significantly associated with parenting stress frequency, as measured by the PIP-Frequency (PIP-F) subscale ($p<0.05$). In addition, economic status, challenges in the healthcare system during the COVID-19 pandemic, and social support were significantly associated with parenting stress difficulties, as measured by the PIP-Difficulty (PIP-D) subscale ($p<0.05$).

Conclusion: Parenting stress among parents of children with Type 1 Diabetes was associated with parental coping mechanisms and social support.

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Keywords
Parenting stress; Type 1 diabetes; COVID-19 pandemic; Cross-sectional study.

Background

Type 1 Diabetes (T1D) is a chronic systemic disorder characterized by autoimmune destruction of pancreatic beta cells, leading to partial or complete cessation of insulin production (1). According to the International Diabetes Federation (IDF), the global prevalence of T1D among children is approximately 4.5 per 100,000, though regional variations exist (2). In Indonesia, a 2018 study reported a prevalence of 1.44 per 100,000 children with T1D, indicating an emerging public health concern (3).

T1D significantly impacts the lives of affected children and their parents, who serve as the primary caregivers (4). Managing T1D is a lifelong challenge that requires meticulous daily tasks, including monitoring blood glucose levels, administering insulin, managing diet, and regulating physical activity, to achieve optimal metabolic control and prevent complications (5). These responsibilities often lead to substantial psychosocial, emotional, and economic burdens on parents.

The diagnosis of T1D often triggers a period of grief and sadness in parents. Feelings of hopelessness and anxiety are common, particularly during the first 6 to 12 months following diagnosis (6). According to the Chronic Sorrow Theory, ongoing caregiving demands, uncertainty regarding the child's health condition, and repeated exposure to stressful situations may contribute to persistent emotional distress among parents of children living with chronic illnesses (8). Parents of children with Type 1 Diabetes often experience recurring stress related to disease management, fear of complications, and long-term caregiving responsibilities (10,38). In this study, factors such as social support, coping mechanisms, and challenges in the healthcare system during the COVID-19 pandemic were included because they may influence parents' adaptation processes and emotional responses to chronic caregiving situations. Adequate social support and adaptive coping strategies may help parents manage recurring stressors more effectively, whereas difficulties accessing healthcare during the pandemic may intensify parenting stress (7,31,38). The hope of raising a healthy child clashes with the daily realities and long-term implications of managing a chronic illness.

Children with T1D require lifelong insulin therapy and stringent dietary management, further challenging parents who are already coping with significant emotional distress. Many parents who have children with T1D are also concerned about their child's quality of life (6). Research shows that mothers of children with T1D often perceive their child's quality of life as significantly lower compared to peers without the condition (9). These perceptions, compounded by the physical and emotional stress of caregiving, may contribute to heightened levels of parental stress (10). Therefore, there

needs to be proper education for parents on how to manage this disease to improve the quality of life and eliminate health risks for all parties involved (11).

The COVID-19 pandemic exacerbated these challenges. Parents faced increased responsibilities, including managing their child's condition while also protecting them from exposure to the virus (12). Lockdowns disrupted routines, negatively affecting glycemic control and HbA1c levels in children, partly due to reduced physical activity and dietary compliance (13). In Indonesia, the implementation of large-scale social restrictions (PSBB) in March 2020, along with subsequent extensions, further complicated access to healthcare. Many parents avoided routine HbA1c checks or healthcare visits due to fear of exposure to COVID-19, even though children with T1D are advised to visit healthcare facilities at least three times a month (14-16).

The pandemic also worsened financial burdens. While Indonesia's national health insurance program alleviates some medical costs, parents incur additional expenses, such as mandatory COVID-19 screening tests for hospital admissions, which are not covered under the scheme. These financial challenges, coupled with caregiving demands, contributed to elevated levels of parental stress (17). Research indicates that lower socioeconomic status is a significant predictor of stress among parents of children with T1D, largely due to the high costs of care (18).

High levels of parental stress can adversely affect the quality of care they provide to their children. Stress hinders their ability to effectively manage their child's illness, which, in turn, negatively impacts the physiological and psychological well-being of children with T1D (19,20). Several interventions have been developed to address this issue. For instance, camp-based multi-component interventions have demonstrated efficacy in reducing parental stress by addressing factors such as lack of knowledge and social support (21). In Indonesia, the Family Association of Children and Adolescents with Diabetes (IKADAR) provides a platform for parents to share knowledge and experiences through social media and family gatherings. However, these gatherings were largely discontinued during the pandemic, reducing opportunities for emotional support (22).

Innovative interventions, such as video consultation-based care, have shown promise in alleviating caregiving burdens by improving access to routine care and reducing stress (23). Although parenting stress among parents of children with Type 1 Diabetes has been widely studied globally, evidence regarding factors associated with parenting stress during the COVID-19 pandemic remains limited, particularly in Indonesia. Previous studies mainly focused on parenting stress before the pandemic or emphasized children's metabolic outcomes rather than parental psychosocial experiences. The COVID-19 pandemic introduced unique challenges, including disruptions in healthcare access, reduced social interaction, economic difficulties, and changes in diabetes management routines, which may have influenced parental stress and caregiving experiences. Therefore, understanding factors associated with parenting stress during this context remains important for developing comprehensive family-centered nursing interventions and improving healthcare preparedness for future public

health crises. This knowledge gap prevents the development of targeted interventions that address both children's and parents' needs holistically. Although the COVID-19

pandemic has transitioned into a post-pandemic phase, understanding the experiences of parents caring for children living with Type 1 Diabetes during periods of healthcare disruption remains important. The findings may provide insights for improving psychosocial support, chronic illness management, telehealth services, and nursing preparedness during future public health emergencies or healthcare access limitations.

This study aims to analyze the factors influencing parenting stress among parents of children with T1D during the COVID-19 pandemic. By identifying these factors, healthcare professionals, particularly nurses, can design comprehensive interventions to reduce parental stress and improve the overall quality of care for children with T1D.

Methods

This study used an analytical cross-sectional design. Participants were parents of children living with Type 1 Diabetes (T1D) who were registered as members of IKADAR Indonesia. IKADAR (Ikatan Keluarga Anak dan Remaja Diabetes) is an Indonesian family association that provides education, information sharing, and psychosocial support for families of children and adolescents living with diabetes. Recruitment was conducted online during the COVID-19 pandemic due to mobility restrictions and safety considerations. Data collection was conducted online using self-administered questionnaires distributed through Google Forms to eligible participants during the COVID-19 pandemic. A consecutive sampling technique was applied, in which all eligible parents who met the inclusion criteria during the data collection period were invited consecutively until the required sample size was achieved. A total of 136 parents participated in this study. The inclusion criteria were parents of children with T1D aged below 18 years, registered members of IKADAR Indonesia, able to understand written Indonesian and complete online questionnaires via Google Forms, with internet access and the ability to complete online questionnaires, and willing to participate in the study. The exclusion criteria included parents without smartphones to access the online questionnaire, parents of children with T1D who also had special needs, and parents caring for adopted children with T1D. This study was reported in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines for observational studies.

Ethical approval was obtained from the Human Ethics Committee of the University of Indonesia (No. SK62/UN2.F12.D1.2.1/ETIK/2021), and informed consent was secured from all participants. Data were collected using validated instruments, including the Pediatric Inventory for Parents (PIP), Multidimensional Scale of Perceived Social Support (MSPSS), Ways of Coping Questionnaire (WCQ), and a researcher-developed questionnaire on healthcare challenges during the COVID-19 pandemic.

The Pediatric Inventory for Parents (PIP), developed by Streisand et al. (24), consists of 42 Likert-scale items and includes two subscales: PIP-Frequency (PIP-F) and PIP-Difficulty (PIP-D), which assess the frequency and perceived difficulty of parenting stress related to caring for a child with chronic illness. The instrument includes four domains: communication, medical care, emotional distress, and rolefunction, with total scores ranging from 42 to 210. Higher scores indicate higher parenting stress. Previous studies reported high internal consistency reliability for the PIP-F (α=0.94) and the PIP-D (α=0.96).

Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS), which consists of 12 items rated on a 7-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). Higher scores indicate higher perceived social support. Previous studies reported acceptable content validity and reliability (Cronbach's $\alpha = 0.85$) (25).

Parents' coping mechanisms were measured using the Ways of Coping Questionnaire (WCQ) developed by Lazarus and Folkman, which consists of 50 items across eight subscales: confrontation, distancing, self-control, seeking social support, accepting responsibility, escape/avoidance, planful problem solving, and positive reappraisal. Items were scored from 0 (not used/not applicable) to 3 (used very often), with higher scores indicating more frequent use of coping strategies. Previous studies demonstrated acceptable validity and reliability (Cronbach's $\alpha = 0.752$) (26).

The researcher-developed questionnaire on healthcare system challenges during the COVID-19 pandemic was developed based on the study by Jethwani (16). The questionnaire initially consisted of 25 items covering four domains: medical care support, blood glucose-related emergency problems, COVID-19-related emergency problems, and technical problems. The questionnaire used a Guttman scale with "Yes" and "No" response options. Following pilot validity and reliability testing among 30 parents of children with T1D, six invalid items were removed, resulting in a final 19-item questionnaire with acceptable validity and reliability (Cronbach's $\alpha = 0.835$).

Data were analyzed using SPSS version 22. Descriptive statistics summarized the data, while the Mann–Whitney U test, the Kruskal–Wallis test, and correlation tests (Spearman and Pearson) were used for bivariate analysis. Variables with $p<0.25$ in the bivariate analysis were included in the multivariate linear regression, using the backward method, to identify factors associated with parenting stress. Statistical significance was set at $p<0.05$.

Result and Discussion

Result

This study involved 136 respondents. Table 1 shows that the majority of respondents were women (mothers) at 81.6%, with most respondents being middle-aged adults (81.6%). The educational level of respondents was predominantly higher education (50.0%), and 53.7% of respondents had an economic status below the

minimum wage. Marital status was predominantly married (95.6%), and 62.5% of respondents were employed.

Table 1. Frequency Distribution of Respondents by Demographic and Healthcare System Challenges During the COVID-19 Pandemic

Variable (n=136)	f	%
Gender		
Man (father)	25	18.4
Women (mother)	111	81.6
Age		
Young adult	20	14.7
Middle adulthood	111	81.6
Late adulthood	5	3.7
Level of education		
Base	14	10.9
Intermediate	54	39.7
High	68	50.0
Economic status		
≤ UMR (regional minimum wage)	73	53.7
> UMR (regional minimum wage)	63	46.3
Marital status		
Married couple	130	95.6
Single	6	4.4
Employment status		
Work	85	62.5
Doesn't work	51	37.5
Healthcare system challenges during COVID-19 pandemic		
High	90	66.2
Low	46	33.8

Table 2 presents the distribution of social support, parental coping mechanisms, and parenting stress scores among parents of children living with T1DM. The median social support score was 70, with the highest support reported in the family domain. The mean parental coping mechanism score was 90, with positive reappraisal showing the highest mean score. The median parenting stress score based on PIP-Frequency (PIP-F) was 64.5, with the highest score observed in the medical care domain, while the median parenting stress score based on PIP-Difficulty (PIP-D) was 49, with the highest score found in the emotional distress domain.

Table 2. Distribution of Social Support, Parental Coping Mechanisms, and Parenting Stress Scores Among Parents of Children with T1DM

Variable	Measurement	Value
Social support	Median (IQR)	70 (18)
	Min–Max	12–84
Parental coping mechanisms	Mean ± SD	90 ± 10.41
	Min–Max	57–114
Parenting stress frequency (PIP-F)	Median (IQR)	64.5 (26)
	Min–Max	4–185

Parenting stress difficulty (PIP-D)	Median (IQR)	49 (20)
	Min–Max	42–146

PIP-F = Pediatric Inventory for Parents-Frequency; PIP-D = Pediatric Inventory for Parents-Difficulty; SD = standard deviation; IQR = interquartile range.

Table 3 shows significant associations between economic status and marital status with PIP-Frequency (PIP-F) scores ($p<0.05$). Economic status was also significantly associated with parenting stress based on PIP-Difficulty (PIP-D) ($p<0.05$). Healthcare system challenges during the COVID-19 pandemic and social support were significantly associated with both PIP-F and PIP-D scores. Parental coping mechanisms were significantly associated with PIP-F scores but not with PIP-D scores.

Table 3. Relationship Between Parental Characteristics and Situational Factors with Parenting Stress

	Parenting Stress (n=136)	
Variable	PIP-F	PIP-D
	p-value	*p-value*
Parent's Gender	0.657	0.290
Parental Age	0.304	0.429
Level of education	0.731	0.113
Economic Status	0.006	<0.001
Marital status	0.031	0.082
Employment Status	0.237	0.105
Challenges related to the health care system during the covid 19 pandemic	<0.001	0.001
Social Support	0.003	0.015
Parents' coping mechanisms for children's illnesses	0.047	0.605

PIP-F = Pediatric Inventory for Parents-Frequency; PIP-D = Pediatric Inventory for Parents-Difficulty.

Multiple linear regression analysis for PIP-Frequency (PIP-F) using the backward method yielded an R^2 value of 0.169, indicating that marital status, healthcare system challenges during the COVID-19 pandemic, and parental coping mechanisms explained 16.9% of the variance in parenting stress frequency. Parents with single marital status had higher parenting stress frequency scores compared to married parents. Lower healthcare system challenges and more adaptive coping mechanisms were associated with lower parenting stress frequency scores.

Multiple linear regression analysis for PIP-Difficulty (PIP-D) yielded an R^2 value of 0.207, indicating that healthcare system challenges during the COVID-19 pandemic and social support explained 20.7% of the variance in parenting stress difficulties. Lower healthcare system challenges and higher social support were associated with lower parenting stress difficulty scores.

DISCUSSION

Parenting stress related to the frequency and perceived difficulties of caring for children with Type 1 Diabetes (T1D) varied across domains, with higher scores observed in the medical care and emotional distress domains. These findings should be interpreted with caution, as no validated cutoff score for the Pediatric Inventory for Parents (PIP) has been established in the literature. The moderate parenting stress scores

observed may be influenced by the recruitment process through IKADAR Indonesia, which likely involved parents who were more socially connected, actively engaged in diabetes management, and had stronger psychosocial support systems. The medical care domain exhibited the highest frequency of caregiving stress, while emotional distress ranked highest among perceived difficulties. Previous research identified emotional distress as the highest in both stress frequency and perceived difficulty categories (24). These results highlight the importance of addressing mental health needs for both parents and their children with T1D, particularly during periods of heightened stress such as the COVID-19 pandemic (27). Parents of children with T1D are known to experience significant psychological burden, including emotional distress, anxiety, and parenting stress (39), which may be further exacerbated during the pandemic (40).

Medical Care and Emotional Distress as Stressors.

Chronic Sorrow Theory may explain these findings, as it posits that parents of children with chronic illnesses experience recurring emotional distress due to ongoing caregiving demands, uncertainty, and concerns about their child's long-term condition (8). The COVID-19 pandemic likely intensified these stressors by disrupting healthcare access and increasing caregiving responsibilities. The high frequency of stress in the medical care domain reflects the substantial burden of managing children's medical needs, such as glycemic control, insulin administration, and monitoring for complications. Emotional distress, which ranked highest among perceived difficulties, corresponds with parental concerns about quality of life, uncertainty regarding their child's future, developmental differences from peers, and the psychological impact of prolonged caregiving during the pandemic (6,28,29,30). These results indicate the need for comprehensive interventions that address both medical and emotional stressors.

Role of Nurses in Supporting Parents.

Nurses play a critical role in supporting parents of children with T1D by addressing both the child's medical needs and the emotional and psychological challenges faced by caregivers. Interventions should equip parents with adaptive coping strategies, enhance social support networks, and facilitate shared experiences among parents in similar situations (31). These efforts can help parents manage emotional distress and strengthen caregiving abilities, as integrated psychosocial care, family-centered interventions, and healthcare support have been shown to foster adaptive coping skills, reduce perceived distress, and improve overall family well-being (41-43).

Influence of Parental Characteristics.

Parental socioeconomic and marital status were significantly associated with parenting stress. Parents with lower economic status reported higher stress scores, likely due to the financial burden of long-term diabetes management and additional costs not covered by insurance (16-18). Single parents also reported higher stress scores than married parents, reflecting the combined challenges of caregiving and limited support

systems (16). These findings underscore the need for financial and emotional support tailored to economically disadvantaged and single-parent families.

Healthcare System Challenges During COVID-19.

Challenges within the healthcare system during the COVID-19 pandemic were significantly associated with increased parenting stress. Delays in routine care, limited access to diabetes supplies, and greater reliance on telemedicine may have contributed to perceptions of inadequate healthcare support. Previous studies have also reported that the COVID-19 lockdown had significant psychological impacts on children with T1D and their parents. Although telehealth and telenursing were beneficial for routine diabetes consultations and ongoing monitoring, these approaches were limited in managing acute episodes such as severe hypoglycemia or hyperglycemia, which require immediate in-person assessment and clinical intervention (32,33,34). These findings highlight the need for strengthened healthcare systems and hybrid care models that integrate telehealth with in-person support.

Effectiveness of Telehealth Interventions.

Previous studies have demonstrated the effectiveness of video-based telehealth interventions, such as Reducing Emotional Distress to Childhood Hypoglycemia in Parents (REDCHiP) and Cognitive Adaptations to Reduce Emotional Stress (CARES), in supporting diabetes management, reducing fear of hypoglycemia, and improving psychosocial adaptation among parents (28). However, emerging concerns, such as difficulty reintegrating into pre-pandemic routines and fluctuations in glycemic control due to inconsistent schedules, underscore the need for continuous adjustments to these interventions. Addressing these challenges is essential for maximizing the long-term benefits of telehealth.

Social Support and Coping Mechanisms.

Social support was inversely associated with parenting stress, with higher levels of support associated with lower perceived difficulties. This aligns with evidence suggesting that social networks buffer against the emotional toll of caregiving (35). Similarly, adaptive coping mechanisms, particularly positive reappraisal and problem-solving strategies, were associated with lower stress levels. These strategies not only benefit parents' mental health but also may support better metabolic, psychological, and well-being outcomes among children with T1D (36,9,37). The parenting stress findings observed in this study may reflect the use of adaptive coping mechanisms and the availability of social support among participants (38).

The findings of this study may also provide important lessons for healthcare systems and nursing services in preparing psychosocial and family-centered support strategies during future healthcare disruptions or public health emergencies affecting children with chronic illnesses.

This study has several limitations. Recruitment through an online diabetes parent association may have introduced selection bias, potentially overrepresenting parents

who were more educated, socially connected, and actively engaged in diabetes management. These characteristics may contribute to stronger social support and more adaptive coping abilities, which may be associated with parenting stress levels.

Therefore, the findings should be interpreted cautiously and may not fully represent all parents of children living with Type 1 Diabetes in Indonesia.

Conclusion

This study found that economic status, marital status, healthcare system challenges during the COVID-19 pandemic, social support, and parental coping mechanisms were associated with parenting stress among parents of children living with Type 1 Diabetes. Higher social support and adaptive coping mechanisms were associated with lower parenting stress. These findings highlight the importance of strengthening social support systems and family-centered nursing interventions to support parents in managing their child's chronic illness. The findings should be interpreted cautiously due to the cross-sectional design and potential selection bias introduced by online recruitment via a diabetes parent association.

Declaration of Conflict of Interest
No conflict of interest declare

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Data Availability Statement
The dataset generated and analysed during the current study is available from the corresponding author upon reasonable request.

Declaration of the Use of AI in Scientific Writing
There is nothing to declare.

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