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DIFFERENCES IN THE INCIDENCE OF FATIGUE AND ANALYSIS OF CONTRIBUTING FACTORS AMONG PATIENTS WITH CHRONIC DISEASES

Yayah Nurhani*, Ninik Yunitr, Fitrian Rayasari, Yani Sofiani
Fakultas Ilmu Keperawatan Universitas Muhammadiyah Jakarta, Jl. Cemp. Putih Tengah I No.1, Cemp. Putih Timur, Cemp. Putih, Jakarta Pusat, Jakarta 10510, Indonesia
*yayahnurhani201@gmail.com

ABSTRACT

Fatigue is one of the most common clinical symptoms experienced by patients with chronic diseases and significantly affects their quality of life. The high prevalence of fatigue across various chronic conditions indicates that it is a common, widespread, and complex symptom. However, comparative studies across different chronic diseases remain limited. In addition, the main risk factors and their variations among chronic conditions have not been comprehensively explored. Objective: This study aimed to identify differences in the incidence and contributing factors of fatigue among patients with various types of chronic diseases. Methods: This study employed a quantitative cross-sectional design. A total of 128 respondents were recruited using stratified random sampling. The instruments used included the Modified Fatigue Impact Scale (MFIS), the Center for Epidemiologic Studies Depression Scale (CES-D), and the Self-Care Symptom Management Scale. The MFIS has demonstrated excellent internal consistency (Cronbach's $\alpha = 0.93$), while the CES-D has shown good validity and reliability with Cronbach's α ranging from 0.85 to 0.90 across various populations. The Self-Care Symptom Management Scale also demonstrated satisfactory psychometric properties, with a Cronbach's α of 0.84. Statistical analyses consisted of univariate descriptive analysis and bivariate analysis, including Chi-square tests for categorical variables and logistic regression for categorical dependent variables.Statistical analyses consisted of univariate descriptive analysis and bivariate analysis, including Chi-square tests for categorical variables and logistic regression for categorical dependent variables. Results: Of the 128 respondents, the majority experienced severe fatigue, particularly those with Type 2 Diabetes Mellitus. There was no significant difference in fatigue levels among the five types of chronic diseases ($p = 0.976$). Severe fatigue was significantly associated with education ($p < 0.001$), employment status ($p < 0.001$), income ($p < 0.001$), self-care practice ($p < 0.001$), and depression ($p = 0.011$), but was not associated with age, sex, duration of illness, or comorbidity.Fatigue should be routinely assessed and managed in patients with chronic diseases regardless of disease type, with a focus on improving self-care practices, early detection of depression, and consideration of educational level, employment status, and income to enhance patients' quality of life.

Keywords: chronic diseases; contributing factors; fatigue

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INTRODUCTION

Fatigue is one of the most common clinical symptoms experienced by patients with chronic diseases and has a substantial impact on their quality of life. Unlike ordinary fatigue, which can be relieved by rest, fatigue associated with chronic illness is persistent, debilitating, and often disproportionate to the level of physical activity performed. It may manifest as physical, mental, or emotional exhaustion, all of which can interfere with daily activities, social functioning, and work productivity (Goertz et al., 2021). Globally, the prevalence of fatigue among patients with chronic diseases varies according to the underlying condition. Among patients with cancer, fatigue prevalence has been reported to range from 70% to 100%, whereas among patients with chronic heart disease it ranges from 50% to 75%, and among those with chronic kidney disease from 60% to 97% (Berger et al., 2015). Fatigue has also been reported in 60.2% of patients with multiple sclerosis, 38.3% of patients with heart failure, 90% of patients with pulmonary hypertension, and 38.2% of individuals living with HIV (Park et al., 2024).

In Indonesia, the prevalence of fatigue also varies considerably across chronic diseases. A study conducted by Sajidah et al. (2021) found that 64% of patients with chronic kidney disease in Jakarta experienced moderate to severe fatigue. Similarly, a study among patients with type 2 diabetes mellitus attending the Ngesrep Primary Health Center in Semarang reported that 56.2% of participants identified fatigue as the primary symptom affecting their daily activities (Simanjuntak et al., 2018).

The etiology of fatigue in patients with chronic diseases is multifactorial. Biological factors, including systemic inflammation, anemia, metabolic disturbances, and sleep disorders, contribute to the development and progression of fatigue. Previous studies have demonstrated that inflammatory processes are strongly associated with fatigue severity (Louati & Berenbaum, 2015), while dysregulation of the hypothalamic–pituitary–adrenal (HPA) axis and activation of the autonomic nervous system further exacerbate fatigue symptoms (Matura et al., 2018). Chronic pain has also been identified as a significant contributor to fatigue (Lee & Giuliani, 2019), and anemia is recognized as an important aggravating factor (Prochaska et al., 2017). Furthermore, patients with chronic diseases frequently experience higher levels of fatigue due to declining physiological function and an increasing burden of comorbidities (Fini & Cruz, 2015). Disease-specific mechanisms have also been reported; for example, Kowalczyk et al. (2021) found that fatigue in patients with cancer is often associated with chemotherapy- or radiotherapy-induced adverse effects, whereas recurrent hypoglycemia and fluctuations in blood glucose levels are major contributors to fatigue among patients with diabetes mellitus.

Based on the above evidence, fatigue represents one of the principal symptoms experienced by patients with chronic diseases and significantly impairs quality of life, social functioning, and daily productivity. The high prevalence of fatigue across various chronic conditions including cancer, cardiovascular disease, chronic kidney disease, diabetes mellitus, and chronic obstructive pulmonary disease indicates that fatigue is a common yet complex clinical problem. However, the extent to which fatigue prevalence and severity differ among various chronic diseases has not been clearly established.

Although numerous studies have investigated fatigue within individual chronic diseases, comparative studies simultaneously evaluating differences in fatigue across multiple chronic disease populations remain limited. Furthermore, the key factors that significantly contribute to fatigue and the extent to which these factors vary among different chronic diseases have not been comprehensively investigated. Consequently, current approaches to fatigue management tend to be generalized rather than tailored to the specific needs of patients with different chronic conditions. Therefore, this study aimed to compare the occurrence of fatigue among patients with different chronic diseases and to identify the factors that contribute to fatigue in this population.

METHOD

This study employed a quantitative cross-sectional design. A cross-sectional study is an observational approach that analyzes data collected from a population at a single point in time. It is widely used to estimate the prevalence of health outcomes, identify health determinants, and describe the characteristics of a population (Wang & Cheng, 2020). The study population consisted of 128 adult patients diagnosed with chronic diseases who met the study eligibility criteria. Data were collected using a structured questionnaire consisting of four sections: (1) a demographic characteristics questionnaire, (2) a Depression Anxiety Stress Scale-21 (DASS-21) depression subscale comprising 7 items (Cronbach's $\alpha = 0.91$), (3) the Self-Care of Chronic Illness Inventory (SC-CII) consisting of 18 items (Cronbach's $\alpha = 0.84$), and (4) the Modified Fatigue Impact Scale (MFIS) comprising 21 items, which demonstrated good construct validity and excellent internal consistency (Cronbach's $\alpha = 0.93$) for assessing fatigue severity. All instruments used in this study had previously demonstrated satisfactory validity and reliability in published studies. This study

was conducted after obtaining approval from the relevant institutions and the participating hospital. Eligible participants received an explanation regarding the objectives and procedures of the study and provided written informed consent before enrollment. Data were collected using structured questionnaires to assess fatigue, self-care practices, depressive symptoms, and participants' demographic characteristics. The collected data were analyzed using descriptive statistics, bivariate analysis using the Chi-square test, and multivariable logistic regression to identify factors independently associated with fatigue among patients with chronic diseases.

Descriptive statistics were used to summarize participants' characteristics. Bivariate analysis was performed using the Chi-square test to examine the associations between demographic, biological, psychological, and behavioral factors and fatigue status. Variables with potential associations were subsequently included in a multivariable logistic regression model to identify factors independently associated with fatigue among patients with chronic diseases. This study received ethical approval from the Ethics Committee of the Faculty of Nursing, Universitas Muhammadiyah Jakarta. Ethical clearance was granted under approval number 1567/F.9-UMJ/X/2025, issued on 20 October 2025. Written informed consent was obtained from all participants prior to data collection, and participant confidentiality and anonymity were maintained throughout the study.

RESULT

Table 1.

Distribution *fatigue* on five type disease chronic (n: 128)

Fatigue	CKD f (%)	HT f (%)	CHF f (%)	COPD n (%)	DM Type 2 n (%)
Light	3 (2.3)	2 (1.6)	3 (2.3)	3 (2.3)	20 (15.6)
Heavy	8 (6.3)	10 (7.8)	10 (7.8)	10 (7.8)	57 (44.5)

Abbreviations: type 2 diabetes mellitus (type 2 DM), chronic kidney disease (CKD), congestive heart failure (CHF), hypertension (HT), Chronic Obstructive Pulmonary Disease (COPD), significance (p-value), Chi-square (x^2).

Table 1 Based on the distribution of *fatigue levels* in five types of chronic diseases (n = 128), most respondents experienced severe *fatigue* , especially in patients with Type 2 Diabetes Mellitus. 2 as much as 57 respondents (44.5%). *Fatigue* heavy Also found on Hypertension, Congestive Heart Failure (CHF) and COPD patients, 10 respondents each (7.8%), and in patients Chronic Kidney Disease (CKD) in 8 respondents (6.3%). Meanwhile, the mild *fatigue category* was most frequently found in patient Type 2 DM There were 20 respondents (15.6%), while CKD, CHF, and COPD each had 3 respondents (2.3%), and hypertension had 2 respondents (1.6%). The Chi-Square test showed a p-value of 0.976 ($p > 0.05$), indicating no significant difference in *fatigue levels* across the five chronic diseases. Thus, *fatigue levels* did not differ significantly based on disease type.

Table 2.

Distribution characteristics respondents (n=128)

Characteristics	CKD	HT	CHF,	COPD	DM Type 2
Age (mean)	39.5	50.1	58.4	60.4	41.7
Type Sex n (%)					
Man	6 (54.5)	7 (46.7)	5 (41.7)	8 (61.5)	33 (42.9)
Woman	5 (45.5)	8 (53.3)	7 (58.3)	5 (38.5)	44 (77.1)
Education n (%)					
Low	7 (63.6)	9 (60)	10 (83.3)	11 (84.6)	57 (74)
Tall	4 (34.4)	6 (40)	2 (16.7)	2 (15.4)	20 (26)
Job n (%)					
Work	5 (45.5)	6 (40)	9 (75)	2 (15.4)	37 (45.5)
Doesn't work	6 (54.5)	9 (60)	3 (25)	11 (84.6)	40 (54.5)
Income n (%)					
< Minimum Wage	6 (54.5)	9 (60)	9 (75)	11 (84.6)	42 (54.5)
Minimum Wage	5 (45.5)	6 (40)	3 (25)	2 (15.4)	35 (45.5)
Long Sick n (%)					
< 2 Years	2 (18.2)	-	-	-	2 (2.6)

2 Years	9 (81.8)	15 (100)	12 (100)	13 (100)	75 (97.4)
Comorbidities n (%)					
There is	11 (100)	10 (66.7)	12 (100)	7 (53.8)	67 (87)
n't any	-	5 (33.3)	-	6 (46.2)	10 (13)

Abbreviation: diabetes mellitus type 2 (DM type 2), chronic kidney disease (CKD), congestive heart failure (CHF), hypertension (HT), Chronic Obstructive Pulmonary Disease (COPD), sample (n), percentage (%).

Table 2 Respondent characteristics differed by disease type. COPD patients had the highest mean age (60.4 years), while CKD patients were the youngest (39.5 years). Across all groups, most respondents had low educational attainment, incomes below the regional minimum wage (UMR), and had lived with their disease for ≥2 years. Female respondents predominated in hypertension, CHF, and type 2 diabetes mellitus, whereas males were more common among CKD and COPD patients. Comorbidities were highly prevalent across all disease groups.

Table 3.
Relationship characteristics respondents self-care, depression with *fatigue* on patient with chronic disease (n=128)

Variables	*fatigue*		*Estimate/ (p-value)*
	Light	Heavy	
Intercept			0.1821 (0.818)
Age			-0.0295 (0.091)
Gender			
Man	17 (13.3)	42 (32.80	0.837 (0.262)
Woman	14 (10.9)	55 (43.0)	
Education			
Low	10 (7.8)	84 (65.6)	32.8 (< 0.001)
Tall	21 (16.4)	13 (10.2)	
Work			
Work	7 (5.5)	68 (53.1)	26.4 (< 0.001)
Doesn't work	24 (18.8)	29 (22.7)	
Income			
< Minimum Wage	7 (5.5)	70 (54.7)	22.1(< 0.001)
>Minimum Wage	24 (18.8)	27 (21.1)	
Long Sick			
< 2 Years	-	4 (3.1)	0.309 (0.578)
>2 Years	31 (24.2)	93 (72.7)	
Comorbidities			
There is	27 (21.1)	80 (62.5)	0.107 (0.744)
n't any	4 (3.1)	17 (13.3)	
Self Care			
Supportive	27 (21.1)	38 (29.7)	19.7 (< 0.001)
Non Supportive	4 (3.1)	59 (46.1)	
Depression			
Yes	3 (2.3)	32 (25)	5.31 (0.021)
No	28 (21.9)	65 (50.8)	

Table 3 show that respondents educated low Which experience *fatigue* heavy as much as (65.6%), whereas educated tall as much as (10.2%) with mark (p= < 0.001). And Respondents who worked and experienced severe *fatigue* were (53.1%), while those who did not work were (22.7%). with mark (p= < 0.001). Temporary income respondents with income < Minimum Wage those experiencing severe *fatigue* were (54.7%), while those > UMR were (21.1%) with a value (p= < 0.001). In addition, respondents with *non-supportive self-care* who experienced severe *fatigue* were (46.1%), whereas *self-care supportive* as much as (29.7%) with mark (p < 0.001). And respondents Those who experienced depression and severe *fatigue* were (25%), while those who were not depressed were (50.8%) with a value of (p = 0.021)

DISCUSSION

Differences in Fatigue Among Patients with Chronic Diseases

The present study demonstrated differences in the occurrence of fatigue among patients with chronic kidney disease (CKD), hypertension, chronic heart failure (CHF), chronic obstructive pulmonary disease (COPD), and type 2 diabetes mellitus (T2DM). Across all chronic disease groups, severe fatigue was more prevalent than mild fatigue, indicating that fatigue remains one of the most burdensome symptoms experienced by individuals living with chronic illnesses (Davies et al., 2021; Maisel et al., 2021). Patients with type 2 diabetes mellitus exhibited a higher proportion of severe fatigue than mild fatigue. This finding reflects the substantial burden of fatigue experienced by diabetic patients and is consistent with previous studies reporting that approximately half of patients with T2DM experience clinically significant fatigue. Persistent hyperglycemia, insulin resistance, recurrent hypoglycemic episodes, chronic inflammation, and impaired mitochondrial energy metabolism have been suggested as major mechanisms contributing to fatigue in diabetes. Moreover, diabetes-related complications such as peripheral neuropathy and cardiovascular impairment further reduce physical functioning and increase perceived fatigue. Overall, these findings emphasize that fatigue is a universal symptom across various chronic diseases, although the underlying pathophysiological mechanisms differ according to disease characteristics (Davies et al., 2021; Dissecting the Fatigue Experience, 2021).

Contribution of Demographic Factors to Fatigue

This study demonstrated that demographic characteristics were not equally associated with fatigue among patients with chronic diseases. Age and sex were not significantly associated with fatigue, whereas educational level, employment status, and income showed significant relationships. The absence of an association between age and fatigue suggests that fatigue is primarily influenced by disease-related physiological and psychosocial factors rather than chronological aging alone. Previous studies have similarly reported inconsistent associations between age and fatigue across chronic disease populations, indicating that disease severity, symptom burden, and functional status may play more substantial roles than age itself (Su et al., 2022; Davies et al., 2021). Likewise, no significant relationship was found between sex and fatigue. Although several studies have suggested that women tend to report higher fatigue than men due to hormonal and psychosocial differences, other investigations have demonstrated that disease severity and psychological distress account for a larger proportion of fatigue variability than biological sex (Yoon et al., 2023).

Conversely, education, occupation, and income were significantly associated with fatigue. Individuals with lower educational attainment may have reduced health literacy, limiting their ability to understand disease management recommendations and perform effective self-management. Employment status may influence fatigue through reduced physical capacity, work-related stress, or unemployment-related psychosocial burdens. Similarly, lower income may restrict access to healthcare services, nutritious food, medications, and supportive resources, thereby increasing symptom burden and fatigue severity. These findings support the concept that socioeconomic determinants substantially influence health outcomes in chronic diseases (World Health Organization, 2023).

Contribution of Biological Factors to Fatigue

The present study found that disease duration and comorbidity were not significantly associated with fatigue. Although longer disease duration and multiple comorbidities are generally considered risk factors for poorer health outcomes, previous studies have reported inconsistent findings regarding their relationships with fatigue (Davies et al., 2021; Su et al., 2022). Several explanations may account for these results. Patients may gradually develop adaptive coping mechanisms over the course of chronic illness, thereby reducing the subjective perception of fatigue despite prolonged disease duration. Furthermore, disease duration alone may not adequately reflect disease severity, treatment effectiveness, or physiological impairment. Similarly, the influence of comorbidities

depends not only on their number but also on their severity and clinical impact. Previous literature suggests that psychological distress, sleep disturbances, physical inactivity, inflammation, and self-management behaviors frequently demonstrate stronger associations with fatigue than disease duration or comorbidity alone. Therefore, fatigue should be considered a multidimensional symptom resulting from complex interactions among biological, psychological, and behavioral factors rather than from disease chronicity itself (Dissecting the Fatigue Experience, 2021; Davies et al., 2021).

Contribution of Depression to Fatigue

The relationship between depression and fatigue can be explained through shared biological mechanisms, including dysregulation of the hypothalamic-pituitary-adrenal axis, chronic inflammatory activation, neurotransmitter imbalance, and altered autonomic nervous system function (Davies et al., 2021).

Contribution of Self-Care Practices to Fatigue

The relationship between fatigue and self-care is likely bidirectional. Persistent fatigue reduces patients' motivation and physical capacity to perform recommended self-management activities. Conversely, inadequate self-care contributes to poor disease control, symptom exacerbation, and further increases fatigue severity. Therefore, interventions designed to improve self-care skills, patient education, symptom monitoring, and behavioral support may help reduce fatigue and improve overall quality of life among patients with chronic diseases. Overall, these findings support the growing evidence that fatigue should be managed using a comprehensive biopsychosocial approach that addresses not only biological factors but also psychological well-being and self-care behaviors. Such multidimensional interventions are likely to produce greater improvements in patient outcomes than strategies focusing solely on the underlying disease (Davies et al., 2021; Dissecting the Fatigue Experience, 2021).

CONCLUSION

This study demonstrated that fatigue is a highly prevalent symptom among patients with chronic diseases, with severe fatigue occurring more frequently than mild fatigue across patients with chronic kidney disease, hypertension, chronic heart failure, chronic obstructive pulmonary disease, and type 2 diabetes mellitus. Although the prevalence of fatigue varied among disease groups, psychological and behavioral factors contributed more substantially than biological factors. Depression and self-care practices were identified as significant factors associated with fatigue, while educational level, employment status, and income also showed significant relationships. In contrast, age, sex, disease duration, and comorbidities were not significantly associated with fatigue. These findings highlight that fatigue in chronic diseases is a multidimensional phenomenon influenced by biological, psychological, and socioeconomic factors. Therefore, comprehensive fatigue management should integrate routine psychological screening, interventions to improve self-care behaviors, and individualized multidisciplinary care to reduce fatigue and improve patients' quality of life.

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