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Research Paper

Assessment of Stress Levels in Parents of Children With and Without Chronic Kidney Disease

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ABSTRACT

Background and Aim: Chronic kidney disease (CKD) in children poses significant psychological challenges for parents, potentially leading to elevated levels of stress, anxiety, and depression. This study aimed to compare levels of stress, anxiety, health anxiety, and depression between parents of children diagnosed with CKD and parents of healthy children.

Methods: This cross-sectional comparative study included 70 parents (35 parents of children with chronic kidney disease and 35 parents of healthy children) recruited from Amir Kabir Children's Hospital in Arak, Iran. Psychological outcomes, including stress, anxiety, depression, and health anxiety were assessed using the depression, anxiety, and stress scale (DASS-21) and the 18-item health anxiety inventory (HAI-18). Statistical analyses was performed using SPSS software, version 26.

Results: Parents of children with CKD reported significantly higher levels of anxiety (P=0.044) and stress (P=0.047) compared to the control group. However, there were no statistically significant differences in depression levels (P=0.117) or health anxiety (P=0.840). Demographic variables showed no significant correlation with psychological outcomes.

Conclusion: Parents of children with CKD experience elevated levels of stress and anxiety, underscoring the need for targeted psychological interventions to support their mental health.

Keywords: Chronic kidney disease (CKD), Anxiety, Stress, Depression, Health anxiety

Introduction

Chronic kidney disease (CKD) in children is a progressive condition that inevitably advances toward more severe stages, adversely impacting the quality of life during childhood [1, 2]. CKD in pediatric populations is defined as a persistent reduction in glomerular filtration rate (GFR) to less than 90 mL/min for a duration of at least three months [3]. The global burden of this disease has increased, rising from the 36th leading cause of death in 1990 to the 19th in 2013 [4]. Despite this increase, accurate estimates of CKD prevalence in children remain challenging due to late diagnosis and limited epidemiological data, with reported prevalence ranging from 15 to 74.7 cases per million children worldwide [5].

J Ped Nephrol
Journal of Pediatric Nephrology

Beyond the affected children themselves, the disease imposes substantial psychological and social burdens on their parents. In addition to fulfilling their typical parental roles, parents are compelled to assume the responsibilities of caregiving for a chronically ill child. This dual role often results in heightened levels of anxiety, stress, and feelings of guilt [6, 7]. Previous studies have demonstrated that parents of children with chronic illnesses, including CKD, experience significantly higher levels of psychological distress compared to parents of healthy children [8]. Research has shown that anxiety and stress are particularly prevalent among caregivers of pediatric CKD patients, and in some cases, depressive symptoms are also reported at clinically significant levels [9, 10]. However, findings regarding specific psychological domains, such as health anxiety, remain inconsistent, and may vary depending on cultural, social, and healthcare contexts.

In Iran, where family members play a central role in caregiving, the psychological impact of pediatric CKD on parents may be especially pronounced. Nevertheless, regional data examining parental mental health in this population are limited. Given the importance of parental psychological well-being in disease management, adherence to treatment, and overall family functioning, further investigation is warranted.

Therefore, the present study aimed to assess and compare levels of stress, anxiety, depression, and health anxiety among parents of children with CKD and parents of healthy children attending Amir Kabir Children's Hospital in Arak during the 2024–2025 period.

Materials and Methods

Study design and population

The present study employed a cross-sectional comparative approach aimed at assessing levels of stress, anxiety, health anxiety, and depression among parents of children suffering from CKD. The study population consisted of parents of children under the age of 18 diagnosed with CKD, as well as parents of healthy children free from chronic illnesses, who visited Amir Kabir Hospital and outpatient clinics in Arak during 2024. Participants were recruited using a convenience sampling method.

Sample size

The sample size was determined to be 35 participants in each group, based on study by Tsai et al. which included 32 parents of children with CKD across eight medical centers in Taiwan [7].

Inclusion and exclusion criteria

Inclusion criteria for the CKD group were as follows:

1) Parents of children diagnosed with CKD who voluntarily consented to participate in the study and complete the questionnaire. 2) the children were under the age of 18. 3) being fluent in the Persian language

Inclusion criteria for the control group were as follows:

1) Parents of children under the age of 18 who were not diagnosed with any chronic illness as self-reported. 2) voluntary participation in the study

Exclusion criteria for both groups were as follows:

1) Parental use of narcotic medications. 2) A confirmed psychiatric disorder in the parent, as self-reported.

Data collection

Data collection tools included a researcher-developed checklist and two standardized questionnaires. The demographic checklist captured information, such as parental age and gender, marital status, education level, employment status, child's age, family economic status, and the duration of the CKD diagnosis. The dDepression, anxiety, and stress scale (DASS-21) was utilized to assess stress, anxiety, and depression among parents of children with CKD. The DASS-21 is a self-report instrument designed to measure symptoms of depression, anxiety, and stress. The DASS-21 has been validated and widely accepted as a reliable and valid tool for assessing psychological distress [11].

Each subscale of the DASS comprises seven items. Since the DASS-21 is the short form of the original 42-item scale, the final score for each subscale is doubled. The severity classification for each subscale is as follows:

Depression: Normal (0–14), mild (15–18), moderate (19–25), severe (26–33), and extremely severe (34+); Anxiety: Normal (0–7), mild (8–9), moderate (10–14), severe (15–19), and extremely severe (20+); Stress: Normal (0–14), mild (15–18), moderate (19–25), SEVERE (26–32), and extremely severe (33+)

The health anxiety inventory–18 (HAI-18) was utilized to assess health anxiety, which has been validated for measuring this construct in terms of both reliability and validity [12]. The HAI-18 score interpretation based on gender is as follows:

Boys: Low (<26), moderate (26–34), and high (>41); Girls: Low (<27), moderate (27–34), and high (>41)

The psychometric properties of the questionnaires used in this study have been validated. Studies have reported Cronbach's α coefficients of 0.81 for depression, 0.74 for anxiety, and 0.78 for stress, for the DASS-21, indicating satisfactory internal consistency. Cronbach's α has been reported at 0.75 for the overall scale and between 0.59 and 0.70 for the subscales for HAI-18, reflecting acceptable reliability. Furthermore, confirmatory factor analysis supports the three-factor structure of the HAI-18 [12, 13].

Statistical analysis

Data were analyzed using SPSS software, version 26. The Kolmogorov–Smirnov test was used to assess data normality. Group comparisons were performed using the chi-square test, independent t-test, or Mann–Whitney U test, as appropriate. Pearson correlation coefficients and agreement coefficients were also calculated. P<0.05 was considered statistically significant.

Results

Demographic data represent an essential component of any research. The following section presents demographic information from 35 parents of children with CKD (patient group) and 35 parents of healthy children (control group).

Table 1 illustrates the demographic characteristics of participants. The mean age of parents in the entire sample was 36.83±7.18 years, ranging from 22 to 58 years. Among the participants, 78.6% were mothers, 31.4% had an educational level of less than a high school diploma, 32.9% had a high school diploma, and 25.7% held a bachelor's degree or higher. A total of 71.4% of the parents were unemployed. Moreover, 55.7% reported a moderate level, 31.4% a decent level, and 10% a poor level of economic status. Additionally, 94.3% of participants were married (Table 1).

Table 2 displays the distribution of stress, anxiety, and depression severity levels across both patient and control groups. The chi-square test revealed a statistically significant difference between the two groups in terms of stress (P=0.047) and anxiety (P=0.044). A higher proportion of parents fell within the "extremely severe" category in the patient group (stress: 25.7% vs 5.7%; anxiety: 31.4% vs 8.6%). However, no significant difference was observed between the two groups regarding depression levels (P=0.117) (Table 2).

Table 3 presents the distribution of health anxiety levels. More than 90% of parents across both groups reported low levels of health anxiety, and no significant difference was found between the groups (P=0.840).

Table 4 compares demographic characteristics between the two groups. The results indicated no significant differences between the groups in terms of parental gender, marital status, employment status, educational level, and economic status (P>0.05). These findings suggest that the two groups were demographically comparable and homogeneous.

Discussion

The present study aimed to assess the levels of anxiety, depression, stress, and health anxiety in parents of children with CKD and compare these levels with those of parents of healthy children. The findings revealed that parents of children with CKD experienced significantly higher levels of anxiety and stress compared to the control group. However, no significant differences were found between the two groups in terms of depression and health anxiety. These findings are clinically and psychologically meaningful, suggesting that a child's chronic illness affects not only their physical health but also has a profound impact on the mental health of their parents.

Parents' elevated anxiety levels are consistent with several research showing similar results in a variety of cultural contexts. Studies from Belgium and Brazil have shown that parents of children with CKD or those receiving renal replacement therapy report high levels of stress and anxiety as a result of uncertainty about the course of the disease, treatment complications, and the demands of providing care [14, 15]. Similarly, caregivers in Oman have been found to experience substantial psychological strain, with higher anxiety among those supporting children or adults receiving dialysis compared to those following transplantation, indicating that treatment modality and disease stage may intensify caregiver anxiety [16].

The heightened stress observed in our study further emphasizes the enduring emotional and physical toll associated with chronic caregiving. Previous research suggests that parents' stress is closely linked to the cumulative demands of managing complex treatment regimens, navigating healthcare systems, and maintaining daily family stability [9, 10]. Internationally, studies have shown a similar trend. Caregivers of pediatric CKD patients experience moderate to severe stress and a lowered quality of life. This stress worsens with longer caregiving periods and less social support [17]. These elevated levels may

J Ped Nephrol
Journal of Pediatric Nephrology

Table 1. Demographic characteristics of the participating parents

Variables	Category	No. (%)	Variables	Category	No. (%)
Gender	Father	15(21.4)	Marital status	Single	4(5.7)
	Mother	55(78.6)		Married	66(94.3)
Education	Less than high school diploma	22(31.4)	Economic status	Poor	7(10.0)
	High school diploma	23(32.9)		Moderate	39(55.7)
	Associate degree	6(8.6)		Decent	22(31.4)
	Bachelor's degree	17(24.3)		Excellent	2(2.9)
	Master's/doctorate degree	2(2.9)			
Employment status	Unemployed	50(71.4)			
	Employed	20(28.6)			

stem from persistent concerns regarding the prognosis of the disease, treatment-related expenses, disruptions in family roles, and the demands of long-term caregiving. The study by Mahmoud et al. reported high anxiety levels among parents of children undergoing dialysis, a finding consistent with the present study. This result supports the notion that parental anxiety is closely associated with the type and progression of the child's illness [10].

Regarding stress, 25.7% of parents in the CKD group experienced extremely severe levels, compared to 5.7% in the control group. This significant difference in stress could be attributed to continuous exposure to stressful situations, including the need to monitor treatment regimens, manage dietary restrictions, and adjust daily routines. These findings are in agreement with those of Tsai et al., who reported high stress among caregivers of children undergoing peritoneal dialysis [7]. The results similarly correspond with the findings of Mahmoud et al., which indicated elevated stress levels in parents of children with chronic illnesses [10]. This consistency highlights the universal importance of addressing the mental health needs of parents across different cultural contexts.

Regarding depression, although no statistically significant difference was observed between the two groups, a linear-by-linear association test at the one-tailed level revealed a significant trend toward increased depression in

Table 2. Comparison of stress, anxiety, and depression levels in parents of children with CKD and parents of healthy children

Levels	No. (%)			P	No. (%)			P	No. (%)			P
	Anxiety				Depression				Stress			
	CKD Group	Healthy Group	Total		CKD Group	Healthy Group	Total		CKD Group	Healthy Group	Total	
Normal	13(37.1)	17(48.6)	30(42.9)	0.044	13(37.1)	22(62.9)	35(50.0)	0.117	13(37.1)	22(62.9)	35(50.0)	0.047
Mild	2(5.7)	0(0)	2(2.9)		7(20.0)	6(17.1)	13(18.6)		4(11.4)	6(17.1)	10(14.3)	
Moderate	6(17.1)	11(31.4)	17(24.3)		7(20.0)	1(2.9)	8(11.4)		6(17.1)	2(5.7)	8(11.4)	
Severe	3(8.6)	4(11.4)	7(10.0)		3(8.6)	3(8.6)	6(8.6)		3(8.6)	3(8.6)	6(8.6)	
Extremely severe	11(31.4)	3(8.6)	14(20.0)		5(14.3)	3(8.6)	8(11.4)		9(25.7)	2(5.7)	11(15.7)	
Chi-square	9.169				7.391				9.169			
Degrees of freedom	4				4				4			
Contingency coefficient (C)	0.333				0.231				0.340			

CKD: Chronic kidney disease.

Table 3. Comparison of health anxiety levels in parents of children with CKD and healthy children

Health Anxiety Levels	No. (%)			P	Degrees of Freedom	Test Statistic
	CKD Group (n=35)	Healthy Group (n=35)	Total (n=70)			
Low	33(94.3)	32(91.4)	65(92.9)	0.840	2	1.545
Moderate	1(2.9)	2(5.7)	3(4.3)			
High	1(2.9)	1(2.9)	2(2.9)			
Total	35(100)	35(100)	70(100)			

CKD: Chronic kidney disease.

the patient group. The absence of a significant difference in health anxiety between groups provides an important nuance. Health anxiety typically refers to preoccupation with one's own health rather than concern for others, and therefore may be less pronounced in parents whose psychological focus is primarily directed toward their child's condition. Recent work has shown that caregivers of CKD patients tend to experience distress associated with caregiving demands and perceived child vulnerability rather than illness-related anxiety about themselves [18]. This finding suggests that while the clinical prevalence of depression was not high in this sample, there was nonetheless a tendency toward depressive symptoms. This trend may be attributed to chronic fatigue, feelings of guilt, or a perceived loss of control over daily life. A study by Tsai et al. reported a higher prevalence of depression among parents of children with CKD, which conceptually aligns with the current findings, although

Table 4. Comparison of demographic characteristics of parents in the patient and healthy groups

Variables	Category	No. (%)		P
		Patient Group	Healthy Group	
Parent gender	Mother	29(82.9)	26(74.3)	0.382
	Father	6(17.1)	9(25.7)	
Marital status	Married	32(91.4)	34(97.1)	0.303
	Single	3(8.6)	1(2.9)	
Employment status	Unemployed	27(77.1)	23(65.7)	0.290
	Employed	8(22.9)	12(34.3)	
Education	Less than high school diploma	12(34.3)	10(28.6)	0.452
	High school diploma	13(37.1)	10(28.6)	
	Associate degree	2(5.7)	4(11.4)	
	Bachelor's degree	6(17.1)	11(31.4)	
	Master's degree	1(2.9)	0(0)	
	Doctorate and above	1(2.9)	0(0)	
Economic status	Poor	3(8.6)	4(11.4)	0.236
	Moderate	20(57.1)	19(54.3)	
	Decent	10(28.6)	12(34.3)	
	Excellent	2(5.7)	0(0)	

the difference was not statistically significant. Such a discrepancy may be due to variations in measurement tools, sample size, or demographic characteristics of the studied populations [7].

The current findings also help improve the global understanding of CKD caregiving. Research across Europe, Asia, and the Middle East consistently shows that caregivers, mainly mothers, are at risk for psychological distress [19]. This is particularly true when their children undergo dialysis or have to stay in the hospital multiple times.

In terms of health anxiety, over 90% of parents across both groups fell into the low-level category, with no significant difference being observed. This finding indicates that health anxiety, which is more related to individual perceptions of their own health status, may not be directly influenced by the child's illness. This is consistent with previous studies focusing on health anxiety in parents. Overall, this result could suggest that parents are more concerned about the health of their child than their own. Furthermore, the anxiety of parents manifests more as general anxiety or stress rather than health-specific anxiety.

A comparison of demographic characteristics between the two groups revealed no significant differences in terms of parental gender, marital status, employment status, education level, or economic situation. This finding indicates that the two groups are comparable and homogeneous with respect to demographic confounding variables. Therefore, the observed differences in anxiety and stress levels are more likely attributed to the child's illness status rather than demographic factors.

Conclusion

This study demonstrates that parents of children with CKD experience higher levels of anxiety and stress compared to parents of healthy children, highlighting the significant psychological impact of pediatric chronic illness on caregivers. These findings underscore the need for healthcare providers to recognize and address parental mental health as an integral part of comprehensive CKD care.

This study is limited in terms of its use of convenience sampling and a relatively small sample size, which may limit the generalizability of the findings. Furthermore, the cross-sectional design of the study hinders the ability to infer causal relationships. Moreover, the large number of questionnaire items may have led to respondent fatigue and reduced accuracy in responses. Another limitation is the lack of measurement of the frequency and duration of parent-child interactions, which could be an important confounding variable.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Resaerch Ethics Committee of Arak University of Medical Sciences, Arak, Iran (Code: IR.ARAKMU.REC.1403.036). Initially, the study objectives were explained to the parents, and written informed consent was obtained from those who agreed to participate.

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Authors' contributions

Conceptualization: Mehran Shayganfard; methodology and formal analysis: Pegah Mohaghegh; Writing: Younes Motiee; Supervision and project administration: Parsa Yousefichaijan; Supervision: Anita Alaghemand and Alireza Toghra.

Conflict of interest

The authors declared no conflict of interest.

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