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Original Article

Comparison of Emotional Expressivity and Tolerance of Ambiguity in Patients with Chronic Kidney Disease and Healthy Controls: A Cross-Sectional Study

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Abstract

Background: Emotional expressivity and tolerance of ambiguity are psychological factors linked to adjustment in chronic illness. Chronic kidney disease (CKD), characterized by long-term treatment and uncertainty, may significantly impact these variables. Identifying differences between patients and healthy individuals can inform targeted psychological support.

Objective: This study compared emotional expressivity and tolerance of ambiguity between adults with CKD and healthy controls.

Methods: In this cross-sectional study, 180 CKD patients were purposively recruited from renal care centers in Zanjan (spring-summer 2024). A matched group of 180 healthy individuals was selected via convenience sampling. Participants completed the Emotional Expressivity Questionnaire (EEQ) and the Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II). Group comparisons were performed using independent samples t-tests, with Cohen's d for effect sizes (α=0.05).

Results: Emotional expressivity was significantly lower in the CKD group (M=48.5, SD=13.4) than in controls (M=52.4, SD=9.7), with a mean difference of -3.9 (95% CI: -6.4 to -1.4; *p*=0.002) and a moderate effect size (d=0.33). In contrast, no significant difference was found in tolerance of ambiguity between CKD patients (M=40.9, SD=9.86) and controls (M=39.43, SD=8.72), with a mean difference of 1.47 (95% CI: -0.36 to 3.30; *p*=0.56) and a small effect size (d=0.16).

Conclusion: While ambiguity tolerance was similar between groups, CKD patients exhibited notably reduced emotional expressivity. This underscores the emotional burden of CKD and highlights the need for integrative care models that promote emotional awareness and expression as part of standard clinical management.

Implications for Nursing and Midwifery Preventive Care

▪ The findings of this study may inform preventive psychological approaches in nursing and midwifery care for patients with CKD, particularly in addressing stress and psychological burden, and may help healthcare professionals recognize low emotional expressivity as a potential factor associated with chronic conditions.

Introduction

Chronic kidney disease (CKD) is one of the most important public health concerns worldwide [1]. According to statistics, the global prevalence of CKD is approximately 10% of the total population, and this rate is rapidly increasing [2]. Chronic diseases such as kidney failure, due to the prolonged involvement of individuals with the illness and its treatment, not only impair physical health and impose an economic burden but also affect all social and psychological aspects of patients' lives. Consequently, they lead to reduced quality of life, depression and anxiety, sleep disturbances, and decreased hope for life among patients and their caregivers [3]. Psychological parameters are associated with adverse health outcomes in patients with chronic kidney disease [4]. These patients often experience worry, shock, distrust, abandonment, social isolation, anger, and fear [5]. Chronic exposure to negative emotions and prolonged stress activates immune responses, which in turn predispose individuals to psychological disorders such as anxiety and depression [6]. The presence of these disorders, particularly depression, significantly reduces treatment adherence among kidney patients [7], thereby exacerbating the disease and increasing mortality rates [8]. Persistent experience of negative emotions often leads to the suppression of emotional expression, which in turn heightens stress and contributes to the development of psychological disorders [9]. Conversely, individuals' ability to express emotions is an important component that fosters emotional awareness [10]. Emotional expressivity, as a core component of emotion, refers to the outward display of feelings regardless of their valence (positive or negative) or mode of expression (facial, verbal, or bodily) [11]. Emotional expression plays a crucial role in maintaining interpersonal relationships. Emotional approach coping, such as actively processing and expressing emotions, can elicit positive social responses and secure social support, which acts as a protective buffer against illness and enhances adjustment in patients with chronic diseases such as breast cancer [12]. Evidence indicates that individuals with chronic kidney disease have lower emotional awareness than healthy individuals [13], experience higher levels of emotional ambivalence and alexithymia, and are therefore more susceptible to psychosomatic disorders [14]. Moreover, research in other chronic illnesses, including cancer and cardiovascular disease, has demonstrated that emotional expressivity predicts the quality of interpersonal relationships and contributes to a better understanding of patients' psychological pathology [15-17]. On the other hand, emotion regulation through changes in emotional expression may influence tolerance of ambiguity [18]. Tolerance of ambiguity refers to the degree to which an individual can accept and manage the cognitive challenges associated with ambiguous situations. In today's complex world, tolerance of ambiguity functions as an essential skill that enables individuals to respond swiftly and adapt effectively to uncertain circumstances [19]. Reactions to ambiguity manifest in cognitive forms (a tendency to perceive situations dichotomously), emotional forms (feelings of disgust, distress, anger, or anxiety), and behavioral forms (avoidance of ambiguous situations) [20]. Individuals with low tolerance of ambiguity tend to feel discomfort when facing complex or uncertain situations and, due to deficiencies in cognitive processing, struggle to find appropriate solutions. Such individuals often become overwhelmed by anxiety and mental rumination in ambiguous contexts and fail to process new information effectively [21]. This condition is characterized by rigid cognitive patterns, confirmation bias, and a persistent sense of threat, which together increase the likelihood of generalized anxiety disorder [22]. Patients with chronic physical symptoms exhibit lower levels of psychological flexibility [23], whereas individuals with higher psychological flexibility report better quality of life in the context of chronic kidney disease [24]. Moreover, low tolerance of ambiguity has been associated with poorer adaptation to medical care in these patients [25]. Similar findings have been reported in other chronic illnesses; for instance, patients with leukemia exhibit lower tolerance of ambiguity than healthy individuals [26]. Among patients with multiple sclerosis, greater tolerance of ambiguity has

been linked to higher life expectancy and reduced death anxiety [27]. In patients with lung cancer, anxiety sensitivity and death anxiety have been identified as major predictors of intolerance of ambiguity [28].

Objectives
This study aimed to compare emotional expressivity and tolerance of ambiguity between individuals diagnosed with chronic kidney disease (CKD) and healthy controls.

It was hypothesized that patients with CKD would demonstrate lower levels of both emotional expressivity and ambiguity tolerance compared to individuals without the disease.

Methods

Study Design and Setting
A descriptive-comparative, cross-sectional study was conducted in Zanjan, Iran, between the spring and summer of 2024. The study setting included three major renal care centers: the Kidney Association Center, Valiasr Hospital, and Bahman Hospital.

Participants and Sampling
The sample consisted of 360 participants divided into two independent groups.
The patient group included 180 adults with a confirmed diagnosis of chronic kidney disease (CKD), purposively recruited from the aforementioned clinical centers. The control group comprised 180 healthy adults without kidney disease, selected via convenience sampling from the general population of Zanjan.

Inclusion and Exclusion Criteria
Inclusion criteria for all participants were: (1) residency in Zanjan, and (2) basic literacy (ability to read and write). For the patient group, an additional mandatory criterion was a CKD diagnosis formally confirmed by an internist or nephrologist. For the

healthy control group, the key inclusion criterion was the absence of any kidney disease. The primary exclusion criterion for both groups, applied during data cleaning, was the submission of an incomplete questionnaire.

Instruments and Measures
Data were collected using two validated self-report questionnaires:

Emotional Expressivity Questionnaire (EEQ): Developed by King and Emmons (1990), this 16-item scale measures three dimensions of emotional expressivity (positive, intimate, and negative) on a 5-point Likert scale. Total scores range from 16 to 80, with higher scores indicating greater expressivity. In this study, the scale demonstrated good internal consistency (Cronbach's $\alpha = 0.76$) [29].

Multiple Stimulus Types Ambiguity Tolerance Scale-II (MSTAT-II): Developed by McLain (2009), this 13-item instrument assesses an individual's tolerance for ambiguous situations on a 5-point Likert scale. Scores range from 13 to 65, with higher scores reflecting greater tolerance. In the present study, the scale showed high internal consistency (Cronbach's $\alpha = 0.83$) [30].

Demographic and clinical data (e.g., age, gender, education, CKD duration, etiology) were also collected.

Data Analysis
All statistical analyses were performed using SPSS software (Version 24). Descriptive statistics were used to summarize demographic characteristics. The normality of data distribution for the main variables was confirmed using the Kolmogorov-Smirnov test. The primary analysis involved conducting independent samples t-tests to compare the mean scores of emotional expressivity and tolerance of ambiguity between the CKD and control groups. Effect sizes were calculated using Cohen's d, and a p-value of less than 0.05 was considered statistically significant. Results are reported as mean (M) ± standard deviation (SD).

Results

A total of 360 participants (180 CKD patients, 180 healthy controls) were included in the analysis. The majority of the overall sample were female (54.4%), married (62.8%), and had an education level below a high school diploma (43.8%). The mean age was 50.8 years (SD = 13.1) in the CKD group and 49.6 years (SD = 11.4) in the control group. Among CKD patients, the mean duration of illness was 2.8 years (SD = 2.1), with diabetes (40.6%) and hypertension (23.3%) being the most common etiologies. The full demographic and clinical profile of the sample is presented in Table 1. Descriptive statistics and the results of independent samples t-tests comparing the main study variables between groups are detailed in Table 2. A significant between-group difference was found in the total score for emotional expressivity, t (358) =3.15t (358) =3.15, p=.002 p=.002. Patients with CKD (M=48.5M=48.5, SD=13.4SD=13.4) reported significantly lower overall emotional expressivity than healthy controls (M=52.4M=52.4, SD=9.7SD=9.7), with a mean difference of -3.9 (95% CI [-6.4, -1.4]) and a moderate effect size (Cohen's d=0.33d=0.33). This pattern was consistent for the subscales of positive emotional expression (p=.002, p=.002) and negative emotional expression (p=.001, p=.001), but not for the expression of intimacy subscale (*p*=.060, *p*=.060).

In contrast, no statistically significant difference was observed between the groups in tolerance of ambiguity, t (358) =0.58t (358) =0.58, *p*=.560 *p*=.560. The CKD group (M=40.9 M=40.9, SD=9.86 SD=9.86) and the control group (M=39.43 M=39.43, SD=8.72 SD=8.72) scored similarly, with a mean difference of 1.47 (95% CI [-0.36, 3.30]) and a negligible effect size (Cohen's d=0.16 d=0.16).

Discussion

The present study aimed to compare emotional expressivity and tolerance of ambiguity between individuals with chronic kidney disease (CKD) and healthy controls. The primary finding indicated that healthy participants demonstrated significantly higher levels of emotional expressivity compared to patients with CKD.

This result aligns with prior research on chronic illnesses. The findings are consistent with Amiri et al. [31], who reported significantly higher levels of emotional ambivalence and alexithymia in patients compared to healthy individuals, noting these maladaptive emotional patterns may predispose individuals to psychosomatic disorders. Similarly, Shafiei et al. [32] identified emotional expressivity as a significant predictor of interpersonal relationship quality in cancer patients. Eram [33] found that individuals with heart disease were more inclined to use cognitive reappraisal for emotion regulation and less likely to suppress emotions compared to non-patients. Furthermore, Mahdavi and Menshaei [34] highlighted the key role of emotional expressivity and alexithymia in understanding the psychopathology of coronary artery disease patients.

These findings can be interpreted within the context of the CKD experience. Patients endure substantial physiological changes and considerable psychological distress. Awareness of the disease's progressive nature and the burdens of long-term treatment, such as dialysis, generates significant stress. Prolonged illness often impairs psychosocial functioning, leading to anxiety, depression, and social withdrawal [35]. Emotional expression is crucial for maintaining relationships and securing social support, which acts as a protective buffer [36, 37]. Faced with physical and psychological challenges, CKD patients may experience a gradual erosion of social connectivity and a consequent impairment in emotional expressivity. Conversely, the free expression of emotions is associated with better mental health [38], while emotional suppression may contribute to psychological and physical morbidity [39]. Thus, the current study confirms that, similar to other chronic conditions like cancer and cardiovascular disease [31-34], CKD is associated with diminished emotional expressivity.

Table 1. Demographic and Clinical Characteristics of Participants by Group

Characteristic	Category	Total (N = 360) n (%)	Control (n = 180) n (%)	CKD (n = 180) n (%)
Gender	Female	196 (54.4)	114 (63.3)	82 (45.6)
	Male	164 (45.6)	66 (36.7)	98 (54.4)
Age (Years)	1–20	3 (0.8)	3 (1.7)	0 (0.0)
	21–30	65 (18.1)	64 (35.6)	1 (0.6)
	31–40	83 (23.1)	48 (26.7)	35 (19.4)
	41–50	66 (18.3)	34 (18.9)	32 (17.8)
	51–60	67 (18.6)	18 (10.0)	49 (27.2)
	> 61	76 (21.1)	13 (7.2)	63 (35.0)
Education Level	Below Diploma	158 (43.8)	19 (10.6)	139 (77.2)
	Diploma	43 (11.9)	21 (11.7)	22 (12.2)
	Bachelor's Degree	74 (20.5)	62 (34.4)	12 (6.7)
	Master's Degree	78 (21.6)	72 (40.0)	6 (3.3)
	PhD	7 (1.9)	6 (3.3)	1 (0.6)
Marital Status	Single	134 (37.2)	113 (62.8)	21 (11.7)
	Married	226 (62.8)	67 (37.2)	159 (88.3)
Disease Etiology	Diabetes	—	—	73 (40.6)
	Hypertension	—	—	42 (23.3)
	Infection	—	—	35 (19.4)
	Nephrolithiasis	—	—	9 (5.0)
	Unknown	—	—	21 (11.7)
Illness Duration	1 Month – 2 Years	—	—	97 (53.9)
	3 – 5 Years	—	—	49 (27.2)
	6 – 8 Years	—	—	21 (11.7)
	9 – 11 Years	—	—	13 (7.2)

Table 2. Descriptive Statistics and Group Comparisons for Emotional Expressivity and Ambiguity Tolerance

Variable	Group	M (SD)	Mean Difference [95% CI]	t (358)	p	Cohen's d
Emotional Expressivity						
Total Score	Control	52.4 (9.7)	-3.9 [-6.4, -1.4]	3.15	0.002	0.33
	CKD	48.5 (13.4)				
Positive Expression	Control	23.9 (4.9)	-2.0 [-3.2, -0.7]	3.08	0.002	0.33
	CKD	21.9 (6.7)				
Negative Expression	Control	13.3 (3.4)	-2.6 [-4.1, -1.1]	3.41	0.001	0.36
	CKD	10.7 (5.2)				
Intimacy Expression	Control	15.1 (3.4)	0.7 [-0.03, 1.4]	1.89	0.060	0.19
	CKD	15.8 (4.1)				
Tolerance of Ambiguity						
Total Score	Control	39.43 (8.72)	1.47 [-0.36, 3.30]	0.58	0.560	0.16
	CKD	40.9 (9.86)				

CI = Confidence Interval. Significant p-values (< .05) and their corresponding effect sizes are in bold.

Conversely, the study found no significant difference in tolerance of ambiguity between CKD patients and healthy controls. No prior study has directly examined this construct in a CKD population, but research on other chronic illnesses presents mixed findings. For instance, Pourmohseni Koluri et al. [40] reported lower ambiguity tolerance in leukemia patients compared to healthy individuals. Similarly, Waroquier et al. [41] noted that intolerance of ambiguity negatively impacted treatment quality in patients with breast cancer and heart disease.

The current null finding may be explained by several factors specific to the CKD trajectory. Kidney transplantation can significantly improve quality of life [42], and levels of hope among CKD patients are often relatively high [43]. Although CKD and its treatments (e.g., hemodialysis) create uncertainty in daily life [35], patients may develop adaptive coping mechanisms over time, enhancing their ability to tolerate ambiguity. Tolerance of ambiguity allows individuals to function effectively despite uncertainty and engage in problem-solving [44, 45]. For CKD patients facing uncertainties around transplantation and disease progression, this capacity may be a crucial component of psychological adaptation. This study has several limitations. Its descriptive-comparative design and limited geographic scope (confined to Zanjan, Iran) restrict causal inference and generalizability. Convenience and voluntary sampling may introduce self-selection

bias. The healthy control group was not screened for other chronic conditions, potentially confounding results. The use of self-report measures carries risks of social desirability bias and item misinterpretation. The cross-sectional design cannot track changes over time, and several confounding variables (e.g., socioeconomic status, psychotherapy history, social support) were not controlled.

Despite these limitations, the study possesses notable strengths. It employed standardized, validated instruments with good reliability. The sample was well-defined, encompassing the accessible CKD population in the region. The study adhered to strict ethical principles. Finally, the findings have practical implications, underscoring the need for psychological interventions, such as emotional expression training, within multidisciplinary CKD care.

Conclusion

The findings of the present study revealed no significant difference in tolerance of ambiguity between individuals with chronic kidney disease and those without the disease. However, a significant difference was observed in emotional expressivity, with patients demonstrating lower levels of emotional expression compared to healthy individuals.

This suggests that the presence of CKD may specifically impair emotional expressivity, likely due to the cumulative psychological burden associated with chronic illness.

These results underscore the necessity of integrating psychological and emotional care into the standard management of chronic medical conditions such as CKD. It is therefore recommended that healthcare providers, including physicians, nurses, and psychotherapists, along with family members, actively attend to the emotional well-being of patients. Implementing targeted psychological interventions, such as structured emotional expression training, could promote adaptive emotion regulation, enhance psychosocial adjustment, and ultimately support better overall health outcomes in this population.

Conflict of Interest

The authors of the present article report no conflicts of interest.

Authors' Contributions

Khanbabaei F, Sobhi A was responsible for study design, data collection, data analysis, and manuscript drafting.

Provided scientific supervision and final editorial review, and all authors approved the final version of the manuscript.

Artificial Intelligence Utilization for Article Writing

No artificial intelligence tools were used in writing the manuscript. AI assistance was only used to help revise responses to reviewer comments.

Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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