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The Effect of Cognitive Behavioral Therapy on Depression and Quality of Life in Chronic Kidney Disease Patients: A Quasi-Experimental Study

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ABSTRACT

Chronic Kidney Disease (CKD) imposes substantial physical and psychological burdens, with depression significantly exacerbating the decline in patients' health-related quality of life (QOL). This study aimed to assess the efficacy of Cognitive Behavioral Therapy (CBT) in alleviating depressive symptoms and enhancing the QOL of CKD patients. Methods: A quasi-experimental study was conducted with 70 CKD patients experiencing depressive symptoms (BDI > 14), who were divided into intervention (n=35) and control (n=35) groups. The intervention group underwent an eight-week CBT program consisting of structured weekly sessions (30–60 minutes each), while the control group received routine medical care only. Depression and QOL were evaluated pre- and post-intervention using the Beck Depression Inventory (BDI) and the WHOQOL instrument, respectively. Analysis using the Mann-Whitney test showed a statistically significant improvement in the intervention group compared with the control group (p = 0.000). Following the intervention, 48.6% of participants in the CBT group transitioned to a "no depression" state, and 60.0% reported a "good" QOL, whereas the control group remained largely unchanged with high rates of severe depression. The integration of structured CBT into clinical nursing care provides a robust, holistic approach to improving the psychological and physical well-being of CKD patients. These results underscore the importance of incorporating routine mental health screening and evidence-based psychological interventions into standard renal care protocols.

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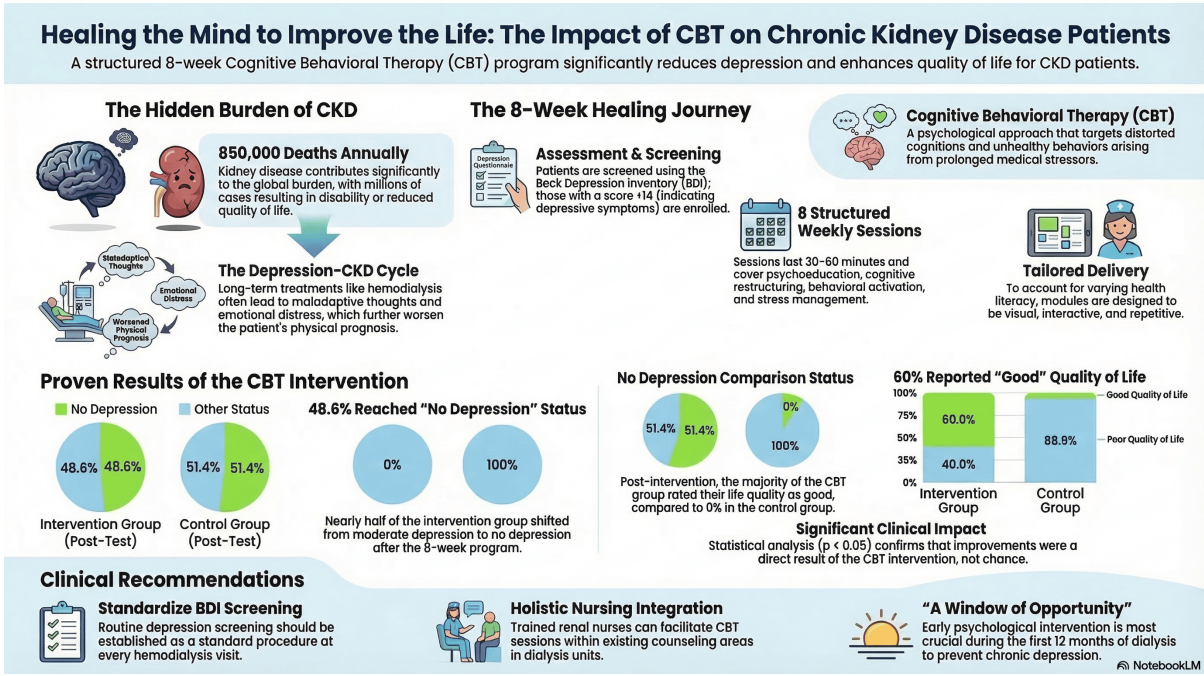
Key Messages:

- An eight-week structured program of Cognitive Behavioral Therapy (CBT) significantly mitigates depressive symptoms and enhances the overall quality of life (QOL) among patients with stage 3–5 chronic kidney disease (CKD), effectively facilitating a clinical transition from moderate-severe depression to non-depressed states
- The incorporation of routine psychological screening and evidence-based CBT into standard renal nursing protocols is essential for a holistic management approach, as it addresses the critical yet often neglected psychological burdens that exacerbate the physical decline of CKD patients

GRAPHICAL ABSTRACT



INTRODUCTION

World Health Organization (WHO) and the Global Burden of Disease (GBD) project, kidney disease in the urinary tract contributes significantly to the global burden of disease, with approximately 850,000 deaths annually and 15,010,167 cases of disability or reduced quality of life. Chronic kidney disease (CKD) ranks 27th among the leading causes of death worldwide (1) . Based on the Indonesian Renal Registry (IRR) in 2018, the number of CKD patients registering for hemodialysis units in Indonesia continues to increase by 10% annually (2). At Bahteramas General Hospital, cases of CKD increase by 0.2% each year (3).

Chronic Kidney Disease (CKD) is one of the illnesses that has a serious impact on patients' quality of life (4). CKD patients undergoing hemodialysis often face mental health issues such as anxiety and depression (5). Patients with CKD must undergo long-term treatments such as hemodialysis or kidney transplantation, which have a major impact on their daily lives. In addition to physical problems, CKD patients often experience psychological disorders, including depression, anxiety, and stress. These conditions further worsen their quality of life, reduce their ability to cope with daily challenges, and hinder their recovery or adaptation to medical conditions (6).

Cognitive Behavioral Therapy (CBT) is grounded in the theory that maladaptive thoughts and behaviors contribute to emotional distress. By identifying and modifying negative cognitive and behavioral patterns, CBT helps patients develop healthier coping strategies. In the context of chronic illness such as CKD, CBT specifically targets the distorted cognitions and behavioral responses that often arise from prolonged medical stressors and lifestyle limitations, making it a relevant and evidence-based psychological approach for improving both mental health and overall quality of life (7).

Depression among CKD patients is a common problem that can worsen the prognosis of the disease. One of the most widely used tools to assess depression levels in patients is the Beck Depression Inventory (BDI), which can measure the severity of depressive symptoms (8). Considering the importance of psychological aspects in the recovery of CKD patients, various psychological approaches such as counseling therapy can improve patients' quality of life by reducing depressive symptoms and enhancing their emotional well-being (9).

This study carries a high level of urgency given the increasing prevalence of CKD both in Indonesia and worldwide, especially in regional areas. The rising number of CKD patients is often accompanied by various related health issues, including psychological disorders. The quality of life of CKD patients is not only influenced by their physical condition but also by emotional and psychological factors such as

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depression and anxiety. Thus, it is important to understand the role of psychological interventions in addressing these problems (10).

Psychological interventions have the potential to provide positive impacts on CKD patients, but few studies have thoroughly evaluated their effectiveness in the Indonesian context. Considering the significant impact of depression on the quality of life of CKD patients, this research can serve as a reference to further explore how psychological therapy (counseling) can be applied more broadly to enhance emotional well-being in CKD patients (11).

While medical approaches to managing CKD are well established, psychological aspects are still often neglected in many clinical practices (12). This study can provide strong evidence of the importance of psychological approaches in CKD patient care, emphasizing not only physical treatment but also patients' mental well-being. It is expected that this will encourage healthcare professionals and nurses to pay more attention to the psychological aspects of CKD patients in their clinical practice (13).

The psychological interventions applied and their effectiveness in comprehensively improving the quality of life of CKD patients, including the measurement of depression levels using the BDI, have not been extensively studied in detail (12). Therefore, this study aims to evaluate the effectiveness of psychological interventions in improving the quality of life of CKD patients using BDI as the main tool for assessing depression (7).

METHODS

This study employed a quantitative approach with a quasi-experimental design using a pre-post with control group design (14). In this study, the researcher provided a psychological intervention in the form of Cognitive Behavioral Therapy (CBT) using the Beck Depression Inventory (BDI) tool to improve the quality of life among patients with chronic kidney disease (CKD) before and after the intervention. The sample size in this study consisted of 70 respondents, who were divided into two groups: the intervention group and the control group.

The sample criteria in this study included patients diagnosed with stage 3, 4, and 5 CKD, aged between 18 and 60 years, patients experiencing depressive symptoms identified by a Beck Depression Inventory (BDI) score > 14, those willing to participate in the study and sign an informed consent form, patients without mental disorders that could not be managed through psychological interventions (psychotic disorders), and patients able to follow instructions and complete the intervention sessions. The sampling technique used was simple random sampling.

The research instruments included two main tools: depression was measured using the Beck Depression Inventory (BDI), which consists of 21 items assessing the intensity of depressive symptoms over the past two weeks. BDI scores were used to categorize patients into mild, moderate, or severe depression. Quality of life was measured using the WHOQOL instrument, which evaluates quality of life in four dimensions: physical, psychological, social, and environmental (15). Quality of life was assessed at two points in time (pre-test and post-test). Data were analyzed using the Mann-Whitney test.

Research Procedure, Pre-test: All participants completed baseline assessments to measure depression levels using the Beck Depression Inventory (BDI) and quality of life using the World Health Organization Quality of Life (WHOQOL) instrument (16).

Psychological Intervention: Participants in the intervention group received Cognitive Behavioral Therapy (CBT) sessions over eight weeks, consisting of eight structured sessions: (psychoeducation on depression and chronic kidney disease, identification of negative thoughts, cognitive restructuring (changing negative thoughts), behavioral activation, stress management, goal setting and motivation enhancement, social skills and support, and reflection with future planning). Each session lasted 30–60 minutes and was conducted once per week (17). Control Group: Participants in the control group did not receive any psychological intervention and continued their routine medical care as usual.Post-test: After eight weeks, post-intervention assessments were conducted using the BDI and WHOQOL instruments to evaluate changes in depression levels and quality of life (18).

Data Analysis: Descriptive statistics (Mean Rank, Sum Of Ranks, and frequency) were used to describe participants' demographic characteristics and baseline variables. The Mann-Whitney U test was

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applied to compare differences in depression levels and quality of life between the intervention and control groups before and after the intervention. A significance level of $p < 0.05$ was considered statistically significant (14).

CODE OF HEALTH ETHICS

All procedures in this study have received ethical approval and were declared ethically feasible by the Health Research Ethics Committee of Bahteramas General Hospital, Southeast Sulawesi Province, as stated in the ethical approval certificate Number: 43/KEP/RSUD/VI/2025.

RESULTS

Table 1 outlines the baseline demographic and clinical characteristics of the study's respondents, revealing a predominantly female cohort (70.0%) where the largest age group falls between 31 and 40 years old (47.1%). The majority of participants are married (62.9%) and have completed senior high school (42.9%), with housewives (37.1%) and entrepreneurs (34.3%) as the most common occupational backgrounds. From a clinical perspective, a significant majority of respondents are in the early stages of hemodialysis (HD), with 65.7% having a treatment duration of 1 to 12 months. Furthermore, hypertension emerges as the primary comorbid disease within this population, recorded at 48.6%, followed by other unspecified comorbidities (30.0%), heart disease (11.4%), and diabetes mellitus (10.0%).

Table 1. Characteristics of Respondents

Variable	Category	n	%
Sex	Male	21	30
	Female	49	70
Age (years)	31-40	33	47.1
	41-50	18	25.7
	51-59	19	27.1
Marital status	Married	44	62.9
	Single	17	24.3
	Widowed/Divorced	9	12.8
Education level	Undergraduate	12	17.1
	Senior High School	30	42.9
	Junior High School	26	37.1
	Primary School	2	2.9
Occupation	Housewife	26	37.1
	Civil Servant	17	24.3
	Retired	3	4.3
	Entrepreneur	24	34.3
Duration of HD	1 - 12 months	46	65.7
	13 - 24 months	14	20.0
	>25 months	10	14.3
Comorbid diseases	Hypertension	24	48.6
	Heart disease	8	11.4
	Diabetes mellitus	7	10.0
	Other comorbidities	21	30.0

Table 2 presents a univariate analysis evaluating the impact of psychological interventions on depression severity and quality of life among patients with chronic kidney disease. Following the intervention, the treatment group demonstrated a substantial reduction in depressive symptoms, shifting from predominantly moderate depression (65.8%) at baseline to experiencing either no depression (48.6%) or merely mild depression (45.7%) post-test. Concurrently, the intervention group's quality of life markedly improved, transitioning from predominantly poor (45.7%) and fair (54.3%) baseline statuses to a predominantly good (60.0%) status post-test, with no patients remaining in the poor category. Conversely, the control group exhibited negligible changes across both metrics over the same period, maintaining high rates of severe (42.9%) and moderate (34.3%) depression alongside a persistently poor

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(88.9%) quality of life at the post-test evaluation. These strongly divergent outcomes between the two cohorts indicate that the implemented psychological intervention was highly effective in simultaneously alleviating depressive symptoms and enhancing the overall quality of life in this patient population.

Table 2. Univariate Analysis Evaluation of the Effectiveness of Psychological Interventions Using the Beck Depression Inventory Tool in Improving the Quality of Life of Patients with Chronic Kidney Disease

Variable	Group	Category	Pre Test		Post Test	
			n	%	n	%
Depression	Intervention	No depression	0	0	17	48.6
		Mild depression	6	17.1	16	45.7
		Moderate depression	23	65.8	2	5.7
		Severe depression	6	17.1	0	0
	Control	Mild depression	9	25.7	8	22.9
		Moderate depression	10	28.6	12	34.3
		Severe depression	16	45.7	15	42.9
Quality of Life	Intervention	Poor	16	45.7	0	0
		Fair	19	54.3	14	40.0
		Good	0	0	21	60.0
	Control	Very poor	1	2.9	2	5.7
		Poor	29	82.9	29	88.9
		Fair	5	14.3	4	11.4

Table 3. Bivariate Analysis of the Effectiveness of Psychological Interventions Using the Beck Depression Inventory in Improving Quality of Life among Patients with Chronic Kidney Disease

Group	N	Mean Rank	Sum Of Ranks	Asymp. Sign	α
Intervention Group Depression	35	18.17	636.00	0.000	0.05
Control Group Depression	35	52.83	1849.00		
Intervention Group Quality of Life	35	53.00	1855.00	0.000	0.05
Control Group Quality of Life	35	18.00	636.00		

Table 3 presents the bivariate analysis evaluating the effectiveness of psychological interventions on depression and quality of life among patients with chronic kidney disease, revealing highly significant differences between the intervention and control cohorts. The analysis demonstrates that the intervention group (N=35) experienced a statistically significant reduction in depression compared to the control group (N=35), as evidenced by a lower mean rank of 18.17 versus 52.83 (p = 0.000, α = 0.05). Conversely, regarding the quality of life, the intervention group exhibited a substantial and statistically significant improvement, achieving a markedly higher mean rank (53.00) than the control group (18.00) (p = 0.000, α = 0.05). These profound, statistically significant shifts in mean ranks definitively establish that the implemented psychological intervention was highly efficacious in simultaneously mitigating depressive symptoms and enhancing the overall quality of life in this patient population.

DISCUSSION

Main findings of this study indicate that eight sessions of Cognitive Behavioral Therapy (CBT), guided by the Beck Depression Inventory (BDI), significantly reduced depression levels and improved the quality of life of patients with chronic kidney disease (CKD). The Mann–Whitney test confirmed this interpretation, with p-values of 0.000 for both variables, ruling out chance as a factor. The consistent direction of effects on both indicators demonstrates that CBT acts as a strong agent of change in the CKD population with mild to severe depressive symptoms.

The results further show that psychological intervention in the form of CBT significantly decreased depression levels among patients with chronic kidney disease, as reflected by the reduction in BDI scores in the intervention group. These findings are consistent with recent meta-analyses reporting that psychological interventions, including CBT, effectively reduce depressive symptoms in CKD patients, with

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the largest effects observed in those undergoing routine therapies such as hemodialysis (7). The reduction in depression also contributed to an improvement in quality of life, aligning with the theory that reducing psychological burden enhances both physical and social functioning in chronic patients (19).

The significant improvement in quality of life in the intervention group, particularly in the psychological and physical domains, supports the hypothesis that CBT can serve as an effective non-pharmacological intervention. Previous studies reported that CKD patients receiving psychological interventions experienced higher KDQOL-SF (Kidney Disease Quality of Life Short Form) scores compared with controls, despite substantial heterogeneity across studies (20). This suggests that, even with variations in implementation, the clinical benefits of such interventions remain tangible.

Although some studies have argued that psychological interventions do not consistently improve quality of life, the current findings contrast with those results. This discrepancy may be attributed to the structured approach and adequate duration of the intervention (eight sessions across eight weeks), which were not consistently applied in earlier studies (21). Furthermore, the use of the BDI as a validated and reliable instrument strengthened these findings, as it has been widely applied in the CKD population (22).

The sample characteristics CKD stage 3–5 patients with mild to severe depressive symptoms also likely contributed to the effectiveness of the intervention. Other studies have reported that patients with moderate to severe depression respond more favorably to CBT compared with those without significant depressive symptoms (23). This supports the argument that psychological interventions are most effective when targeted at populations with clinically evident psychological burdens.

Hemodialysis duration also played a role in the success of the intervention. In this study, most respondents had been undergoing hemodialysis for 1–12 months, suggesting they were still in the adaptation phase. Evidence shows that patients in the early stages of dialysis experience higher levels of stress and depression, making early psychological intervention crucial to prevent chronic depression (24). The fact that 65.7% of participants had been on dialysis ≤12 months likely enhanced responsiveness to CBT. Japanese studies also report that "new-onset dialysis" patients had BDI II scores 4.3 points higher than the general CKD population, with the greatest effect sizes from psychological interventions. Our findings validate these results and highlight the importance of a window of opportunity in early dialysis (25).

The CBT intervention in this study focused on stress management, cognitive restructuring, and reinforcement of adaptive behavior, which are consistent with the principles of classical CBT. Beck's theory suggests that depression is linked to irrational negative thinking patterns, and interventions targeting these cognitive distortions have proven effective in reducing depressive symptoms (7). In the CKD context, patients often experience feelings of helplessness and hopelessness, which can be addressed through CBT techniques (19).

Nevertheless, there are limitations to the generalizability of this study. The majority of respondents were women (70%), who theoretically may be more open to expressing emotions and more responsive to psychological interventions. Previous research indicates that women tend to score higher on depression scales but also respond better to talk-based therapies such as CBT (26). This gender imbalance could be further explored by considering underlying psychosocial factors such as differences in emotional expression, social support networks, and help-seeking behaviors which may influence treatment responsiveness. Future studies should consider subgroup analyses to better understand these gender-based differences in CBT outcomes.

The educational level of respondents, with most having completed junior and senior high school (79%), should also be considered in interpreting these results. Individuals with lower education tend to have limited health literacy; however, CBT remained effective when delivered using simple, repetitive, and interactive approaches. In this study, CBT modules were designed visually and interactively to facilitate patient understanding, which may have contributed to the intervention's success (27).

Bivariate analysis revealed highly significant differences between the intervention and control groups in both depression and quality of life variables. This reinforces the argument that CBT exerts a causal effect in reducing depression and improving quality of life. Similar studies have reported comparable findings, with intervention groups showing much greater reductions in BDI scores compared with controls (28).

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The change in depression categories from moderate to non-depressed in more than half of the respondents in the intervention group represents a clinically meaningful effect. In clinical practice, this improvement means that patients are able to resume daily activities, reduce risks of non-adherence, and improve treatment compliance (21). Furthermore, reducing depression also contributes to lowering cardiovascular morbidity risks, which are frequently associated with depression in kidney patients (29).

The observed improvements in the psychological and environmental domains of quality of life are consistent with evidence showing that patients who experience reductions in depression tend to perceive stronger social support and family involvement. This underscores the importance of a holistic approach to CKD management, where psychosocial aspects should not be overlooked (8).

A limitation of this study was the absence of long-term follow-up to evaluate the sustainability of intervention effects. Several studies have shown that CBT effects may diminish after 3–6 months if booster sessions are not provided. Future research should therefore emphasize the importance of evaluating the sustainability of CBT effects over time and consider integrating "booster sessions" to maintain treatment benefits in clinical practice.

Additionally, this study did not examine potential mediators such as self-efficacy or social support, which are theoretically influential in the relationship between CBT and quality of life. Future investigations could explore potential mechanisms of action such as improvements in self-efficacy, coping skills, or perceived support as mediating factors linking CBT to enhanced quality of life, as suggested by prior research.

From an implementation perspective, this study supports integrating psychological care into CKD management, particularly in hemodialysis services. Delivering CBT by trained health workers could become a routine intervention for patients with BDI scores >14. This aligns with the global trend of integrating mental health services into chronic disease care. CBT interventions using the BDI tool have proven effective in reducing depression and improving quality of life in CKD patients. These findings support the importance of psychological interventions as part of holistic chronic disease management. Further studies are required to evaluate long-term effects, effectiveness in different subgroups, and moderating factors influencing intervention success (16).

CONCLUSION

This quasi-experimental study confirms that eight sessions of Cognitive Behavioral Therapy (CBT), guided by the Beck Depression Inventory (BDI), significantly reduced depression levels and improved the quality of life among patients with stage 3–5 chronic kidney disease (CKD). The shift in BDI scores from moderate–severe categories to non-depressed in 48.6% of respondents, accompanied by a marked increase in the proportion reporting good quality of life, demonstrates that structured psychological interventions can serve as a key component in the holistic management of CKD patients. These findings also challenge the assumption that patients with multimorbidity and lower educational backgrounds cannot benefit from CBT, provided the modules are delivered visually, interactively, and repetitively, tailored to each individual's learning pace.

For clinical practice, routine depression screening using the BDI should be established as a standard procedure at every hemodialysis visit, similar to regular laboratory examinations. Patients identified with a score >14 can be directly referred to an eight-week CBT program facilitated by trained renal nurses. Integrating this service does not require additional space, as existing counseling areas within dialysis units can be utilized. Local governments are encouraged to include the indicator "coverage of psychological interventions among CKD patients" in hospital performance assessments to ensure that mental health in chronic disease care is effectively translated into practice.

Future research should be designed as a multi-site randomized controlled trial with cluster randomization to control for differences in hospital facilities and policies. The intervention arms could be expanded into three groups—standard CBT, CBT with three-monthly booster sessions, and a combination of CBT with mindfulness-based stress reduction—to identify the most effective strategy for sustaining long-term benefits.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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