



Analysis of the factors affecting the hospital readmission incidence of hemodialysis patients in Bandar Lampung, Indonesia[☆]



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KEYWORDS

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Abstract

Objective: The aim of this study was to identify the factors associated with the hospital readmission incidence of hemodialysis patients (HD) in Bandar Lampung, Indonesia.

Method: This study used a cross-sectional retrospective study which involved 111 respondents that acquired through consecutive sampling from May 19 to June 1, 2018. The data was obtained using a questionnaire and data collection sheets.

Results: There were significant correlations between the hospital readmission incidence and hemodialysis adherence ($p = 0.002$), anemia ($p = 0.048$), and social support ($p = 0.034$). Moreover the median number of hospital readmissions was 2, with a minimum of 2 and a maximum of 8 readmission incidence.

Conclusion: Hemodialysis adherence, social support, and anemia in hemodialysis patients were manageable factors that could affect the hospital readmission incidence. Nurse should pay attention in improving the level of care. Nursing interventions need to be developed to improve those factors related to the readmission incidence of hemodialysis patients.

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Introduction

The number of hospitalized hemodialysis (HD) patients has been increasing along with the increasing prevalence of HD

patients. Increasing the prevalence of HD inpatients has led to a higher risk of rehospitalized.² This condition can be explained through a previous study, which showed that 36.6% were inpatients in 2014 and 37.1% were inpatients in 2015.¹ Moreover, based on the existing data, 56% were inpatients in 2014, which increased to 56.6% who were inpatients in 2015.

A hospital readmission/rehospitalization is described as a condition where patient's return to the hospital for treatment, with or without arranged medication, from 30 to 90 days after being previously hospitalized.^{2,3} There are a few

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factors contributing to readmissions that are centered on the patients themselves called patient-centered readmission factors.⁴ Patient-centered readmission factors include self-management, the quality of hospital care, social support, and other factors.

Hospital readmission becomes the main burden of end-stage renal disease (ESRD) patients.⁵ It can have negative impacts on the patients as well as their families, increasing the emotional burdens of the patient and their family, and finally, leading to a loss of the will to live. Moreover, hospital readmission can negatively affect the national healthcare system, which will expend more on the treatment and rehospitalization of these patients.^{2,6,7}

Some research has stated that the factors affecting the hospital readmission rate of HD patients include self-management (HD adherence), the hospital care quality (length of HD), social support, and other factors (age, sex, depression, anemia, overhydration, and pulmonary edema). These factors were not significant; however, there have been no further studies conducted on some of the factors, such as the length of HD. Moreover, the differences in the patient characteristics between the previous research and the interview results from the Dr. H. Abdul Moeloek Regional Public Hospital in the Lampung province have not been determined. Therefore, further research is needed, including empirical data from the Regional Public Hospital, in order to verify the results of the previous research.

Method

This research used a qualitative, cross-sectional, retrospective study. It was designed to evaluate the correlation between the risk factors and the effects of rehospitalizations in HD patients while conducting an observation and data collection at the same time.

The sample size of this study was 111 respondents who were selected using nonprobability sampling and consecutive sampling methods. The study inclusion criteria were: routine HD care with a minimum of three months, hospital readmission at least once in the previous 24 months, medical records of pre- and post-HD care (including the urea, hemoglobin, and BB values), a willingness to participate in this study, and a completed informed consent form. The exclusion criteria were: chronic disease history (e.g., cancer vascular access infection, tuberculosis, hepatitis, and human immunodeficiency virus), history of dysglycemia, four consecutive HD session absences, and a history of traveling HD.

The data was collected using a questionnaire as the interview instrument. The questionnaire included one item about HD adherence. Additionally, to measure the social support, 7 items from the Enhancing Recovery in Coronary Heart Disease Social Support Instrument were used. Finally, the Depression subscale of the Hospital Anxiety and Depression Scale, which contained 7 items, was used to measure depression.

The data was processed using the Statistical Package for the Social Sciences to conduct univariate, bivariate, and multivariate analyses. The univariate analysis was conducted by measuring the frequencies and proportions of the respondents' characteristics. The bivariate analysis was

conducted using the Mann-Whitney *U* and Kruskal-Wallis tests to identify the significant correlations between two variables. The multivariate analysis was conducted using the linear regression test in order to identify which factors were related to the dependent variable.

Results

Respondent characteristics

Table 1 shows that most of respondents were 45–49 years old (45.9%) and female (52.3%), with half of them undergoing HD sessions of <5 h twice a week (85.6%). The HD adherence percentage was 64.9%, with 51.4% experiencing overhydration, 56.8% experiencing moderate anemia, and 23.4% experiencing pulmonary edema. Based on the social support and depression sections of the questionnaire, most of the respondents had poor social support (58.6%) and moderate depression (36.0%).

Table 2 shows that the median number of hospital readmissions was 2; however, based on the minimum and maximum values, the respondents were readmitted at least twice, and as many as 8 times in some cases.

Correlations between the independent variables and the hospital readmission incidence

The results indicated that there were significant correlations between the HD adherence ($p=0.032$), anemia ($p=0.048$), and social support ($p=0.034$) and the hospital readmission incidence in ESRD patients undergoing HD. Additionally, the results also showed that there were not significant correlations between the age ($p=0.266$), sex ($p=0.447$), overhydration ($p=0.905$), pulmonary edema ($p=0.193$), HD session time ($p=0.839$), and depression ($p=0.668$) and the readmission incidence (Table 3).

Factors most correlated with the hospital readmission incidence

The results of the multivariate analysis and linear regression showed that the factor most correlated with the hospital readmission rate was the HD adherence ($\beta=2.14$). Therefore, increasing the HD adherence (compliance) can increase the chance of hospital readmission up to 6.9%, after controlling for the social support and anemia variables.

Discussion

The results of the bivariate analysis showed a significant correlation between the HD adherence and the hospital readmission incidence ($p=0.032$). This is in agreement with other research studies^{2,8–10} reporting that the HD adherence can affect the hospital readmission incidence. HD noncompliance can occur because a patient does not understand the consequences of such actions.^{11,12} Moreover, HD noncompliance can increase the risk of HD medication complications and cause overhydration, which can result in hospital readmission (Table 3).

Table 1 The distribution of the respondents based on the independent variables.

| No. | Variable | Frequency | Percentage (%) |
|-----|----------------------------------|-----------|----------------|
| 1 | <i>HD adherence</i> | | |
| | a. Compliant | 38 | 34.2 |
| | b. Noncompliant | 73 | 65.8 |
| 2 | <i>Length of HD care</i> | | |
| | a. <5 h | 95 | 85.6 |
| | b. =5 h | 16 | 14.4 |
| 3 | <i>Social support</i> | | |
| | a. Poor | 65 | 58.6 |
| | b. High | 46 | 41.4 |
| 4 | <i>Age</i> | | |
| | a. Senior (>60 years old) | 24 | 21.6 |
| | b. Middle aged (45–59 years old) | 51 | 45.9 |
| | c. Young adult (17–44 years old) | 36 | 32.4 |
| 5 | <i>Sex</i> | | |
| | a. Male | 53 | 47.7 |
| | b. Female | 58 | 52.3 |
| 6 | <i>Depression</i> | | |
| | a. Severe depression | 21 | 18.9 |
| | b. Moderate depression | 40 | 36.0 |
| | c. Mild depression | 23 | 20.7 |
| | d. Not depressed | 27 | 24.3 |
| 7 | <i>Anemia</i> | | |
| | a. Severe | 43 | 38.7 |
| | b. Moderate | 63 | 56.8 |
| | c. Mild | 3 | 2.7 |
| | d. Normal | 2 | 1.8 |
| 8 | <i>Hydration status</i> | | |
| | a. Excessive | 59 | 53.2 |
| | b. Normal | 52 | 46.8 |
| 9 | <i>Pulmonary edema</i> | | |
| | a. Yes | 26 | 23.4 |
| | b. No | 85 | 76.6 |

HD: hemodialysis.

Table 2 The distribution of the respondents based on the dependent variable.

| No. | Variable | Median | Min–Max |
|-----|--------------------------------|---------|-----------|
| 1 | Hospital readmission incidence | 2 times | 2–8 times |

Based on the analysis, it was determined that there was no correlation between the HD session length and the hospital readmission incidence ($p=0.839$). That condition happen because most of respondents reported HD sessions of <5 h, creating an insignificant correlation between the two variables. Moreover, those patients with HD sessions of ≥ 5 h may have had longer HD sessions because most of them were noncompliant.

The results showed a significant correlation between the degree of social support and the hospital readmission incidence ($p=0.034$). A low mean social support value can increase the chance of hospital readmission from 49.35

Table 3 The bivariate analysis results.

| Variable | <i>p</i> -value |
|-------------------|-----------------|
| HD adherence | 0.032* |
| Length of HD care | 0.839 |
| Social support | 0.034* |
| Age | 0.266 |
| Sex | 0.447 |
| Depression | 0.668 |
| Anemia | 0.048* |
| Pulmonary edema | 0.193 |
| Overhydration | 0.905 |

HD: hemodialysis.

* Statistically significant value.

times to 60.71 times. These results correspond to previous research,¹⁵ which stated that there was a significant correlation between social support and hospital readmission

Table 4 Multivariate analysis and linear regression results.

| Variable | B coefficient | β -value | R-value | R ² -value | p-value |
|------------------------|---------------|----------------|---------|-----------------------|---------|
| Constant | 0.401 | | | | |
| Hemodialysis adherence | -0.069 | -0.214 | 0.282 | 0.08 | 0.011 |
| Social support | -0.050 | -0.162 | | | |
| Anemia | 0.035 | 0.142 | | | |

($p=0.04$). Social support can improve the stress, depression, disease acceptance, and burden caused by chronic diseases such as ESRD.¹⁴

With regard to age, the results showed that there were no significant differences between the ages and the hospital readmission rate ($p=0.266$). This corresponds to previous research¹³ suggesting that there was an insignificant correlation between the age variable and the hospital readmission ($p=0.6$). The insignificant correlation between the age variable the hospital readmission rate in this study was due to the fact that most of the patients who were readmitted were middle aged or young adults. In young adult patients, the organ function is still good, so it did not affect the readmission incidence. Another previous study¹⁵ reported that the physiological functions of the human body will decrease as the body grows old over time, which is line with the results of the current study.

There was no significant relationship between the gender and the readmission incidence ($p=0.447$), which is in accordance with a previous study⁷ reporting that there was no relationship between the sex and the readmission incidence ($p=0.5$). The fact that there was no significant relationship with the gender in this study could be due to the fact that most of the readmission patients were females. In women, the progression of kidney failure is slower than in men.

Additionally, there was no significant relationship between depression and the readmission incidence ($p=0.668$). This is in accordance with previous research,¹⁶ which also stated that there was no significant relationship between depression and the readmission incidence ($p=0.07$). These study results may be due to the fact that the depression experienced by these patients was still at a moderate level.

The results of this study showed that there was a significant relationship between anemia and the readmission incidence ($p=0.048$). These results are in accordance with those from a previous study,¹⁷ which also reported that anemia exhibited a significant relationship with the readmission incidence in HD patients ($p=0.005$). In hemodialysis patients, anemia is one of the factors that influence the readmission incidence. Hospital readmission occurs when anemia has a reduced hemoglobin capacity as a carrier of oxygen, causing patients to have difficulty carrying out daily activities and decreasing their quality of life.

Based on the results of the analysis of the interdialytic weight gain changes, it was determined that there was no significant relationship between overhydration and the readmission incidence ($p=0.905$). Similarly, another previous study¹⁸ concluded that overhydration did not affect the readmission incidence, even if the reason why the patient was being treated in the hospital was due to overhydration

($p=0.1$). According to the researchers, the reason why there was no significant difference was because the HD patients had unregulated fluid and sodium, which caused an unregulated body fluid volume, and HD was performed. Because the HD was carried out routinely twice a week, it helped to remove the excess body fluid from these patients.

Additionally, there was no significant relationship between pulmonary edema and the readmission incidence ($p=0.193$). This finding showed no significant differences that could have been caused by a disruption in the electrolyte balance, perhaps the sodium, with the kidneys automatically retaining H₂O. This can increase the occurrence of hypervolemia, and severe hypervolemia can cause pulmonary edema. In patients who undergo routine HD twice a week, the H₂O is removed, overcoming the hypervolemia.

The results of the multivariate analysis with the linear regression showed that the factor most associated with the HD patient readmission incidence was HD adherence ($\beta=2.14$) (Table 4). Based on this analysis, an equation model was obtained that could estimate the readmission incidence of patients with terminal renal failure undergoing HD at the Dr. H. Abdul Moeloek Regional Public Hospital. The equation model used the HD adequacy variables, anemia, and HD adherence and the results were as follows: every increase in the HD adherence value would increase the HD patient readmission incidence by 0.069 (6.9%), after controlling for the social support and anemia variables.

Hemodialysis adherence, social support, and anemia in hemodialysis patients were manageable factors could affect with hospital readmission incidence. Nurse and healthcare teams should pay attention to improve their level of care. Additionally, nurses can educate the patients and their families about HD adherence behavior, which consists of fluid restrictions, dietary restrictions, drug consumption, and maintaining the HD treatment protocol. The results also indicated that the quality of the nursing services needs to be improved in accordance with the standards of the nursing care of HD patients. Moreover, nurses must carry out the required evaluations, such as regularly monitoring their patients' laboratory results, in order to prevent complications.

Research needs to be developed with regard to nursing interventions to improve those factors related to the readmission incidence of HD patients with ESRD, such as HD compliance, anemia, HD adequacy, and social support, which can reduce the readmission incidence in these patients. In addition to the role of nurses and healthcare teams, the role of spouse, family, friends, and participation in religious, occupational, community, and social organizations is needed in an effort

to reduce the readmission incidence of patients with terminal renal failure with hemodialysis.

One limitation of this study was that the primary data consisted of self-reported questionnaires asking the HD patients about their experiences (HD session, HD adherence, social support, and depression level), although this data is current. However, some secondary data is also needed for this type of research, such as the laboratory results, including the pre- and post-HD urea values, Kt/V values (quantification of the HD and peritoneal dialysis treatment adequacy), and QB values (the blood flow rate during HD), which are not documented in the medical record.

Conflict of interests

The authors declare no conflict of interest.

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