

## MANAGING ANXIETY IN PATIENTS WITH CHRONIC KIDNEY DISEASE UNDERGOING HEMODIALYSIS: CAN PROGRESSIVE MUSCLE RELAXATION REDUCE ANXIETY?

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### ABSTRACT

Chronic Kidney Disease (CKD) requiring long-term hemodialysis can cause anxiety. Progressive Muscle Relaxation (PMR) is a non-pharmacological intervention that can be used to reduce anxiety. This study aimed to determine the effect of PMR on anxiety among CKD patients undergoing hemodialysis. The study employed a pre-experimental design using a one-group pretest-posttest approach. The population consisted of 215 CKD patients undergoing hemodialysis at RSI Sakinah Mojokerto. A total of 37 respondents were selected using consecutive sampling. Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS). PMR was administered for 15–20 minutes before hemodialysis. The results showed that before the intervention, most respondents experienced severe anxiety (37.8%), whereas after the intervention, most respondents reported no anxiety (32.4%). The Wilcoxon Signed-Rank Test showed a p-value of 0,000 ( $p < 0.05$ ). PMR helps reduce anxiety by decreasing muscle tension, promoting physical relaxation, and suppressing sympathetic nervous system activation involved in the stress response, thereby enabling patients to feel calmer and more comfortable during hemodialysis. In conclusion, PMR is effective in reducing anxiety among CKD patients undergoing hemodialysis.

**Keywords:** *Anxiety, Chronic Kidney Disease, Hemodialysis, Progressive Muscle Relaxation (PMR)*

### INTRODUCTION

Chronic Kidney Disease (CKD) is a progressive and irreversible decline in kidney function that requires kidney replacement therapy in its advanced stages, with hemodialysis being the most frequently used treatment. Although hemodialysis prolongs survival and improves metabolic balance, patients must undergo lifelong treatment that imposes substantial physical, social, and psychological burdens (Mayasari D., 2022). Among these psychological problems, anxiety is one of the most common conditions experienced by patients receiving maintenance hemodialysis. Persistent anxiety may negatively affect treatment adherence, quality of life, physiological stability, and overall clinical outcomes, highlighting the importance of addressing psychological as well as physical aspects of CKD management (Rahayu, 2023)

Anxiety remains highly prevalent among patients undergoing hemodialysis. Previous studies have reported that approximately 30–50% of hemodialysis patients experience anxiety with varying levels of severity (Bakhsh & Mahallawi, 2025). Anxiety may arise from uncertainty regarding disease progression, dependence on dialysis machines, fear of invasive procedures, limited understanding of the disease, long-term treatment demands, and concerns about death (Huang et al., 2024). Continuous activation of the sympathetic nervous system caused by anxiety may contribute to sleep disturbances, muscle tension, increased heart rate, fatigue, and poor adherence to hemodialysis schedules, thereby worsening patients' health conditions (Sitepu et al., 2025).

The increasing burden of CKD further emphasizes the importance of effective anxiety management. The World Health Organization estimated that CKD affects approximately 15% of the global population, while anxiety disorders affect more than 301 million people worldwide (WHO,2023). According to the Indonesian Health Survey (SKI) 2023, CKD affects 0.22% of the Indonesian population, with hypertension and diabetes mellitus identified as the major contributing risk factors. East Java ranks second among Indonesian provinces, reporting approximately 98,738 CKD cases. At the local level, the Mojokerto District Health Profile (2024) recorded 1,964 outpatient visits related to CKD, indicating that CKD remains an important public health problem in the study area (Dinkes Kabupaten Mojokerto, 2024).

Non-pharmacological interventions have increasingly been recommended to complement pharmacological treatment for anxiety in patients undergoing hemodialysis. One of the most widely used interventions is Progressive Muscle Relaxation (PMR). PMR is a relaxation technique involving systematic contraction and relaxation of muscle groups to reduce muscle tension and suppress sympathetic nervous system activity (Anggraini et al., 2024). A study by (Chandra Meidianta et al., 2023) found that PMR significantly reduced anxiety levels among patients undergoing hemodialysis, indicating that this technique is an effective non-pharmacological intervention for managing anxiety during dialysis treatment. PMR effectively reduces anxiety among patients receiving hemodialysis because it is inexpensive, safe, easy to perform, and can be practiced independently without requiring specialized equipment. In addition to reducing anxiety, PMR may improve sleep quality and decrease perceived physical discomfort, making it a practical intervention in clinical settings (Pambudiarto et al., 2024).

Therefore, this study aimed to determine the effect of Progressive Muscle Relaxation (PMR) on anxiety levels among patients with Chronic Kidney Disease undergoing hemodialysis at RSI Sakinah Mojokerto. This study contributes to the existing literature by providing evidence regarding the effectiveness of PMR as a simple, low-cost, and non-pharmacological nursing intervention in reducing anxiety among hemodialysis patients.

## **METHOD**

This study employed a quantitative pre-experimental design using a one-group pretest–posttest approach to evaluate the effect of Progressive Muscle Relaxation (PMR) on anxiety levels among patients with Chronic Kidney Disease (CKD) undergoing hemodialysis. The study was conducted in the Hemodialysis Unit of RSI Sakinah Mojokerto, Indonesia, from April 13 to April 18, 2026.

The study population consisted of 215 patients with CKD undergoing routine hemodialysis at RSI Sakinah Mojokerto. Participants were recruited using a consecutive sampling technique during a 6-day recruitment period. All patients attending routine hemodialysis during the study period were consecutively screened according to the predetermined eligibility criteria. Patients who met the inclusion criteria were enrolled sequentially until the required sample size of 37 respondents was achieved.

The inclusion criteria were patients aged 18 years or older, willing to participate by signing informed consent, conscious and cooperative, able to communicate verbally, physically able to perform the PMR procedure, and experiencing at least mild anxiety

(Hamilton Anxiety Rating Scale [HARS] score  $\geq 14$ ). Patients were excluded if they had hemodynamic instability or impaired consciousness, underwent emergency (cito) hemodialysis, experienced severe fatigue that prevented participation in the intervention, had previous experience performing PMR, or presented with very severe anxiety or panic, as these conditions could interfere with concentration, comprehension, and the ability to follow PMR instructions.

Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS) before and after the intervention. Baseline anxiety (pretest) was assessed before the PMR session. Participants then received Progressive Muscle Relaxation (PMR) consisting of 14 systematic muscle exercises performed in two consecutive cycles over approximately 20 minutes before the hemodialysis procedure. The intervention involved sequential contraction and relaxation of muscle groups from the facial muscles to the lower extremities following a standardized PMR protocol. After completion of the intervention, anxiety levels were reassessed (posttest) using the same HARS instrument.

Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarize participants' demographic characteristics and anxiety levels. The normality of the data distribution was examined using the Shapiro–Wilk test. As the data were not normally distributed, differences between pretest and posttest anxiety scores were analyzed using the Wilcoxon Signed-Rank Test. Statistical significance was established at a p-value  $< 0.05$ .

## FINDING AND DISCUSSION

### RESEARCH RESULT

#### General Characteristics of Respondents

**Table 1. Demographic Characteristics of Respondents**

| Characteristics                 | Frequency | Percentage (%) |
|---------------------------------|-----------|----------------|
| <b>Gander</b>                   |           |                |
| Male                            | 17        | 45,9           |
| Female                          | 20        | 54,1           |
| <b>Aged</b>                     |           |                |
| 18 – 44 Years                   | 3         | 5,4            |
| 45 – 59 Years                   | 26        | 70,3           |
| 60 – 69 Years                   | 6         | 16,2           |
| > 70 Years                      | 2         | 5,4            |
| <b>Education Level</b>          |           |                |
| No Formal Education             | 3         | 8,1            |
| Elementary School               | 15        | 40,5           |
| Junior High School              | 10        | 27,0           |
| Senior High School              | 8         | 21,6           |
| Higher Education                | 1         | 2,7            |
| <b>Duration of Hemodialysis</b> |           |                |
| < 12 Months                     | 2         | 5,4            |
| $\geq 12$ Months                | 35        | 94,6           |
| <b>Total</b>                    | <b>37</b> | <b>100</b>     |

Table 1 shows the demographic characteristics of the respondents. Of the 37 participants, 54.1% were female and 45.9% were male. Most respondents were aged 45–59 years (70.3%), had completed elementary school (40.5%), and had undergone hemodialysis for  $\geq 12$  months (94.6%).

### Specific Findings

#### 1. Anxiety Levels Before Progressive Muscle Relaxation (PMR)

**Table 2. Distribution of Anxiety Levels Before Progressive Muscle Relaxation (PMR)**

| Anxiety Level    | Frequency | Percentage (%) |
|------------------|-----------|----------------|
| No Anxiety       | 0         | 0              |
| Mild Anxiety     | 12        | 32,4           |
| Moderate Anxiety | 11        | 29,7           |
| Severe Anxiety   | 14        | 37,8           |
| <b>Total</b>     | <b>37</b> | <b>100</b>     |

Table 2 presents the distribution of anxiety levels before the Progressive Muscle Relaxation (PMR) intervention. All 37 respondents (100%) experienced anxiety with varying levels of severity. The largest proportion of respondents experienced severe anxiety (37.8%,  $n = 14$ ), followed by mild anxiety (32.4%,  $n = 12$ ) and moderate anxiety (29.7%,  $n = 11$ ). No respondents were categorized as having no anxiety before the intervention.

#### 2. Anxiety Levels After Progressive Muscle Relaxation (PMR)

**Table 3. Distribution of Anxiety Levels After Progressive Muscle Relaxation (PMR)**

| Anxiety Level    | Frequency | Percentage (%) |
|------------------|-----------|----------------|
| No Anxiety       | 12        | 32,4           |
| Mild Anxiety     | 10        | 27,0           |
| Moderate Anxiety | 11        | 29,7           |
| Severe Anxiety   | 4         | 10,8           |
| <b>Total</b>     | <b>37</b> | <b>100</b>     |

Table 3 presents the distribution of anxiety levels after the Progressive Muscle Relaxation (PMR) intervention. Of the 37 respondents, the largest proportion experienced no anxiety (32.4%,  $n = 12$ ), followed by moderate anxiety (29.7%,  $n = 11$ ), mild anxiety (27.0%,  $n = 10$ ), and severe anxiety (10.8%,  $n = 4$ ).

#### 3. Effect of Progressive Muscle Relaxation (PMR) on Anxiety Levels

**Table 4. Effect of Progressive Muscle Relaxation (PMR) on Anxiety Levels Among Patients with Chronic Kidney Disease Undergoing Hemodialysis**

| Variable           | <i>p-Value</i> | <i>Mean-Rank</i> | <i>Z-Score</i> |
|--------------------|----------------|------------------|----------------|
| Pretest - Posttest | 0,000          | 19,00            | -5,315         |

Table 4 presents the effect of Progressive Muscle Relaxation (PMR) on anxiety levels among patients with Chronic Kidney Disease undergoing hemodialysis. The

Wilcoxon Signed-Rank Test showed a statistically significant difference between pretest and posttest anxiety levels ( $p = 0.000$ ;  $Z = -5.315$ ), indicating that Progressive Muscle Relaxation significantly reduced anxiety levels among the respondents.

## DISCUSSION

### 1. Anxiety Levels Before Progressive Muscle Relaxation (PMR)

The findings of this study showed that before receiving the Progressive Muscle Relaxation (PMR) intervention, all respondents experienced anxiety at varying levels. The largest proportion of respondents experienced severe anxiety (37.8%), followed by mild anxiety (32.4%) and moderate anxiety (29.7%), while none of the respondents were categorized as having no anxiety. These findings indicate that anxiety remains a common psychological problem among patients with Chronic Kidney Disease (CKD) undergoing hemodialysis.

Patients undergoing hemodialysis frequently experience anxiety because they must adapt to a lifelong treatment regimen while facing uncertainty regarding disease progression, dependence on hemodialysis machines, invasive procedures, lifestyle changes, and fear of complications or death. These stressors may activate the sympathetic nervous system, resulting in psychological distress that varies according to each patient's coping mechanisms and ability to adapt. Consequently, anxiety levels among patients undergoing hemodialysis may range from mild to severe depending on individual psychological responses (Sitepu et al., 2025).

The high prevalence of anxiety observed in this study may also be associated with the respondents' demographic characteristics. Female respondents slightly outnumbered males, which may be explained by women's greater emotional sensitivity and vulnerability to psychological distress related to chronic illness (Haidar, 2025). Most respondents were aged 45–59 years, an age group that often experiences increased psychological stress due to declining physical function, ongoing family responsibilities, and concerns about disease progression (Yunia et al., 2023). The majority had completed elementary school, suggesting that limited health literacy may have influenced their understanding of CKD and hemodialysis, thereby increasing anxiety (Agustyowati et al., 2023). In addition, most respondents had undergone hemodialysis for  $\geq 12$  months, indicating that prolonged exposure to long-term treatment and its physical, psychological, and social burdens may contribute to persistent anxiety (Mufidah, 2024).

According to the researchers, the high anxiety levels observed before the intervention reflected the psychological burden experienced by patients receiving long-term hemodialysis. In addition to physical limitations, patients often experience concerns regarding disease progression, dependence on dialysis therapy, and reduced quality of life. These conditions may contribute to persistent anxiety and highlight the importance of implementing effective non-pharmacological interventions to improve psychological well-being among patients undergoing hemodialysis.

### 2. Anxiety Levels After Progressive Muscle Relaxation (PMR)

The findings of this study showed that anxiety levels decreased after the Progressive Muscle Relaxation (PMR) intervention. Most respondents were categorized as having no anxiety (32.4%), followed by moderate anxiety (29.7%), mild anxiety (27.0%), and

severe anxiety (10.8%). No respondents experienced very severe anxiety or panic after the intervention. These findings indicate that PMR contributed to reducing anxiety levels among patients with Chronic Kidney Disease (CKD) undergoing hemodialysis.

Progressive Muscle Relaxation (PMR) improves the body's physiological response by reducing heart rate, blood pressure, and respiratory rate, which are typically elevated during anxiety. These physiological changes promote emotional stability and enhance an individual's ability to cope with anxiety-provoking situations (Yuniarti & Rahmawati, 2018). Furthermore, PMR activates the parasympathetic nervous system while suppressing sympathetic nervous system activity, resulting in reduced muscle tension and decreased stress hormone production. The alternating process of muscle contraction and relaxation also increases body awareness, enabling individuals to better regulate their physical and emotional responses to anxiety (Ardiandari & Priambodo, 2024).

According to the researchers, the decrease in anxiety after the PMR intervention indicates that this technique helped patients achieve both physical and psychological relaxation before undergoing hemodialysis. By reducing muscle tension and promoting relaxation, patients were better able to manage emotional distress associated with dialysis treatment. Therefore, PMR has the potential to serve as an effective complementary nursing intervention for reducing anxiety and improving the psychological well-being of patients with CKD undergoing hemodialysis.

### 3. Effect of Progressive Muscle Relaxation (PMR) on Anxiety Levels

The findings of this study demonstrated that Progressive Muscle Relaxation (PMR) significantly reduced anxiety levels among patients with Chronic Kidney Disease (CKD) undergoing hemodialysis. Before the intervention, most respondents experienced severe anxiety (37.8%), whereas after the intervention, the largest proportion of respondents was categorized as having no anxiety (32.4%). The Wilcoxon Signed-Rank Test showed a statistically significant difference between pretest and posttest anxiety levels  $p$  value 0.000 ( $p < 0,05$ ), indicating that PMR was effective in reducing anxiety among patients undergoing hemodialysis.

The reduction in anxiety may have been influenced not only by the PMR intervention but also by patients' adaptation to long-term hemodialysis, family support, effective coping strategies, and a supportive therapeutic environment. Previous studies have reported that these factors contribute to patients' ability to manage stress and anxiety during hemodialysis treatment (Amaludin et al., 2024).

The findings of this study are consistent with those of (Anggraini et al., 2024), who reported that PMR significantly reduced anxiety among patients undergoing hemodialysis. Their study demonstrated that patients experienced lower anxiety levels after practicing PMR because the technique promoted physical and psychological relaxation through systematic muscle contraction and relaxation. Similarly, (Chandra Meidianta et al., 2023) concluded that PMR is an effective non-pharmacological intervention for reducing anxiety in patients receiving hemodialysis.

Physiologically, PMR reduces anxiety by decreasing sympathetic nervous system activity while enhancing parasympathetic nervous system responses. This mechanism reduces muscle tension, heart rate, blood pressure, and stress hormone secretion, thereby promoting relaxation and emotional stability. Consequently, PMR helps patients better

manage anxiety associated with routine hemodialysis and may improve their psychological well-being (Ardiandari & Priambodo, 2024).

According to the researchers, PMR is a practical, safe, and low-cost intervention that can be easily incorporated into routine nursing care for patients undergoing hemodialysis. Regular implementation of PMR before hemodialysis sessions may help patients achieve a more relaxed psychological state and reduce anxiety associated with long-term treatment.

## CONCLUSION

This study demonstrated that Progressive Muscle Relaxation (PMR) was effective in reducing anxiety levels among patients with Chronic Kidney Disease (CKD) undergoing hemodialysis. Before the intervention, the largest proportion of respondents experienced severe anxiety (37.8%), whereas after the intervention, the largest proportion was categorized as having no anxiety (32.4%). The Wilcoxon Signed-Rank Test showed a statistically significant difference in anxiety levels before and after the intervention ( $Z = -5.315$ ,  $p = 0.000$ ), indicating that PMR significantly reduced anxiety among patients undergoing hemodialysis. These findings suggest that PMR is a simple, safe, low-cost, and effective non-pharmacological intervention that can be integrated into routine nursing care to improve the psychological well-being of patients undergoing hemodialysis.

## REFERENCES

- Agustyawati, T. H. R., Khofifah, N., & Putri, T. A. R. K. (2023). *Faktor-Faktor Yang Mempengaruhi Tingkat Kecemasan Pasien Hemodialisa*. 1(2), 97–103.
- Amaludin, M., Safitri, D., Arisandi, D., Akbar, A., Nurpratiwi, Hidayat, U. R., Alfikrie, F., & Hatmalyakin, D. (2024). *Faktor Yang Mempengaruhi Tingkat Kecemasan Pasien Gagal Ginjal Kronis Yang Menjalani Hemodialisa*. 32(3), 167–186.
- Anggraini, Y., Triana, N., & Maya Sari, G. (2024). Pengaruh Relaksasi Otot Progresif Terhadap Kecemasan Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa. *Jurnal Kesehatan Tambusai*, 5(4), 10715–10722. <https://doi.org/10.31004/jkt.v5i4.34931>
- Ardiandari, D., & Priambodo, G. (2024). *Pengaruh Teknik Relaksasi Otot Progresif Terhadap Tingkat Kecemasan Pada Pasien Hemodialisa Di Rumah Sakit TK III 04.06.04 Surakarta*. 20, 1–10.
- Bakhsh, A. M., & Mahallawi, W. H. (2025). Psychological Effects of Hemodialysis on Patients with Renal Failure: A Cross-Sectional Study. *Journal of Clinical Medicine*, 14(20). <https://doi.org/10.3390/jcm14207136>
- Chandra Meidianta, A., Masnina, R., & Meidianta, A. C. (2023). Literature Review A Literature Review On The Impact Of Progressive Muscle Relaxation (PMR) On Anxiety In Patients With Hemodialysis. Corresponding Author. *Journal of Nursing*, 1(2), 32–62. <https://journalofnursing.org>
- Dinkes Kabupaten Mojokerto. (2024). Profil Kesehatan Kabupaten Mojokerto Tahun

2024. *Dinas Kesehatan Kabupaten Mojokerto*, 4, 1–209.
- Haidar, A. (2025). *Faktor - Faktor Yang Berhubungan Dengan Tingkat Kecemasan Pada Pasien Hemodialisa*. 10(1), 73–82.
- Huang, P., Huang, H.-T., Ma, J., Pang, J., Zhang, Y.-Y., Ma, C.-H., Wang, S.-D., Liang, X.-Z., & Wang, J. (2024). Impact of anxiety symptoms on dialysis adherence and complication rates: A longitudinal observational study. *World Journal of Psychiatry*, 14(12), 1918–1924. <https://doi.org/10.5498/wjp.v14.i12.1918>
- Mayasari D. (2022). Hubungan Kadar Ureum, Kreatinin, dan Hemoglobin Dengan Tingkat Fatigue Pada Pasien Hemodialisa. *Jurnal Repository Unissula*, 1(3), 1–15.
- Mufidah, N. (2024). *Hubungan Lamanya Terapi Hemodialisa Terhadap Tingkat Kecemasan Pada Pasien CKD Yang Menjalani Hemodialisa*. 16, 1319–1328.
- Pambudiarto, A. A., Azizah, A. N., Amalia, L., Tsani, Niswatin, K., Hudiawati, D., & Susanti, E. (2024). Evidence Based Nursing: Penerapan Intervensi Progressive Muscle Relaxation. *Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM)*, 7.
- Rahayu, S. (2023). *the Effect of Progressive Muscle Relaxation in Chronic Rental Failure Patients on Anxiety Levels*. 10, 1–23.
- Sitepu, M. B., Derang, I., & Simanullang, R. (2025). *Hubungan Mekanisme Koping Dengan Tingkat Kecemasan Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Di Rsup Haji Adam Malik Medan Tahun 2024 the Relationship Between Coping Mechanisms and Anxiety Levels of Chronic Kidney Failure Patients Undergoing*. 13(2), 1–12.
- Yunia, E. A., Saragih, J., Damanik, D. W., & Dewi, R. S. (2023). *Anxiety in patients treated with hemodialysis*. 5(2), 182–186.
- Yuniarti, E. V., & Rahmawati, I. (2018). Progressive Muscle Relaxation Effect On The Level Anxiety Of Cancer Patients Undergoing Chemotherapy. *International Journal of Nursing and Midwifery Science*, April.