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# The Relationship Between Duration of Hemodialysis and Level of Depression Among Hemodialysis Patients in Kupang City

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**Abstract**: Hemodialysis is a long-term renal replacement therapy that can affect patients' daily functioning and psychological well-being. Depression is common in this population and may reduce quality of life and treatment adherence. However, evidence on whether hemodialysis duration is associated with depression remains inconsistent, and local multi-center data from Kupang City are limited. **Objective**: To analyze the relationship between duration of hemodialysis and depression level among hemodialysis patients in Kupang City. **Methods**: A quantitative cross-sectional study was conducted in July–August 2025 at three hemodialysis centers in Kupang City (RSUD W.Z. Johanes, RS Siloam, and RSUP Ben Mboi). Using purposive sampling, 163 respondents were recruited from a population of 365 routine hemodialysis patients. Depression was assessed using the Beck Depression Inventory-II (BDI-II). Hemodialysis duration was obtained from medical records and categorized as <12 months, 12–24 months, and >24 months. Data were analyzed descriptively and tested using the Chi-square test. **Findings**: Most respondents were not depressed (60.7%), while 39.3% had mild to severe depression. The largest proportion had undergone hemodialysis for >24 months (35.6%). There was no statistically significant association between hemodialysis duration and depression level ($p = 0.434$). **Implications**: Depression among hemodialysis patients appears to be influenced by factors beyond treatment duration, supporting the need for routine depression screening and psychosocial support integrated into hemodialysis care. **Originality**: This multi-center study provides local evidence from three hospitals in Kupang City using a standardized instrument (BDI-II), helping clarify inconsistent prior findings and reinforcing a multifactorial view of depression in hemodialysis patients.

**Keywords:** hemodialysis; depression; duration of hemodialysis; Beck Depression Inventory-II; Kupang City.

## INTRODUCTION

Chronic kidney disease (CKD) represents a long-term health burden because many patients eventually require renal replacement therapy in the form of routine hemodialysis. Hemodialysis demands strict adherence to treatment schedules, dietary and fluid restrictions, and continuous medical monitoring, which substantially alters patients' daily activities, productivity, and social roles. Living with a lifelong dependence on hemodialysis

often creates persistent psychological stress, as patients must adapt to physical limitations and uncertainties related to their illness and treatment. These circumstances highlight that hemodialysis is not merely a medical procedure but also a complex social and psychological experience that can affect overall well-being (Bello et al., 2022; Taylor, 2018).

Depression is a major mental health problem among individuals with chronic illnesses and is particularly relevant for patients undergoing hemodialysis. Depression may reduce quality of life, impair motivation for self-care, and negatively influence adherence to long-term treatment regimens. National health data in Indonesia indicate that depression remains a significant public health concern, with notable variations across provinces, including relatively high prevalence in East Nusa Tenggara Province (Kementerian Kesehatan RI, 2018). In hemodialysis patients, depressive symptoms are frequently associated with fatigue, social withdrawal, and difficulties in coping with ongoing therapy, making depression an important clinical issue that requires systematic attention (Syafira et al., 2024; Taylor, 2018).

Previous studies have examined depression among hemodialysis patients from various perspectives. First, research focusing on the prevalence and determinants of depression has emphasized the important roles of family support, self-acceptance, and sociodemographic characteristics in influencing psychological outcomes among hemodialysis patients (Baeti & Maryati, 2016; Kuwa et al., 2022; Siagian & Saragih, 2023). These findings suggest that depression in hemodialysis is not solely determined by medical factors but is also shaped by psychosocial conditions surrounding the patient.

Second, studies utilizing different depression assessment instruments have reported varying estimates of depressive symptoms among hemodialysis patients. Screening tools such as the Beck Depression Inventory (BDI) and the Geriatric Depression Scale (GDS) have been widely used to measure depression severity; however, differences in measurement tools, cut-off scores, and population characteristics often lead to inconsistent prevalence rates across studies (Musthafa & Armelia, 2020; Octafiani & Armelia, 2021). These methodological variations underline the need for consistent and standardized measurement approaches when evaluating depression in this population.

Third, specific investigations on the relationship between duration of hemodialysis and depression have produced conflicting results. Several studies reported no significant association between the length of time undergoing hemodialysis and the level of depression

(Tartum, 2016; Prabawati & Fransiska, 2024). Conversely, other studies found a significant relationship, suggesting that longer duration of hemodialysis may be linked to better psychological adaptation and lower depression levels (Korin, 2020). The inconsistency of these findings indicates a clear research gap, likely influenced by differences in study settings, categorization of hemodialysis duration, and assessment methods. Furthermore, evidence from multi-center studies in Kupang City remains limited, restricting the generalizability of previous results to this local context.

Therefore, this study aims to analyze the relationship between the duration of hemodialysis and the level of depression among hemodialysis patients in Kupang City by involving three hospitals that provide hemodialysis services. Depression levels were assessed using the Beck Depression Inventory-II (BDI-II), while the duration of hemodialysis was obtained from patients' medical records. This research is expected to provide more comprehensive local evidence to clarify the inconsistent findings of earlier studies and to contribute to the improvement of psychological care in hemodialysis services.

Theoretically, the duration of hemodialysis may influence depression through opposing mechanisms. In the early phase of treatment, patients are likely to experience psychological distress due to lifestyle changes and dependence on therapy. Over time, some patients may develop better coping strategies and psychological adaptation, which could reduce depressive symptoms; however, others may continue to experience or even develop worsening depression due to accumulated physical complications, chronic fatigue, and socioeconomic burdens. Based on this rationale, the hypothesis of this study is that there is a relationship between the duration of hemodialysis and the level of depression among hemodialysis patients in Kupang City.

## RESEARCH METHOD

This study investigated individual hemodialysis patients as the unit of analysis, focusing on two key variables: duration of hemodialysis (exposure) and depression level (outcome). The duration of hemodialysis was defined as the length of time patients had been receiving routine hemodialysis treatment, while depression level was assessed using a standardized self-report instrument. The study setting comprised three hemodialysis service providers in Kupang City RSUD W.Z. Johanes, RS Siloam, and RSUP Ben Mboi where participants were recruited during July–August 2025.

A quantitative cross-sectional design was selected because the primary objective was to examine the association between the duration of hemodialysis and depression level at a single point in time across a defined patient population. This design was considered appropriate for estimating the distribution of depression categories and testing relationships between categorical variables in routine clinical settings, while remaining feasible within the study timeframe and resources.

The data sources consisted of primary data from respondents and secondary clinical data from medical records. Primary data included patients' responses to the depression questionnaire and basic sociodemographic characteristics collected during the study period. Secondary data were obtained from patients' medical records to determine the duration of hemodialysis and to support eligibility screening according to the predefined criteria.

Participants were selected using purposive sampling from the population of all routine hemodialysis patients treated at the three hospitals. The total population size was 365 patients, and the minimum sample size was determined using the Slovin formula, yielding 163 respondents. Inclusion criteria were: (1) age 18–65 years, (2) receiving routine hemodialysis, and (3) willing to participate. Exclusion criteria were: (1) documented history of psychiatric disorders prior to initiating hemodialysis, or (2) refusal to participate. Depression was measured using the Beck Depression Inventory–II (BDI-II), a 21-item instrument, administered either through self-completion or researcher-assisted completion when needed. Duration of hemodialysis was extracted from medical records and subsequently classified into categorical groups for analysis.

Data analysis was conducted in two stages. First, univariate analysis was performed to describe respondents' characteristics and the distribution of hemodialysis duration and depression levels. Second, bivariate analysis was conducted using the Chi-square test to examine the relationship between the categorized duration of hemodialysis and categorized depression level. Statistical significance was determined at a conventional alpha level ($p < 0.05$), and results were presented in frequency tables to support interpretation of the association.

## RESULT AND DISCUSSION

### Age of Respondents

Based on Table 4.1, respondents were aged 18–65 years and were divided into seven age groups. The smallest proportion was found in the 18–24 year age group (4

respondents/2.5%), while the largest proportion was in the 53–59 year age group (46 respondents/28.2%). Other age groups included 25–31 years (13 respondents/8.0%), 32–38 years (17 respondents/10.4%), 39–45 years (25 respondents/15.3%), 46–52 years (27 respondents/16.6%), and 60–65 years (31 respondents/19.0%). Overall, the majority of respondents were aged 53 years and above, while the smallest proportion was in the 18–24 year group.

**Table 4.1** Frequency Distribution of Patients' Age

| Age (years) | Frequency (n) | Percentage (%) |
|---|---|---|
| 18–24 | 4 | 2.5 |
| 25–31 | 13 | 8.0 |
| 32–38 | 17 | 10.4 |
| 39–45 | 25 | 15.3 |
| 46–52 | 27 | 16.6 |
| 53–59 | 46 | 28.2 |
| 60–64 | 31 | 19.0 |
| **Total** | **163** | **100** |

**Gender**

Based on the frequency distribution analysis, it was found that out of 163 respondents, the majority were male, totaling 99 individuals (60.7%), while female respondents numbered 64 individuals (39.3%). These data indicate that the proportion of male respondents was higher than that of females, with a difference of 21.4%.

**Table 4.2** Frequency Distribution of Patients' Gender

| Gender | Frequency (n) | Percentage (%) |
|---|---|---|
| Male | 99 | 60.7 |
| Female | 64 | 39.3 |
| **Total** | **163** | **100** |

**Marital Status**

Based on the results from 163 respondents, the majority were married, totaling 143 individuals (87.7%), while those who were unmarried accounted for 20 individuals (12.3%).

**Table 4.3** Frequency Distribution of Marital Status

| Marital Status | Frequency (n) | Percentage (%) |
|---|---|---|
| Married | 143 | 87.7 |

| Marital Status | Frequency (n) | Percentage (%) |
|---|---|---|
| Unmarried | 20 | 12.3 |
| **Total** | **163** | **100** |

**Educational Level**

Based on Table 4.4, most respondents had completed senior high school or equivalent education (72 respondents/44.2%), followed by bachelor's degree (44 respondents/27.0%). Other education levels included junior high school (16 respondents/9.8%), elementary school (15 respondents/9.2%), diploma (7 respondents/4.3%), no formal education (5 respondents/3.1%), and master's degree (4 respondents/2.5%).

**Table 4.4 Frequency Distribution of Educational Level**

| Education Level | Frequency (n) | Percentage (%) |
|---|---|---|
| No School | 5 | 3.1 |
| Elementary | 15 | 9.2 |
| Junior High | 16 | 9.8 |
| Senior High | 72 | 44.2 |
| Diploma | 7 | 4.3 |
| Bachelor (S1) | 44 | 27.0 |
| Master (S2) | 4 | 2.5 |
| **Total** | **163** | **100** |

**Occupation**

The distribution of respondents' occupations varied. Out of 163 respondents, most worked in the private sector (48 respondents/29.4%) and as housewives (39 respondents/23.9%). Furthermore, respondents who were unemployed totaled 25 individuals (15.3%), civil servants 24 individuals (14.7%), farmers 15 individuals (9.2%), and retirees 12 individuals (7.4%). The highest proportions of respondents working in the private sector and as housewives indicate that most respondents were in the productive age group.

**Table 4.5** Frequency Distribution of Occupation

| Occupation | Frequency (n) | Percentage (%) |
|---|---|---|
| Unemployed | 25 | 15.3 |
| Housewife | 39 | 23.9 |
| Farmer | 15 | 9.2 |
| Private | 48 | 29.4 |

| Occupation | Frequency (n) | Percentage (%) |
|---|---|---|
| Civil Servant | 24 | 14.7 |
| Retiree | 12 | 7.4 |
| **Total** | **163** | **100** |

**Domicile**

Most respondents resided within Kupang City, totaling 108 individuals (66.3%), while respondents living outside the city numbered 55 individuals (33.7%). This condition indicates that most respondents were domiciled within the city area, likely because the research was conducted in hospitals located in central Kupang, making access to health facilities easier compared to those from outside the city.

**Table 4.6** Frequency Distribution of Domicile

| Domicile | Frequency (n) | Percentage (%) |
|---|---|---|
| Within City | 108 | 66.7 |
| Outside City | 55 | 33.7 |
| **Total** | **163** | **100** |

**Univariate Analysis**

*Distribution of Duration of Hemodialysis*

Based on statistical analysis, the duration of hemodialysis was classified into three categories: <12 months, 12–24 months, and >24 months. In the <12 months category, 56 respondents were identified (34.4%), followed by the 12–24 months category with 49 respondents (30.1%). The >24 months category consisted of 58 respondents (35.6%). The categorization of hemodialysis duration into three ordinal groups facilitated the analysis process.

**Table 4.7** Distribution of Duration of Hemodialysis

| Duration (months) | Frequency (n) | Percentage (%) |
|---|---|---|
| <12 | 56 | 34.4 |
| 12–24 | 49 | 30.1 |
| >24 | 58 | 35.6 |
| **Total** | **163** | **100** |

*Distribution of Depression Levels*

Based on the frequency distribution, 99 patients (60.7%) were classified as not depressed, 27 patients (16.6%) had mild depression, 23 patients (14.1%) had moderate depression, and 14 patients (8.6%) had severe depression.

**Table 4.8 Frequency Distribution of Depression Levels**

| Depression Level | Frequency (n) | Percentage (%) |
|---|---|---|
| No Depression | 99 | 60.7 |
| Mild | 27 | 16.6 |
| Moderate | 23 | 14.1 |
| Severe | 14 | 8.6 |
| **Total** | **163** | **100** |

**Bivariate Analysis**

*Relationship Between Duration of Hemodialysis and Level of Depression*

Based on statistical analysis in Table 4.9, among patients undergoing hemodialysis for less than 12 months, most respondents were in the non-depressed category (33 individuals), while 9 respondents each experienced mild and moderate depression, and 5 respondents experienced severe depression. In the 12–24 months group, the majority were also non-depressed (34 individuals), with 7 respondents each experiencing mild and moderate depression, and only 1 respondent experiencing severe depression. In the group with more than 24 months of hemodialysis, 32 respondents were not depressed, 11 had mild depression, 7 had moderate depression, and 8 had severe depression. Overall, the largest proportion in each duration category consisted of respondents who were not depressed, although variations in depression levels were observed across all categories.

The Chi-square test produced a p-value of 0.434 (>0.05), indicating that there was **no** statistically significant relationship between the duration of hemodialysis and the level of depression among respondents. Therefore, statistically, the length of time undergoing hemodialysis did not influence the depression level in this study. These findings are consistent with previous studies by Prabawati, which reported no association between hemodialysis duration and depression level, and by Tartum, which also found no significant relationship between the two variables.

**Table 4.9** Distribution of Hemodialysis Duration and Depression Level

| Duration (months) | No Depression | Mild | Moderate | Severe | P-Value |
|---|---|---|---|---|---|
| <12 | 33 | 9 | 9 | 5 | |
| 12–24 | 34 | 7 | 7 | 1 | 0.434 |
| >24 | 32 | 11 | 7 | 8 | |
| **Total** | **99** | **27** | **23** | **14** | |

*Note: p-value <0.05 indicates a significant relationship; p-value >0.05 indicates no significant relationship.*

## DISCUSSION

This study involved 163 hemodialysis patients who met the inclusion criteria across three hospitals in Kupang City. The respondents were predominantly aged 53–59 years, most were male, and the majority were married. In terms of clinical exposure, hemodialysis duration was relatively evenly distributed across the three categories (<12 months, 12–24 months, and >24 months). Regarding outcomes, most respondents were classified as not depressed, while the remainder experienced mild to severe depression. The key statistical finding of this study was that hemodialysis duration was not significantly associated with depression level based on the Chi-square test ($p = 0.434$).

The absence of a significant association suggests that depression among hemodialysis patients is more plausibly driven by multifactorial mechanisms rather than by treatment duration alone. Although longer exposure to hemodialysis may theoretically lead to psychological adaptation, it may also coincide with cumulative burdens such as chronic fatigue, comorbidities, functional limitations, and financial stressors. These competing pathways can dilute a simple linear relationship between duration and depression. In addition, the finding that a substantial proportion of respondents were classified as not depressed indicates that many patients may have developed coping strategies or received adequate support, which could reduce depressive symptoms regardless of how long they have been on hemodialysis.

When compared with previous studies, the current findings align with reports showing no significant relationship between hemodialysis duration and depression, such as those by Prabawati and Fransiska and by (Tartum, 2016). These studies similarly concluded that duration alone does not explain depressive status among hemodialysis patients. In contrast, other studies, including (Korin, 2020) reported a significant relationship, arguing that longer treatment duration may be linked to lower depression levels through better psychological adaptation. The divergence across studies indicates that contextual factors such as differences in sample characteristics, categorization of hemodialysis duration, instruments used to measure depression, and local healthcare and social conditions may meaningfully shape the observed association. A potential novelty of the present study lies in its multi-center design in Kupang City, providing local evidence from three hospitals

that may better reflect variations in service access and patient backgrounds within this region.

From a broader perspective, the findings imply that psychological outcomes in hemodialysis patients should be understood beyond biomedical parameters. Sociodemographic and contextual factors such as educational attainment, occupational status, and place of residence may influence patients' health literacy, economic resilience, and access to care, which in turn shape their vulnerability to depression. Patients living outside Kupang City, for example, may face additional travel and logistical burdens, contributing to physical and psychological fatigue. Similarly, lower educational background may limit disease-related understanding and adaptive coping, while unstable employment or unemployment can intensify financial pressure. These conditions reinforce the interpretation that depression in chronic illness is not merely an individual clinical symptom but also reflects structural and social realities affecting patients' everyday lives.

Reflecting on the functional and dysfunctional implications of these results, the relatively high proportion of patients classified as not depressed can be viewed as a functional sign of adaptation or the presence of supportive coping resources among many respondents. However, the persistence of mild to severe depression in a considerable minority remains clinically concerning, as untreated depression can impair quality of life, reduce adherence to dietary and treatment regimens, and worsen overall prognosis. This indicates that even if duration is not a significant predictor, depression screening remains essential, and the health system should not assume that patients will adapt psychologically over time.

Based on these findings, an actionable implication is the need to strengthen integrated psychosocial care within hemodialysis services. Routine depression screening (e.g., using standardized tools such as the BDI-II), structured referral pathways to mental health professionals, and family-centered support interventions should be incorporated into routine hemodialysis care. Hospitals may also consider psychosocial education programs, peer-support groups, and counseling strategies that enhance adaptive coping. For patients with additional barriers such as those living outside the city or experiencing socioeconomic hardship targeted support, including social assistance navigation and coordination of care, may reduce treatment-related stressors. Overall, the study emphasizes that reducing depression among hemodialysis patients requires a comprehensive approach that addresses psychosocial and contextual determinants alongside clinical management.

## CONCLUSION

This study provides the key insight that, among hemodialysis patients in Kupang City, the length of time undergoing hemodialysis is not a significant determinant of depression level. Although most respondents had been on hemodialysis for more than 24 months (35.6%) and the majority were classified as not depressed (60.7%), a substantial proportion (39.3%) still experienced mild to severe depression, underscoring the need for continuous psychological attention within routine hemodialysis care.

Scientifically, this research contributes local multi-center evidence from three hospitals in Kupang City by simultaneously describing the distribution of hemodialysis duration and depression severity and testing their association using a standardized depression instrument (BDI-II). By addressing inconsistent findings in prior studies, the present study strengthens the understanding that depression in hemodialysis patients should be viewed as multifactorial, where psychosocial and contextual factors may play a more prominent role than treatment duration alone.

Several limitations should be acknowledged. The cross-sectional design limits causal inference, and purposive sampling may reduce generalizability beyond the study settings. In addition, this study did not comprehensively measure potential confounders such as comorbid conditions, socioeconomic indices, family/social support scales, or coping strategies, which may influence depression outcomes. Future research is recommended to employ longitudinal designs and multivariable modeling, including standardized measurements of psychosocial support and clinical comorbidity, to better clarify the pathways leading to depression among hemodialysis patients.

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