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Effectiveness of Music Therapy in Reducing Anxiety Among Patients Undergoing Hemodialysis: A Literature Review of Complementary Care Approaches

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Abstract

Introduction: Anxiety is a psychological problem that is often experienced by patients with chronic kidney failure who are undergoing hemodialysis. Research shows that nearly half of hemodialysis patients experience abnormal anxiety, and about 25% are in the borderline category. The high prevalence of anxiety is related to the physical and emotional burden during long-term hemodialysis therapy. This condition confirms the need for effective nonpharmacological interventions, one of which is music therapy. **Objective:** This study aims to collect and analyze scientific evidence related to the effectiveness of music therapy in reducing anxiety in patients with chronic kidney failure undergoing hemodialysis in the context of a palliative approach. **Methods:** This study uses a literature review method by examining articles published in 2023–2025 obtained through PubMed and Searching Engine, Mesh. The search was conducted using keywords related to music therapy and anxiety in hemodialysis patients. A total of 10 articles met the inclusion criteria and were systematically analyzed to assess the research design, anxiety instruments, type of music, and the results of the intervention. **Results:** Based on the article analyzed, music therapy was shown to be effective in reducing anxiety in hemodialysis patients. This intervention is effective as a nonpharmacological method because it provides a relaxation effect, is easy to apply, is cost-effective, and can be adjusted to the patient's needs. **Conclusion:** Music therapy has the effectiveness to be used as an effort to reduce anxiety in patients undergoing hemodialysis.

Keywords: Anxiety; Chronic kidney failure; Hemodialysis; Music Therapy; Palliative Care

Introduction

According to The United States Renal Data System (USRDS) at the end of 2009, more than 871,000 people were treated for ESRD in the United States. According to data from Basic Health Research (Riskesdas) in 2013, the prevalence of chronic kidney failure in Indonesia is around 0.2%. South Sulawesi is fifth after Central Sulawesi, North Sulawesi, Aceh and Gorontalo. The incidence rate in South Sulawesi is 0.3%, while based on age group, it was found that the age group ≥ 75 years old is 0.6% higher than other age groups and the incidence in men is 0.3% higher than women. The high incidence rate is due to several factors that cause systemic and cardiovascular diseases. Many diseases can appear

at the same time as ESRD. In this case, infections and cardiovascular diseases are common causes of ESRD disease that can result in death. The high incidence of ESRD is due to the incidence of diabetes and hypertension, which also affect 34% and 21% of the total cases. The glomerulus is the third largest cause of ESRD. (1)

The World Health Organization (WHO) shows that chronic kidney disease is ranked 12th highest as the cause of death in the world with 850,000 deaths every year. According to Basic Health Research in 2013 it was 0.2% in the age group of 35-44 years 0.3%, the age group of 45-54 years 0.4%, the age group of 55-74 years 0.5%, the age group ≥75 years 0.6% compared to 2018 the prevalence of GGK increased by 0.32% According to the Basic Health Research of Jambi Province in 2013 the prevalence of GGK based on doctor's diagnosis in Jambi Province was 0.2 percent compared to 2018 the prevalence of GGK increased by 0.32% (2).

Chronic kidney disease is a non-communicable disease that has a major impact on the morbidity, mortality and socio-economic of the community because the high cost of treatment is one of the public health problems followed by a fairly high incidence rate that needs attention (3)(4). Changes in the environment, community behavior, demographic, technological, economic, and socio-cultural transitions greatly affect changes in disease patterns as well as increased blood pressure, blood sugar, body mass index or obesity, unhealthy diet, lack of physical activity, and smoking and alcohol cause an increase in the burden of non-communicable diseases due to increased risk factors (5).

The global picture of GGK is also strengthened by significant variations in prevalence rates between countries with the prevalence rate of chronic kidney disease (CKD) varying between countries. For example, in Nepal, the prevalence is recorded at 6.0% (Poudyal et al., 2022), while in the United States, the figure is much higher, reaching 13.7% (Lin et al., 2021). In Malaysia, the prevalence is also fairly high, at 15.48% (Saminathan et al., 2020). On the other hand, in Iran, the prevalence of chronic kidney disease reaches 27.5%, which is influenced by various factors, including socio-demographic factors and medical history (6)(7).

Although global prevalence data vary, in Indonesia, GGK has become one of the diseases with the highest health burden. Chronic kidney disease is one of the ten most common diseases in Indonesia (Ariyani et al., 2019). In Indonesia, the burden of kidney disease treatment costs is the second highest in the list of BPJS Kesehatan claims, after heart

disease. Based on estimates in 2015, funds allocated for health services related to kidney disease reached nearly 3 trillion rupiah, an increase from around 2.2 trillion rupiah in the previous year, 2014 (8).

Based on the results of the 2023 Indonesian Health Survey, the prevalence of chronic kidney disease that has been diagnosed by health workers in the Indonesian population aged 15 years and older is recorded at 0.18%, or around 638,178 people. However, this figure has decreased compared to data from Riskesdas in 2018, which reported the prevalence of chronic kidney disease based on a doctor's diagnosis in the same age group of 0.38%, or equivalent to 713,783 people. The decline in prevalence recorded by the Indonesian Health Survey (SKI) in 2023, although it appears to be good news, must be juxtaposed with the increase in the existing death rate (9)(10).

Hemodialysis is the primary renal replacement therapy for patients with end-stage chronic kidney disease (CKD). Although it prolongs survival, the treatment imposes substantial physical and psychological burdens due to lifelong dependence on dialysis, activity limitations, and uncertainty regarding disease progression. Anxiety is one of the most common psychological disorders among patients undergoing maintenance hemodialysis. A cross-sectional study involving 298 hemodialysis patients reported that 49.3% experienced abnormal anxiety, while 25.5% were classified as having borderline anxiety according to the Hospital Anxiety and Depression Scale (HADS) (Nagy et al., 2023). These findings indicate that anxiety is a prevalent psychological comorbidity requiring comprehensive assessment and management as part of routine hemodialysis care (11).

Poorly managed anxiety disorders have the potential to worsen patients' quality of life and add to the complexity of the burden of the disease they are facing. This is evidenced by a 2023 study that showed that anxiety has a significant relationship with decreased quality of life and increased symptoms of depression in patients undergoing hemodialysis (Mohamed et al., 2023). This situation reinforces the urgency of implementing a palliative approach, which focuses on reducing physical and emotional suffering as a whole. In this context, palliative approaches play a role not only as supportive treatment, but also as a strategy to improve psychological well-being for patients with prolonged chronic conditions (12)(13).

One of the non-pharmacological interventions that is increasingly being used to help

reduce anxiety in patients undergoing hemodialysis is music therapy. This intervention works through the presentation of music in a planned manner that can induce calm, reduce tension, and help stabilize the stress response during the dialysis procedure. Scientific evidence from various domestic studies supports the effectiveness of this approach. A quasi-experimental study conducted in East Bekasi reported that the provision of relaxation music with natural nuances was able to reduce anxiety levels in chronic kidney failure patients who were undergoing hemodialysis therapy (14).

Similar findings were reported by Lina et al. (2020) at Dr. M. Yunus Bengkulu Hospital, where listening to Beethoven's classical music during hemodialysis significantly reduced patients' anxiety levels between the pre- and post-intervention assessments. Furthermore, Arly et al. (2024) demonstrated that a combination of music therapy and lavender aromatherapy inhalation significantly decreased anxiety among patients undergoing hemodialysis, as measured using the Hamilton Anxiety Rating Scale (HARS). Collectively, these findings indicate that music therapy, either as a standalone intervention or combined with other complementary therapies, represents a safe, practical, and effective non-pharmacological strategy to improve psychological comfort and quality of life in patients receiving hemodialysis (15)(16).

Given the high levels of anxiety in hemodialysis patients and the growing scientific evidence on the effectiveness of music therapy in palliative approaches, a literature review that explores the relationship between the two aspects is is warranted. This literature analysis is expected to be able to enrich the theoretical foundation and provide a strong scientific reference for the development of palliative-based nursing practices, so as to help health workers provide more comprehensive interventions to improve patients' quality of life (17)(18).

This literature review aims to collect, analyze, and synthesize the latest scientific evidence regarding the effectiveness of music therapy in reducing anxiety in hemodialysis patients in the context of palliative care. This study is specifically directed to understand the extent to which music interventions have an impact on patients' psychological regulation, as well as examine the physiological and emotional mechanisms underlying their therapeutic effects. In addition, the study aims to evaluate the relevance of music therapy as part of a palliative approach that focuses on improving the comfort and quality of life of hemodialysis patients.

Methods

This study uses the Literature Review method by examining scientific articles that discuss music therapy in reducing anxiety in chronic kidney failure patients undergoing hemodialysis. The review sources use electronic media from several databases, including PubMed and Search engines, Mesh with a publication range of 2023 to 2025. The articles found and met the criteria amounted to 10 journals, consisting of 4 international journals and 6 national journals. The keywords used include music therapy, music therapy, anxiety, anxiety, music therapy for hemodialysis, and chronic kidney failure. Each article was analyzed based on the research design, the number of samples, the anxiety measurement instrument, the type of music used, and the results of the intervention. The collected articles were reviewed to ensure fit for criteria, were systematically arranged, compared with each other, and discussed with other relevant literature. All findings were then synthesized to provide an overview of the effectiveness of music therapy as a non-pharmacological intervention in reducing anxiety in hemodialysis patients.

Results

Table 1. Literature Review on the Effectiveness of Music Therapy in Chronic Kidney Failure Patients

No.	Journal title, Author, year of publication	Research design, population, sample	Result
1.	The Effect of Classical Music Therapy on Reducing Anxiety in Hemodialysis Patients at Sembiring Deli Tua Serdang Hospital. (Girsang Rostiodertina et al., 2023).(19)	D: quantitative design with a Quasi Experimental approach, i.e. one group pre-test post-test. T-test (parametric test). S: 27 people.	The results showed that classical music therapy had a significant effect on reducing anxiety levels in hemodialysis patients at Sembiring Deli Tua Serdang Hospital. The analysis data using the T-Test showed a p-value of 0.000, which means that there was a very significant effect of classical music therapy on the reduction of the patient's anxiety. The discussion mentioned that classical music can be an effective non-pharmacological intervention in reducing anxiety, as it is able to calm the nervous system and distract the patient from fear during the hemodialysis process.
2.	Effect of Music Therapy on the Psychological Well-Being of Maintenance Hemodialysis Patients: A Retrospective Study (Ba Xiaohui et al., 2024). (14)	D: retrospective studies and prospective intervention studies. Self-rating Depression Scale (SDS), Self-rating Anxiety Scale (SAS). Wilcoxon's statistical test. Q: 218 people.	The results and discussion of this study showed that the administration of music therapy for three months significantly improved the psychological condition of hemodialysis patients. Patients who received music therapy experienced decreased depression (SDS) and

No.	Journal title, Author, year of publication	Research design, population, sample	Result
			anxiety (SAS) scores, as well as decreased stress levels measured through HSS on physiological, psychological, and social dimensions. In addition, the level of patient satisfaction with treatment was also higher in the group that received music therapy (96.88%) compared to the control group (88.52%). The discussion shows that music therapy can be an effective and inexpensive intervention to reduce stress and improve the emotional well-being of hemodialysis patients. A decrease in SDS and SAS scores indicated an improvement in depression and anxiety conditions, while a decrease in HSS scores indicated better stress management. These results are in line with previous research that states that music therapy can improve the quality of life and psychological well-being of patients with chronic conditions. Therefore, music therapy is recommended as an adjunct in the routine treatment of hemodialysis patients to improve their psychological outcomes and satisfaction levels.
3.	The effectiveness of live music in reducing anxiety and depression in patients who are undergoing hemodialysis. A pilot study randomly controlled (Miriam Serrano Soliva et al., 2024).(20)	D: cluster randomized trial, The instrument used in this study is the Hospital Anxiety and Depression Scale (HAD). This analysis was conducted using one-way nested random effects models and bootstrap 95% confidence intervals for ICC. The Mann-Whitney-Wilcoxon test is used to compare results between sessions/clisters.	The results showed that the live music intervention significantly lowered the levels of anxiety and depression in hemodialysis patients. In the intervention group, anxiety and depression scores decreased significantly after the music session, while in the control group there was no significant change. The ICC analysis showed that the variability of outcomes within the cluster increased after the intervention, especially for anxiety (post-intervention ICC = 0.313) and depression (ICC = 0.461), indicating that the outcomes within the sessions became more homogeneous after the intervention. The discussion stated that live music can be an effective non-pharmacological strategy to reduce anxiety and depression in hemodialysis patients. The post-intervention increase in ICC showed that the effects of music were not only individual but were also influenced by session factors and the clinical environment. In addition, these results

No.	Journal title, Author, year of publication	Research design, population, sample	Result
			are in line with previous studies that stated that music can improve mood and reduce stress in patients with chronic diseases. However, the limitations of the number of clusters and designs that do not fully consider cluster effects are important notes in the interpretation of these results.
4.	The Effectiveness of Music Therapy on Anxiety Changes in Chronic Kidney Failure Patients with Hemodialysis at Private Hospitals X and Y in East Bekasi (Simanjuntak et al, 2024) (21).	D: Q*uasi-experimental* with case control design. The statistical tests used include independent t-test and multiple linear regression. Q: 67 respondents were selected by purposive sampling	The results of the study showed that natural relaxation music therapy was shown to be effective in lowering anxiety levels in chronic kidney failure patients undergoing hemodialysis. Statistical analysis showed a p-value of 0.000, which indicates that the reduction in anxiety after the intervention was *statistically significant*. The majority of respondents before therapy experienced moderate anxiety, and after being given music therapy, there was a *marked decrease in anxiety* scores. In addition, demographic factors such as education level and length of time undergoing hemodialysis also affect changes in patients' anxiety levels. This study confirms that psychosocial interventions such as music therapy can improve the quality of care and psychological well-being of patients during the hemodialysis process.
5.	The Effect Of Music Therapy On Anxiety Level Of Hemodialysis Patients (Maulana et al, 2024) (22)	D*: pre-experimental* with *one group pretest-posttest design.* Q: 30 respondents in hemodialysis patients in the hemodialysis room	The results showed that before being given music therapy interventions, the majority of respondents (87%) experienced mild anxiety, while 7% experienced moderate anxiety and 7% experienced severe anxiety. After being given music therapy, there was a decrease in anxiety levels, which suggests that music therapy is effective in lowering anxiety levels in hemodialysis patients.
6.	Effect Of Instrumental Music On Anxiety And Depression Among Hemodialysis Patients: A Randomized Controlled Trial (Imani Et Al, 2021) (23).	D: The design of this study was a single-blind randomized controlled trial conducted at Hamadan medical center in 2017. S: 50 hemodialysis patients.	The results of the study showed that instrumental music therapy can significantly reduce anxiety and depression levels in hemodialysis patients. Before the intervention, depression and anxiety scores did not differ significantly between the experimental and control groups. After the intervention, the group receiving instrumental music experienced a statistically significant decrease in depression and anxiety

No.	Journal title, Author, year of publication	Research design, population, sample	Result
			scores, while the control group showed no significant changes.
7.	The Effect of Relaxation Music Therapy on Anxiety and Depression Symptoms in Male Hemodialysis Patients at Haji Medan Hospital (24).	D: This study used an analytical *experimental* design with a pre-test and post-test approach. S: 30 respondents met the inclusion and exclusion criteria.	The results showed that listening to relaxation music for 6 weeks significantly reduced anxiety and depression levels in male hemodialysis patients at Haji Hospital Medan. Before the intervention, respondents' anxiety and depression scores were in the severe category (20.00 each), whereas after the intervention, these scores decreased to the normal category (2.00 for anxiety and 3.50 for depression, respectively). This change showed a statistically significant difference with a p value <0.001 (p <0.05).
8.	The Effect of Music Therapy on Fatigue and Anxiety Levels in Hemodialysis Patients (Gulcek & Aylaz, 2022)(25).	D: This study used an *experimental* design with a control group and an experimental group. S: 120 patients undergoing hemodialysis at Diyarbakır Training and Research Hospital	The results showed that music therapy significantly reduced fatigue and anxiety levels in hemodialysis patients. Patients receiving music therapy experienced a decrease in fatigue scores from an average of 54.78 to 23.45 after the intervention, and anxiety levels also decreased significantly. A comparison between the experimental and control groups showed that music therapy was effective in reducing both variables.
9.	The Effectiveness of Natural Music Therapy on Anxiety Levels in Hemodialysis Patients (Siregar et al, 2022) (26).	D: The design of this study is a *quasi-experimental* design. S: 96 respondents who underwent hemodialysis at H. Adam Malik General Hospital, Medan	The results showed a difference in anxiety levels between the intervention and control groups after receiving nature music therapy. The average anxiety score in the intervention group was 37.90, while in the control group it was 42.33, with a p-value of 0.048, indicating that nature music therapy can significantly reduce anxiety levels in hemodialysis patients.
10.	The Effect of Dangdut Music Therapy on Anxiety Levels in Patients with Chronic Kidney Failure Undergoing Hemodialysis Therapy (Sagala et al, 2020)(27).	D: This type of research is quantitative with a *Quasi Experimental* research design, S: 12 people underwent hemodialysis in the working area of the South Tapanuli Regency Regional General Hospital.	The results of the study showed that dangdut music therapy significantly reduced anxiety levels in patients with chronic kidney failure undergoing hemodialysis. The average anxiety score before the intervention was 12.58 and decreased to 9.08 after receiving dangdut music therapy. The Wilcoxon test obtained a Z value of -3.145 with a p-value of 0.002, indicating that dangdut music therapy significantly reduced patient anxiety levels. Thus, dangdut music can be used as an alternative non-pharmacological therapy to help

No.	Journal title, Author, year of publication	Research design, population, sample	Result
			reduce anxiety in hemodialysis patients.

Discussion

The review of ten analyzed articles showed a consistent pattern of findings that the use of music therapy plays an important role in reducing anxiety levels in patients undergoing hemodialysis procedures. Various types of music, ranging from classical, instrumental, nature sounds, to dangdut music, have been empirically proven to significantly decrease anxiety scores. These findings indicate that music preferences can be tailored to individual comfort without reducing the effectiveness of the intervention. This pattern is clearly evident in quasi-experimental studies, randomized clinical trials, as well as retrospective studies with large sample sizes. For example, the study by Ba Xiaohui et al. (2024) documented a significant reduction in anxiety and depression after three months of music therapy. Similar effects were also found in interventions using live music, which not only reduced anxiety but also improved the consistency of emotional responses across sessions, indicating that the impact of music therapy remains stable under diverse clinical conditions (14).

Further analysis indicates that music therapy not only affects anxiety but also positively impacts various other psychological aspects. Several studies have reported reductions in fatigue levels, depressive symptoms, and physiological stress, thereby overall enhancing patients' emotional well-being. For example, a study conducted by Gulcek and Aylaz (2022) found a significant decrease in fatigue and anxiety levels in the group receiving therapy compared to the control group. The variety of research methods employed—including Wilcoxon tests, independent t-tests, and nested random effects models—further strengthens confidence in the consistency of the results, despite differences in instruments and analytical techniques used (25).

Additionally, several studies reveal that responses to music therapy are influenced by individual characteristics, such as education level and the duration of hemodialysis treatment, as demonstrated by Simanjuntak et al. (2024). These findings suggest that personalization of interventions may be an important consideration in clinical practice. From a physiological perspective, the anxiety-reducing effects of music are associated with modulation of the limbic system, which plays a role in decreasing stress activation and

eliciting feelings of calmness. This understanding aligns with the core principles of palliative care, which emphasize comfort and emotional support for patients facing long-term chronic illnesses such as renal failure (21).

Overall, the body of evidence indicates that music therapy is a safe, affordable, and easily implemented non-pharmacological intervention with great potential for integration into palliative nursing practice. The consistency of results across various studies, both at the national and international levels, strengthens the position of music therapy as a strategic approach that can be standardized in the management of anxiety in hemodialysis patients.

Conclusion

Music therapy is an effective non-pharmacological intervention for reducing anxiety in patients undergoing hemodialysis. Evidence consistently shows that classical, instrumental, and live music provide the greatest benefits by promoting relaxation through limbic system stimulation, thereby decreasing emotional distress and physiological stress responses. In addition to reducing anxiety, music therapy improves psychological comfort and supports holistic palliative nursing care by alleviating symptoms such as depression, fatigue, and elevated blood pressure. Its implementation during hemodialysis sessions is practical, safe, low-cost, and can be tailored to patients' music preferences, making it a valuable supportive intervention. Based on current evidence, classical, instrumental, and live music are recommended as the most effective therapeutic options for anxiety management in hemodialysis patients.

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