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Mental health and physical activities among heart failure patients

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Abstract

Background: Changes in heart structure result in a decrease in the ability to pump blood, thereby impacting tissue perfusion. This condition triggers fatigue so that patients suffer from limitations in carrying out physical activities.
Purpose: To find out the relationship between mental health and the ability to perform physical activity in heart failure patients.
Method: The study employed a quantitative design with a cross-sectional approach on 140 heart failure patients. The researcher applied a purposive technique in determining samples. Data collection lasted for 3 months starting from October to December 2023 at the Cardiac Clinic of Dr. Moewardi Hospital, Surakarta. The researcher administered the depression anxiety stress scale-42 (DASS 42) instrument to assess mental health, and the international physical activity questionnaire (IPAQ) to assess the ability to perform physical activities. For relationship analysis among variables, the researcher used the Spearman test with a significance <0.005.
Results: The results showed a relationship between depression and physical activity (p=0.001), anxiety and physical activity (p=0.002), and stress and physical activity (p=0.002).
Conclusion: The state of mental health in heart failure patients has a relationship in their ability carrying out activities.

Keywords: Heart Failure; Mental Health; Physical Activity.

INTRODUCTION

The average age of heart failure patients in Indonesia is relatively younger compared to those in Europe and America. Heart failure patients in Indonesia had a prevalence of 0.3% in 2013 (Amsyah, 2020). The Central Java Health Department recorded a prevalence of heart disease patients of 1.9% (Akhmad, Primanda, & Istanti, 2016).

Several factors cause heart failure patients to experience mental health disorders. Previous research found that heart failure patients with poor self-care behavior, inadequate social support, poor knowledge about the disease, smoking habits, and longer duration of suffering have higher levels of depression (Yazew, Beshah, Salih, & Zeleke, 2019). The frequency of anxiety by severity category was severe 53 (36.8%), moderate 69 (47%), and mild 22 (15.3%) (Hasibuan, 2018). Other studies indicate that depression and anxiety can worsen heart failure progression. Heart failure patients with depression are less able to maintain healthy eating patterns, engage in regular physical activity, and adhere to medication (Celano, Villegas, Albanese, Gaggin, & Huffman, 2018).

Structural abnormalities result in decreased ability to pump blood, causing patients to easily feel tired and experience limitations in physical activity. The majority of heart failure patients experience severe fatigue (Nugraha, Pebrianti, & Platini, 2018).

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Some researchers in Japan conducted a study on chronic heart failure and mental health topics, indicating a relationship between mental health and physical activity (Izawa, Watanabe, Oka, Hiraki, Morio, Kasahara, & Shimizu, 2014). However, the study had a weakness because the researchers used the short form (SF-36) instrument to assess quality of life. This instrument does not assess depression. The upcoming study will use the depression anxiety stress scales (DASS-42) questionnaire, considered more appropriate for identifying mental health disorders. Other facts indicate that knowledge, especially in the field of health, is rapidly advancing, and the demographics of previous studies differ from those conducted. These reasons serve as the basis for researchers to conduct research on the correlation between mental health and physical activity among heart failure patients.

RESEARCH METHOD

The researcher applied a quantitative study with a cross-sectional approach on 140 heart failure patients at the Cardiology Clinic of Moewardi Hospital in Surakarta. Data collection lasted for 3 months from October to December 2023. The researcher applied a purposive technique in determining samples with predefined criteria, including inclusion criteria: heart failure patients classification by New York Heart Association (NYHA) I-IV, aged 18 - 69 years. Exclusion criteria included: uncooperative patients, those suffering from stroke and with lower limb disabilities, and those who refused to sign informed consent.The researcher administered the depression anxiety stress scale-42 (DASS 42) instrument to assess mental health, and the international physical activity questionnaire (IPAQ) to assess the ability to perform physical activities, which has been adapted into Indonesian and declared valid and reliable. The validity test results of the IPAQ instrument found that each relevant content had a Scale Content Index (SCVI) of 0.94. The construct validity value with Kaiser-Meyer-Olkin coefficient (KMO) of 0.910 and X2 = 573.434 (df=28; p 0.000). The Cronbach's alpha coefficient value was 0.884 (0.828 – 0.902), indicating reliability of the instrument. The validity and reliability test results of the DASS-42 instrument used to assess mental health yielded reliability coefficient values of 0.954 (depression scale), 0.903 (anxiety scale), and 0.917 (stress scale). The assessment scales were consistent with high reliability. The validity test results of the 42 DASS-42 items obtained a calculated r value greater than 0.4. Then the researcher used Kolmogorov-Smirnov test to test normality, yielding a p-value=0.0001, indicating non-normal data distribution. Therefore, the analysis in this study used the Spearman test. The Ethics Committee of Moewardi Hospital has reviewed the feasibility of the research protocol with ethical approval number 1.777/IX/HREC/2023.

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RESEARCH RESULTS

Table 1. Characteristics of the Respondents (N=140)

Variables	Results
Age (Mean±SD)(Range)(Year)	(64.26±12.720) (17-69)
17 – 25	8/5.7
26 – 35	21/15.0
36 – 45	18/12.9
46 – 55	48/34.3
56 – 65	39/27.9
≥65	6/4.2
Gender (n/%)	
Male	86/61.5
Female	54/38.5
Occupation (n/%)	
Employed	96/68.5
Unemployed	44/31.5
Education (n/%)	
Elementary	20/14.3
Junior High	27/19.3
Senior High	58/41.4
University	35/25.0
NYHA Classification (n/%)	
I	82/58.6
II	40/28.6
III	16/11.4
IV	2/1.4
Mental Health	
Depression (n/%)	
Normal	115/82.1
Mild	10/7.2
Moderate	10/7.2
Severe	3/2.1
Very Severe	2/1.4
Anxiety (n/%)	
Normal	71/50.7
Mild	23/16.4
Moderate	26/18.5
Severe	10/7.2
Very Severe	10/7.2
Stress (n/%)	
Normal	119/85.0
Mild	12/8.6
Moderate	6/4.3
Severe	3/2.1
Very Severe	0/0.0
Physical Activities (n/%)	
Heavy	60/42.9
Moderate	60/42.9
Mild	20/14.2

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Table 1 shows that most subjects were male, totaling 86 (61.5%). The highest number of heart failure patients was in the early elderly age group, with a total of 48 (34.3%). The number of subjects who were employed 96 (68.5%). Most subjects had a high school education, totaling 58 (41.4%). Most subjects classified by NYHA 1 classification, totaling 82 (58.6%).

Based on Table 1, the researcher found that the highest number of cases of depression in terms of mental health criteria was classified as normal, with a total of 115 (82.1%), and a small number were classified as very severe, with 2 (1.4%). Research results based on anxiety mental health criteria showed normal levels in 71 cases (50.7%), very severe in 10 (7.2%), and severe in 10 (7.2%). Research results based on stress levels showed normal levels in 119 cases (85%) and no cases with a very severe stress level.

Based on Table 1, the number of heart failure patients engaged in heavy physical activity were 60 (42.9%), moderate activity 60 (42.9%), and mild activity 20 (14.2%) individuals.

Table 2. The Relationship between Mental Health and Physical Activities

Variables	Physical Activities			p-value
	Mild (n= 20)	Moderate (n= 60)	Heavy (n= 60)	
Depression (n/%)				
Normal	9/45.0	15/25.0	10/16.7	
Mild	2/10.0	9/15.0	8/13.3	0.001
Moderate	2/10.0	4/6.7	12/20.0	
Severe	5/25.0	11/18.3	10/16.7	
Very severe	2/10.0	21/35.0	20/33.3	
Anxiety (n/%)				
Normal	5/25.0	30/50.0	36/60.0	
Mild	1/5.0	13/21.7	9/15.0	
Moderate	6/30.0	9/15.0	11/18.3	0.002
Severe	5/25.0	4/6.6	1/1.7	
Very severe	3/15.0	4/6.7	3/5.0	
Stress (n/%)				
Normal	11/55.0	53/88.3	55/91.7	
Mild	5/25.0	5/8.3	2/3.3	
Moderate	3/15.0	1/1.7	2/3.3	0.002
Severe	1/5.0	1/1.7	1/6.7	
Very severe	0.00	0.00	0.00	

Table 3. The Relationship between NYHA Classification and Physical Activities

Variables	Physical Activities			p-value
	Mild (n= 20)	Moderate (n= 60)	Heavy (n= 60)	
NYHA Classification (n/%)				
I	3/15.0	31/51.7	48/80.0	
II	6/30.0	24/40.0	10/16.7	0.001
III	10/50.0	4/6.7	2/3.3	
IV	1/5.0	1/1.6	0/0.0	

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Based on tables 2 and 3, the test results showed a relationship between depression mental health and physical activity with a significance value of 0.001. The test results also indicated a relationship between anxiety and physical activity with a significance value of 0.002. Similarly, the test results showed a relationship between stress and physical activity with a significance value of 0.002. Furthermore, the test results for the relationship between NYHA classification and physical activity yielded a p-value of 0.001.

DISCUSSION

According to the research findings, the average age of heart failure patients is between 46 to 55 years old. These findings align with previous research where heart failure patients were aged over 45 years old (Sinurat, Barus, & Siregar, 2021). One theory states that individuals over the age of 40 may experience a decline in the function of the aorta and arteries, leading to atherosclerosis, which is one of the triggers for heart failure (Sari, Inayati, & Dewi, 2023).

This study found that most heart failure patients were male, totaling 86 individuals (61.5%), while females numbered 54 individuals (38.5%). This finding is consistent with previous findings stating that most heart failure patients are male at 65.5%, with females at 34.5%. Males have fewer estrogen hormones compared to females. The protective effects in the bloodstream can be obtained from estrogen hormones (Kristinawati & Khasanah, 2019).

One factor influencing activity is employment status. The research results showed that most subjects, 96 (68.5%), were employed. The activity levels of the subjects who were employed and unemployed differed. This study aligns with previous research indicating that 64.4% of total subjects were employed, suggesting that the employed subjects have higher activity levels (Wati, Oktarina, & Rudini, 2020). These findings illustrate that most heart failure patients have a high school education. This corresponds with the theory discussing that higher education levels make it easier to understand disease prevention explanations (Ardhiansyah, & Hudiyawati, 2023).

The research results indicate a relationship between NYHA classification and physical activity with a significance value of p=0.001. These findings align with other studies stating that higher NYHA classifications have a greater impact on physical activity due to breathlessness and fatigue (Ruku, 2023). Another study supports this notion that one of the factors influencing physical activity is NYHA classification. The study explains that the inability to perform physical activity often occurs in patients and is exacerbated by a worsening prognosis (Arifudin, & Kristinawati, 2023). This research is supported by theories explaining that heart damage leads to a decrease in cardiac output. When this occurs, the heart is unable to meet metabolic demands, leading to compensation mechanisms to maintain constant pumping of blood. If these mechanisms are pushed to their limits but normal cardiac output remains unmet, symptoms of heart failure such as fatigue and breathlessness will arise (Nurkhalis, & Adista, 2020).

The study shows a significant relationship between depression and physical activity (p-value=0.001). This finding aligns with previous research stating that depression can be reduced through physical activity. Based on pathological mechanisms, exercise can increase the release of neurotransmitters (serotonin, dopamine, and norepinephrine) that can alleviate depressive disorders (Liguori, Russo, Curcio, Sasso, Della-Morte, Gargiulo, & Testa, 2018).

The research results show a relationship between anxiety and physical activity (p-value = 0.002). Anxiety experienced arises due to disturbances in oxygenation, breathing difficulties, and worries about one's condition (Dharmansyah, & Budiana, 2021). Previous research has stated that there is a relationship between anxiety and NYHA functional class (Kristinawati, & Khasanah, 2019). Heart failure patients with NYHA functional class 1 often experience mild anxiety, while those with NYHA class 2 experience moderate to severe anxiety (Gebru, Berhe, Tsehaye, Mekonen, Kiros, Gebrehiwot, & Mohammed, 2021). This condition can affect the ability to engage in activities. As explained in the previous paragraph, supported by other research, physical function plays a significant role; if physical function is not optimal, physical activity will naturally decrease (Oktavira, & Hudiyawati, 2023).

The research results show a significant relationship between stress and physical activity. Researchers assume that heart failure patients with

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stress experience poor sleep quality, thus affecting physical activity later on. This theory is supported by previous research stating that stress levels can affect sleep quality. The study found that the majority of heart failure patients experiencing stress had poor sleep quality. Stress can occur in individuals due to mental tension and frequent awakening at night (Tsabedze, Kinsey, Mpanya, Mogashoa, Klug, & Manga, 2021). Another study discussing physical activity with sleep quality found that physical activity influences improved sleep quality (Hardiyana & Kristinawati, 2023).

CONCLUSION

The mental health of heart failure patients is related to their ability to engage in physical activity. A suggestion for future research is to conduct longitudinal studies to explore the long-term cause-and-effect correlation between variables in the heart failure population.

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