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Effect of the Fun Dialysis program on intradialytic anxiety in patients with chronic kidney disease: A quasi-experimental study

Yani Nurhayani[1]*, Asep Novi Taufiq Firdaus[2], Yuniko Febby Husnul Fauzia[2]

[1]Program Studi Pendidikan Profesi Keperawatan, Universitas Muhammadiyah Ahmad Dahlan Cirebon
[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

Abstract

Background: Patients with chronic kidney disease (CKD) undergoing hemodialysis often experience anxiety due to long-term therapy, activity restrictions, and concerns about complications. The fun dialysis program is a nonpharmacological intervention that combines humor therapy, interactive games, and rewards to create a more enjoyable hemodialysis environment.
Purpose: To analyze the effect of the fun dialysis program on anxiety levels among CKD patients undergoing hemodialysis.
Method: A quasi-experimental study with a pretest-posttest control group design was conducted on 66 hemodialysis patients, consisting of 33 in the intervention group and 33 in the control group. The intervention group participated in the fun dialysis program for 8 cycles (4 weeks), while the control group received routine care. Anxiety levels were measured using the State-Trait Anxiety Inventory (STAI) and analyzed using the Mann–Whitney test.
Results: Severe anxiety in the intervention group decreased from 42.4% to 18.2%, while mild anxiety increased from 42.4% to 60.6%. In the control group, severe anxiety increased from 27.3% to 33.3%. There was a significant difference between the two groups (p = 0.018).
Conclusion: The fun dialysis program is effective in reducing anxiety among chronic kidney disease patients undergoing hemodialysis and has the potential to be implemented as a safe, low-cost, nonpharmacological nursing intervention.

Keywords: Anxiety; Chronic Kidney Disease; Hemodialysis; Humor Therapy; Nursing Intervention.

INTRODUCTION

Chronic kidney disease (CKD) is a progressive and irreversible impairment of kidney function that results in the loss of the body's ability to maintain metabolism and fluid and electrolyte balance, leading to increased uremia (Sumah, 2020). Chronic kidney disease has become a global health problem, with steadily increasing prevalence and incidence, poor prognosis, and high treatment costs. Globally, approximately 1 in 10 people is estimated to have CKD. According to the global burden of disease (GBD), chronic kidney disease is one of the leading causes of death worldwide. In 2017, CKD was responsible for approximately 1.2 million deaths and rose from the 17th leading cause of death in 1990, to the 12th leading cause in 2017. In Indonesia, data from the 2023 Indonesian health survey (SKI) indicate that the prevalence of chronic kidney disease based on physician diagnosis among individuals aged ≥15 years was 0.18%. This finding indicates that CKD remains a public health problem requiring serious attention. Although its prevalence is relatively low, the number of patients requiring kidney replacement therapy continues to increase each year, particularly those undergoing hemodialysis, in line with increasing

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life expectancy, diabetes mellitus, hypertension, and other noncommunicable diseases (Ministry of Health Republic of Indonesia, 2024).

Hemodialysis is one form of kidney replacement therapy (KRT) that functions to remove metabolic waste products, uremic toxins, and excess fluid when the kidneys are no longer able to perform their functions optimally. In Indonesia, hemodialysis remains the most widely used kidney replacement therapy modality for patients with end-stage chronic kidney disease and is generally performed twice a week for approximately 4–5 hours per session, depending on the patient's clinical condition and dialysis adequacy targets. According to the 16th annual report of the Indonesian renal registry (IRR) in 2023, the number of active and newly initiated patients undergoing hemodialysis has continued to increase from year to year. Patients aged 45–64 years represent the largest age group, indicating a substantial disease burden among the productive-age population. In addition, cardiovascular disease remains the leading cause of morbidity and mortality among patients undergoing hemodialysis.

In West Java Province, the number of patients with CKD undergoing hemodialysis has also continued to increase alongside the growing number of cases of end-stage kidney disease. Based on an analysis of IRR data from 2022, the incidence of patients undergoing hemodialysis in West Java reached 232 per million population (PMP), with a prevalence of 346 per million population. In 2022, there were 158 hemodialysis units distributed across 26 of the 27 regencies/cities. At Sumber Waras Hospital Cirebon, the number of patients with end-stage kidney disease (ESKD) undergoing hemodialysis has increased annually. In 2022, there were 143 patients, followed by an increase of 52 patients in 2023 and 32 patients in 2024. By April 2025, there were 23 newly initiated patients. Based on data from the hemodialysis unit in April 2025, there were 79 active patients undergoing hemodialysis, comprising 39 male and 40 female patients. In addition to experiencing physical challenges, patients with CKD undergoing hemodialysis also experience various psychological problems, particularly anxiety. Anxiety may arise from the need to undergo lifelong hemodialysis, dietary and fluid restrictions, treatment costs, changes in daily activities, dependence on dialysis machines, fear of complications or death, and changes in roles in daily life (Beizaee et al., 2018). These conditions require patients to develop adaptive coping mechanisms to maintain their quality of life while undergoing treatment.

The management of anxiety in patients undergoing hemodialysis presents several challenges, particularly regarding the limitations of pharmacological therapy. Anxiolytic medications may cause adverse effects, carry a risk of accumulation, and potentially interact with other medications used by patients with CKD. Therefore, non-pharmacological interventions may provide a safer alternative that can be incorporated into nursing care (Barello et al., 2023). Humor therapy is one form of non-pharmacological intervention that may be effective in reducing stress and anxiety. Humor and laughter are known to improve respiratory function, promote blood circulation, stimulate the immune system, and reduce stress hormones such as cortisol (Prida et al., 2026). Psychologically, humor serves as a coping mechanism, facilitates the release of suppressed emotions, and promotes positive social interactions. Recent research has also indicated that humor therapy may improve the quality of life of patients with chronic diseases, including patients with cancer, hospitalized patients, and patients undergoing hemodialysis.

Fun dialysis was designed as a non-pharmacological intervention that combines several therapeutic approaches, namely relaxation and humor, to reduce anxiety among patients undergoing hemodialysis. This approach incorporates humor therapy through the presentation of humorous videos, enjoyable interactive games, and game-based rewards. Humor therapy was selected because laughter is known to stimulate the release of endorphins, reduce cortisol levels, and alleviate psychological tension associated with anxiety. Simple games or interactive activities during the dialysis process may divert patients' attention from boredom and discomfort while simultaneously improving mood and social interaction (Calik Kus & Ersoy, 2026). In addition, the implementation of a reward system within the games provides additional motivation for patients to participate actively, thereby promoting

Yani Nurhayani[1]*, Asep Novi Taufiq Firdaus[2], Yuniko Febby Husnul Fauzia[2]

[1]Program Studi Pendidikan Profesi Keperawatan, Universitas Muhammadiyah Ahmad Dahlan Cirebon
[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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positive emotions, engagement, and reduced anxiety (Ritz, 2002; Ainun & Pase, 2024). The combination of humor therapy, games, and a reward system is expected to be more effective than the use of a single therapeutic approach because it can provide simultaneous emotional and cognitive stimulation. Thus, this approach may create a more pleasant hemodialysis environment, support psychological adaptation, and improve patients' quality of life.

As an effort to help reduce anxiety among patients undergoing hemodialysis, the researchers designed an intervention in the form of the fun dialysis program, which combines relaxation and humor techniques through three main activities fun games, fun rewards, and fun shows, implemented for approximately 1.5 hours during each hemodialysis session. This program was developed as a non-pharmacological intervention aimed at creating a more pleasant hemodialysis environment, reducing boredom during treatment, strengthening patients' coping mechanisms, and reducing anxiety levels. Although previous studies have demonstrated that humor therapy, relaxation, and recreational activities may provide psychological benefits for patients with chronic diseases, the effectiveness of combining these three components within the fun dialysis program among patients with chronic kidney disease undergoing hemodialysis has not yet been investigated, particularly at Sumber Waras Hospital Cirebon.

RESEARCH METHOD

This study employed a quantitative quasi-experimental design with a pretest–posttest control group approach to analyze the effect of the fun dialysis program as a non-pharmacological intervention on anxiety levels among patients with CKD undergoing hemodialysis. The study was conducted from July to September 2025 in the Hemodialysis Unit of Sumber Waras Hospital, Cirebon. The study population comprised all patients with CKD who underwent routine hemodialysis, totaling 102 patients. The sample consisted of 66 patients who met the study criteria. The respondents were divided into two groups, an intervention group comprising 33 respondents and a control group comprising 33 respondents. Participants were selected using purposive sampling. The intervention group received the fun dialysis program, whereas the control group received routine care according to the standard services provided in the hospital's hemodialysis unit.

The inclusion criteria were patients aged 18–70 years who underwent routine hemodialysis twice a week, were able to communicate, were fully conscious, were willing to participate in the study, and had signed an informed consent form. The exclusion criteria included patients undergoing hemodialysis less than twice a week, patients experiencing hemodynamic instability or complications during hemodialysis, and patients who did not complete the entire intervention program.

The independent variable in this study was the fun dialysis program, whereas the dependent variable was the anxiety level of patients with CKD undergoing hemodialysis. The fun dialysis program was a non-pharmacological intervention developed to create a more enjoyable hemodialysis environment through a combination of humor-based activities, interactive games, and rewards. The intervention was designed to divert patients' attention from situations that could induce tension during hemodialysis, enhance social interaction, create a positive atmosphere, and help patients manage anxiety during treatment. The fun dialysis program was implemented over 4 weeks, comprising a total of 8 sessions, with two sessions conducted per week in accordance with the patients' routine hemodialysis schedule. Each session lasted approximately 1.5 hours while the patients were undergoing hemodialysis. The fun dialysis program consisted of three main components, fun shows, fun games, and fun rewards.

Fun shows consisted of humor-based activities delivered through entertaining videos or visual materials, with the aim of creating a pleasant atmosphere, diverting patients' attention from anxiety during hemodialysis, and providing positive emotional stimulation. Fun games consisted of interactive games that could be performed while patients were undergoing hemodialysis without interfering with medical procedures. The games included UNO, face-drawing activities, emoticon look-alike, and A-I-U-E-O facial expression exercises, conducted either individually or in groups. These activities were

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[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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intended to increase patient engagement, provide distraction from boredom during hemodialysis, enhance social interaction, and create a positive experience during treatment. Fun rewards involved providing simple rewards to patients as an expression of appreciation for their participation and engagement in the games. The rewards served as positive reinforcement to increase patients' motivation to participate in the fun dialysis activities. The rewards consisted of simple gifts that were unrelated to medical treatment and did not affect the hemodialysis services received by the patients. During the intervention, participants' engagement in each session was recorded using an observation sheet. Participants were considered to have completed the intervention if they participated in all 8 sessions of the fun dialysis program.

Participants in the control group did not receive the fun dialysis program and continued to receive routine medical care as usual. Data were collected using a respondent characteristics questionnaire and an anxiety-level measurement instrument. The respondent characteristics questionnaire was used to obtain data on age, type sex, educational level, and duration of hemodialysis treatment. Patients' anxiety levels were assessed using the State-Trait Anxiety Inventory (STAI). Measurements were performed before the intervention (pretest) and after completion of the entire intervention (posttest) in both the intervention and control groups. The measurement results were subsequently categorized according to the anxiety-level categories used in this study, namely mild, moderate, and severe anxiety. A normal category was also used when the measurement results fell within the normal range according to the categorization guidelines of the instrument used.

Data analysis was conducted in stages, comprising univariate and bivariate analyses. Univariate analysis was used to describe respondent characteristics and the distribution of anxiety levels in each group. Categorical data were presented as frequencies and percentages, including age, type sex, educational level, duration of hemodialysis treatment, and anxiety-level categories before and after the intervention. Bivariate analysis was conducted to determine the difference in anxiety levels between the intervention and control groups following the fun dialysis program. Based on the characteristics of the data, which were analyzed using non-parametric methods, comparisons between the two groups were performed using the Mann–Whitney U test. Statistical significance was set at $\alpha=0.05$. A p-value <0.05 was considered indicative of a statistically significant difference between the intervention and control groups. Changes in the distribution of anxiety levels before and after the intervention were also presented descriptively to illustrate changes in anxiety categories within each group. This study received ethical approval from the Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Cirebon, under approval number 011/KEPK-FIKESUMC/VII/2025.

Yani Nurhayani[1]*, Asep Novi Taufiq Firdaus[2], Yuniko Febby Husnul Fauzia[2]

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Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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RESEARCH RESULTS

Table 1. Frequency Distribution of Anxiety (N=66)

Variable	Group	
	Intervention (n=33)	Control (n=33)
Age (n/%)		
17–25	2/6.1	2/6.1
26–35	4/12.1	2/6.1
36–45	10/30.3	7/21.2
46–55	8/24.2	10/30.3
56–65	7/21.2	11/33.3
>65	2/6.1	1/3.0
Gender (n/%)		
Male	14/42.4	15/45.5
Female	19/57.6	18/54.5
Level Education (n/%)		
Primary Education	7/21.2	8/24.2
Lower Secondary Education	11/33.3	12/36.4
Upper Secondary Education	11/33.3	11/33.3
Higher Education	4/12.2	2/6.1
Duration of Hemodialysis (n/%)		
<6 months	12/36.4	15/45.5
>6 months	21/63.6	18/54.5
Anxiety Level Before Fun Dialysis (n/%)		
Mild	14/42.4	19/57.5
Moderate	5/15.2	5/15.2
Severe	14/42.4	9/27.3
Anxiety Level After Fun Dialysis (n/%)		
Mild	20/60.6	15/45.5
Moderate	7/21.2	7/21.2
Severe	6/18.2	11/33.3

Based on Table 1. the hemodialysis patients in the intervention group were predominantly aged 36–45 years (30.3%), female (57.6%), and had a secondary education level (33.3%). In contrast, the control group was predominantly composed of respondents aged 56–65 years (33.3%), female (54.5%), and had a lower and upper secondary education level (35.4%). These findings suggest that increasing age may be associated with a higher risk of patients with CKD requiring hemodialysis therapy. Several factors, including dietary and fluid intake patterns, medication use, and social stress arising from family and occupational circumstances, may contribute to systemic diseases that can impair renal function.

Yani Nurhayani[1]*, Asep Novi Taufiq Firdaus[2], Yuniko Febby Husnul Fauzia[2]

[1]Program Studi Pendidikan Profesi Keperawatan, Universitas Muhammadiyah Ahmad Dahlan Cirebon
[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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Regarding the duration of hemodialysis, the majority of respondents in both groups had been undergoing hemodialysis for more than 6 months, accounting for 63.6% of the intervention group and 54.5% of the control group. Overall, the distribution of respondents' demographic and clinical characteristics showed a relatively comparable pattern between the intervention and control groups, although variations were observed across individual characteristics. Before the implementation of the fun dialysis intervention, the distribution of anxiety levels in the intervention group showed that 42.4% of respondents experienced severe anxiety, 42.4% experienced mild anxiety, and 15.2% experienced moderate anxiety. In the control group, the majority of respondents experienced mild anxiety (57.6%).

Following the implementation of the fun dialysis program, the distribution of anxiety levels in the intervention group demonstrated a more favorable pattern. The proportion of respondents experiencing severe anxiety decreased to 18.2%, while the proportions experiencing mild and moderate anxiety increased to 60.6% and 21.2%, respectively. In the control group, the proportion of respondents with severe anxiety increased to 33.3%, while mild anxiety decreased to 45.5%, and moderate anxiety remained at 21.2%. These changes in the distribution of anxiety levels indicate a decrease in the proportion of respondents experiencing severe anxiety and an increase in the proportion experiencing mild anxiety among patients who received the fun dialysis intervention. However, these findings represent descriptive changes only and cannot be used to establish the effectiveness of the intervention without consideration of the results of inferential statistical analysis.

Table 2. Overview of the Effect of the Fun Dialysis Program on Anxiety Levels Among Patients Undergoing Hemodialysis

Group	Mean Rank		Z	p-value
	Pre-test	Post-test		
Intervention	39.8	27.92	-2.364	0.018
Control	33.74	33.26	-1.03	0.918

Based on Table 2. the statistical analysis demonstrated a difference in anxiety levels between the intervention and control groups following the implementation of the fun dialysis program. In the intervention group, the mean rank of anxiety levels decreased from 39.08 at the pre-test to 27.92 at the post-test. This decrease in the mean rank indicates a tendency toward reduced anxiety levels following the fun dialysis intervention. The statistical analysis yielded a p-value of 0.018 ($p<0.05$), indicating a statistically significant difference in anxiety levels following the intervention.

In contrast, the mean rank in the control group showed minimal change, decreasing from 33.74 at the pre-test to 33.26 at the post-test. The analysis yielded a p-value of 0.918 ($p>0.05$), indicating that there was no statistically significant change in anxiety levels in the control group during the study period. Thus, the findings indicate that the change in anxiety levels was greater among patients who received the fun dialysis program than among those in the control group. These findings support the potential effect of the fun dialysis program in reducing anxiety levels among patients with CKD undergoing hemodialysis.

DISCUSSION

Based on the research findings, anxiety experienced by respondents in both the intervention and control groups prior to the implementation of the fun dialysis program was associated with various factors, including pain caused by needle insertion using a large-bore needle for AV shunt access, concerns regarding complications such as chills associated with the use of a double-lumen catheter, examination results, the duration of the hemodialysis procedure, the need to undergo long-term and, in some cases, lifelong hemodialysis, chronic fatigue, decreased energy associated with hemodialysis, transportation difficulties to and from hemodialysis sessions, treatment costs, dietary restrictions, changes in body image, treatment-related restrictions, and family and economic problems. These findings

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[1]Program Studi Pendidikan Profesi Keperawatan, Universitas Muhammadiyah Ahmad Dahlan Cirebon
[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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are consistent with previous research indicating that patients undergoing hemodialysis may experience pruritus, fatigue, muscle cramps, and insomnia during the treatment process (Semaan et al., 2018). Patients may also experience lifestyle changes, including recurrent hospitalization and dependence on medications. Other factors associated with anxiety among patients undergoing hemodialysis include chronic pain, sleep disturbances, machine-related noise, deterioration in psychomotor and mental functioning, decreased sexual functioning, and inadequate family support, including support related to dietary and fluid restrictions (Gerogianni et al., 2019).

Factors influencing anxiety among patients undergoing hemodialysis can generally be categorized into internal and external factors. Internal factors include emotional conditions, personality, religiosity, and spirituality, whereas external factors include social support, treatment experiences, and the social environment. In addition to the factors associated with moderate and severe anxiety, some patients experienced mild anxiety, which may be characterized by relatively relaxed and calm emotional states, a tendency to avoid excessive worrying, the absence of sadness, and the ability to laugh and smile easily, among other characteristics (Tangian et al., 2015).

Following the implementation of the fun dialysis intervention for 4 weeks (8 sessions), the intervention group demonstrated a more favorable distribution of anxiety levels. The proportion of respondents with severe anxiety decreased from 42.4% at pre-test to 18.2% at post-test, whereas the proportion with mild anxiety increased from 42.4% to 60.6%. In contrast, in the control group, the proportion of respondents with severe anxiety increased from 27.3% to 33.3%, while the proportion with mild anxiety decreased from 57.6% to 45.5%. These findings indicate a more favorable shift in anxiety levels among respondents who received the fun dialysis intervention.

At the individual level, 8 respondents in the intervention group experienced a reduction in anxiety levels, whereas 4 respondents in the control group experienced an increase in anxiety levels. Several respondents in the intervention group, including those with severe, moderate, and mild anxiety, reported reductions in anxiety scores, although some remained within the same anxiety category. They reported improved mood during hemodialysis and reduced feelings of worry and sadness. Some respondents stated that they had accepted their condition and were able to enjoy the services provided, while others reported feeling cared for by nurses and being entertained during the hemodialysis process. Anxiety scores in the intervention group ranged from 23 (mild anxiety) to 78 (severe anxiety) at pre-test and from 21 (mild anxiety) to 62 (severe anxiety) at post-test. These findings indicate a reduction in the range of anxiety scores following the intervention. Meanwhile, some respondents in the control group experienced increased anxiety, which may have been associated with persistent boredom, worry, fear, and other unresolved concerns. Conversely, some respondents in the control group experienced decreased anxiety, particularly newly initiated patients who initially reported tension, fear, anxiety, and worry but gradually adapted to their condition following the provision of routine education.

This study demonstrated a significant reduction in mean state anxiety in the intervention group following the implementation of fun dialysis for 4 weeks. The components of fun dialysis, including humor, jokes and laughter therapy, comedy videos, enjoyable games, and cheerful exercises designed to create a pleasant atmosphere during hemodialysis, may contribute to reducing anxiety levels among patients undergoing hemodialysis in the intervention group. The humorous videos presented may divert participants' attention from their anxiety. Enjoyable games, such as UNO, face drawing, emoticon look-alike contests, and A-I-U-EO, facial exercises, were able to attract the interest of patients and their families, such that even before the sessions began, some patients had already asked about and requested these activities to be repeated. Laughter therapy may enhance interpersonal interaction and social support, foster a sense of mutual assistance, and promote group identity, solidarity, and cohesion. Deliberate laughter has also been shown to improve team communication in stressful situations. Laughter therapy has been widely applied among patients with chronic diseases, mental health conditions, and cancer. One previous study reported that 30-minute

Yani Nurhayani[1]*, Asep Novi Taufiq Firdaus[2], Yuniko Febby Husnul Fauzia[2]

[1]Program Studi Pendidikan Profesi Keperawatan, Universitas Muhammadiyah Ahmad Dahlan Cirebon
[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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weekly laughter therapy sessions reduced depressive symptoms among patients undergoing hemodialysis but did not produce a significant effect on anxiety levels (Bennett, 2020). This discrepancy may be attributable to methodological differences, as the fun dialysis sessions in the present study were conducted more frequently, for a longer duration, and incorporated a greater variety of activities than those used in the previous study.

One factor influencing anxiety among patients with CKD undergoing hemodialysis is social support. Several respondents experienced inadequate social support from their families. This finding is consistent with previous studies indicating that the need for social or family support among patients undergoing hemodialysis varies considerably (Al Husna et al., 2019; Febriyanti, 2026). Such support may include assistance during treatment, having someone accompany or transport patients to hemodialysis sessions, financial assistance from spouses, parents, siblings, children, or other individuals, coverage of hemodialysis costs through Health Social Security Agency, encouragement from others, as well as trust and recognition from the community. Therefore, greater social support received by patients undergoing hemodialysis may be associated with lower levels of anxiety. These findings indicate that social support may also influence anxiety levels among patients undergoing hemodialysis.

Based on the Mann–Whitney U test, the p-value (Asymp. Sig. [2-tailed]) was 0.018, which was below the significance threshold of 0.05. This finding indicates a statistically significant difference between the intervention and control groups. The mean rank was 39.08 in the control group and 27.92 in the intervention group. This indicates that the distribution of anxiety scores was higher in the control group than in the intervention group. Thus, the findings suggest that the fun dialysis intervention had a significant effect compared with the control condition.

Previous research demonstrated that comedy videos had a significant effect on preoperative anxiety and blood pressure among patients with cancer, although the reported p-value was greater than 0.05. After watching the videos, the mean anxiety score was 43.36 ± 9.76 in the experimental group and 97.13 ± 5.76 in the control group (Genç & Saritas, 2020). A meta-analysis also concluded that laughter therapy can reduce anxiety among patients regardless of the duration and frequency of the sessions. Another study examining the effects of laughter yoga among patients undergoing hemodialysis reported improvements in mood and reductions in stress and anxiety following the intervention. Although these findings are consistent with the results of the present study, laughter yoga requires more specialized skills and may be more difficult to implement during hemodialysis sessions (Bennett et al., 2015).

One study reported that humorous videos significantly reduced *state anxiety* but did not significantly affect trait anxiety. The study concluded that trait anxiety is more strongly associated with patterns of thinking and attitudes that may not be easily or significantly influenced by humor therapy sessions (Alagöz et al., 2025). During states of anxiety, the adrenal glands release corticosteroid hormones, which are subsequently converted into cortisol. Humor therapy appears to be a relatively rapid approach that may reduce cortisol levels, thereby enabling patients to disengage from anxiety-provoking thoughts and rapidly achieve a more positive emotional state. Therefore, humor therapy may be more effective in addressing state anxiety. However, sustained reductions in anxiety may require additional interventions, such as psychoanalysis, counseling, and long-term environmental modifications.

One strength of this study was its ability to engage the interest and participation of both patients and nurses. Patients may have been attracted to fun dialysis because they perceived a significant gap within the Indonesian cultural context and required positive changes to the monotonous routine of hemodialysis treatment. The provision of noninvasive complementary therapy in the form of humor and laughter therapy through fun dialysis may provide primary outcomes in terms of reduced stress, anxiety, and depression, while secondary outcomes may include improved quality of life (QOL), enhanced emotional well-being, improved mood, and better cognitive functioning among patients with chronic diseases, including those undergoing hemodialysis. From a nursing practice perspective, fun dialysis may be implemented in local healthcare settings because

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[1]Program Studi Pendidikan Profesi Keperawatan, Universitas Muhammadiyah Ahmad Dahlan Cirebon
[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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it is relatively inexpensive, does not produce adverse effects when appropriately implemented in clinical settings, and does not require extensive time.

CONCLUSION

The findings of this study indicate that the fun dialysis program has the potential to reduce anxiety among patients with chronic kidney disease undergoing hemodialysis. Following 4 weeks of intervention (8 sessions), the intervention group demonstrated a more favorable change in anxiety levels, characterized by a reduction in the proportion of patients with severe anxiety and an increase in the proportion with mild anxiety. In contrast, anxiety levels in the control group showed less favorable changes. The combination of humor, comedy videos, enjoyable games, cheerful exercises, and laughter therapy may provide distraction, positive emotional experiences, and opportunities for social interaction during hemodialysis. Therefore, fun dialysis may be considered a simple, noninvasive, and relatively low-cost complementary nursing intervention to support anxiety management, particularly state anxiety, among patients undergoing hemodialysis. Further studies with larger samples and more rigorous controlled designs are warranted to confirm its effectiveness and determine the long-term effects of the intervention.

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[1]Program Studi Pendidikan Profesi Keperawatan, Universitas Muhammadiyah Ahmad Dahlan Cirebon
[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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Yani Nurhayani[1]*, Asep Novi Taufiq Firdaus[2], Yuniko Febby Husnul Fauzia[2]

[1]Program Studi Pendidikan Profesi Keperawatan, Universitas Muhammadiyah Ahmad Dahlan Cirebon
[2]Program Studi Keperawatan, Universitas Muhammadiyah Cirebon
Corresponding author: *E-mail: yaninurhayani@fikes.ummada.ac.id

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