

Research Article

Analysis of Pain and Depression Level in Knee Osteoarthritis Patients at Islamic Hospital Siti Rahmah

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ABSTRACT

Background: Knee osteoarthritis is a degenerative joint disease involving slow cartilage damage. Pain is the main symptom of osteoarthritis, and it causes patients to feel desperate, which further affects their emotional well-being, leading to depression. **Purposes:** This study aims to determine the relationship between the level of pain and the level of depression in knee osteoarthritis patients at RSI Siti Rahmah Padang. **Methods:** The materials used in this study are medical records, the Patient Health Questionnaire (PHQ)-9, and the Visual Analog Scale (VAS). This research uses univariate data analysis presented in the form of frequency distribution. Bivariate data analysis uses the chi-square, cross-sectional technique with 75 respondents. **Results:** Knee osteoarthritis patients with severe pain mostly also experience severe depression, with a percentage of 11%; patients with moderate pain mostly also experience moderate depression, with a rate of 14%; and patients with mild pain also experience mild depression, with a percentage of 10%. Bivariate analysis results show that there is a relationship between the level of pain and the level of depression with a value of $p < 0.05$ ($p = 0.000$). **Conclusion:** This study found a relationship between the level of pain and the level of depression in knee osteoarthritis patients at RSI Siti Rahmah Padang.

Keywords: depression level, knee osteoarthritis, pain level

INTRODUCTION

Osteoarthritis is a degenerative joint disease, which is characterized by the occurrence of cartilage damage (1). Osteoarthritis can affect joints including cervical, thoracal, lumbar, pelvis, knees, ankles, and fingers. Osteoarthritis often occurs in the knee joint, as the knee joint is used to support the body (2).

Based on data from the World Health Organization in 2017, the prevalence of osteoarthritis in the world is 9.6% in men and 18% in females. Based on Basic Health Research in Indonesia, the prevalence is 7.3%, which are 6.1% in males and 8.5% in females (3). Based on radiology, the prevalence of knee osteoarthritis was around 15.5% in men, while it was as much as 12.7% in females (4). The prevalence of joint disease in West Sumatra Province based on data from Basic Health Research in 2018 has a prevalence of 7.21%, while Padang City has

a prevalence of 5.25% (5). Siti Rahmah Islamic Hospital is a hospital located in Padang, with a total of 1021 patients with osteoarthritis in 2022 and 790 patients with knee osteoarthritis.

Patients with knee osteoarthritis have clinical symptoms consisting of pain, stiffness, cheating, deformity, and gait changes. Pain is the main symptom of osteoarthritis. This is due to the emphasis on the joint surface (6). Pain is an unpleasant experience with sensory as well as emotional components, caused by damage to a tissue. The pain felt by people with knee osteoarthritis is chronic pain, where the pain is felt for more than three months. Pain will provoke an emotional response in everyone (7).

Pain in knee osteoarthritis patients can be a stressor, because pain interferes with the patient's activities, so the patient cannot work productively (7). Pain causes patients to feel hopeless, which further impacts mental emotional disorders, namely depression (8). One of the triggers of depression is a serotonin imbalance. Serotonin has a role in emotions, when you are happy there is an increase in serotonin, but when you are depressed there is a decrease in serotonin (9). Chronic inflammation increases levels of pro-inflammatory cytokines making the nervous system more sensitive to pain. To counteract this, the body activates the HPA axis, leading to increased cortisol. However, prolonged high cortisol levels disrupt normal regulation, keeping inflammation active and worsening pain. At the same time, cortisol reduces serotonin production by inhibiting its key enzyme. This leads to persistent pain, increased sensitivity, and emotional distress such as depression. Effective pain management should address both inflammation and serotonin balance to break this cycle. Decreased serotonin is caused by increased cortisol levels, then there is an increase in inflammation, which has an impact on the increase in pain, due to failure at the time of central descent inhibition (10). Based on this, it can be concluded that there is a possibility that pain triggers depression (10).

Depression can result in an exacerbation of the treatment process, patients have a pessimistic attitude and are not compliant in carrying out treatment so that the treatment process is increasingly difficult to handle (11). The relationship between pain and depression needs to be known, because depression is one of the causes of the inability to manage life. A person with depression will provide obstacles in carrying out the treatment process. Therefore, the researcher is interested in conducting a study on how the relationship between pain level and depression level in knee osteoarthritis patients at Siti Rahmah Padang Hospital, so that they can overcome their depression to improve the quality of life and optimal prognosis in knee osteoarthritis patients.

METHODS

This type of research is a categorical comparative analysis with a cross-sectional research design. The research was carried out at Siti Rahmah Padang Hospital, from March 2023 to January 2024. The target population in this study is patients with a diagnosis of knee osteoarthritis patients undergoing medicamentosa therapy in Padang City. The affordable population in this study is patients with a diagnosis of knee osteoarthritis who are undergoing medicamentosa therapy at Siti Rahmah Padang Hospital.

The inclusion criteria for this study sample are patients with a diagnosis of knee osteoarthritis who undergo medicamentosa therapy at Siti Rahmah Padang Hospital and are willing to be respondents. The exclusion criterion is patients who have a history of other mental

disorders. The sampling technique in this study is consecutive sampling with a sample number of 75.

The data analysis in this study was a univariate analysis which aims to describe the characteristics of the research variables in the form of frequency distribution and presentation. Bivariate analysis was an analysis that aims to explain the relationship between two variables. The bivariate test used was the chi-square test to determine the relationship between pain level and depression level using the SPSS application.

The materials used in this study are medical records, *Patient Health Questionnaire* (PHQ)-9 sheets and *Visual Analog Scale* (VAS) sheets. The PHQ-9 is a screening tool to measure the severity of depressive symptoms. This questionnaire consists of 9 questions, each of which is related to the criteria for diagnosing depression in the DSM (Diagnostic and Statistical Manual of Mental Disorders). Interpretations of PHQ-9 are normal (0 – 4), mild depression (5 – 9), moderate depression (10 – 14,) and severe depression (15 – 27). Visual Analog Scale was used to assess the intensity of symptoms, such as pain, by asking respondents to indicate where they feel to be on a straight-line scale. The VAS produces a quantitative score between 0 and 10 with the interpretation that the larger the number on the VAS, the higher the intensity or severity of the pain felt. The interpretation of the results is mild level with a scale (1-3), moderate level with a scale (4-7), severe level with a scale (8-10). This research has passed the research ethics feasibility from the Health Research Ethics Committee, Faculty of Medicine, Baiturrahmah University with registered number 168/ETIK-FKUNBRAH/03 /10/2023.

RESULTS

Table 1 illustrates the characteristics of knee osteoarthritis based on gender, where females represented the largest population, with 56 respondents, accounting for 74.7%. The age group of 66-74 years was the most prevalent, with 35 respondents representing 46.7%. Most respondents were not employed, with 65 respondents accounting for 86.7%. The group with > 1 year of knee osteoarthritis was the largest, with 40 respondents representing 53.3%.

Table 1. The characteristics of 75 knee osteoarthritis patients

Variable	F	%
Gender		
Male	19	25.3
Female	56	74.7
Age		
45-54 years old	19	25.3
55-65 years old	21	28.0
66-74 years old	35	54.6
Occupation		
Employment	10	13.3
Unemployment	65	86.7
Duration of Illness		
<1 year	24	32.0
1-5 years	40	53.3
>5 years	11	14.7

Table 2 shows that most knee osteoarthritis patients experienced moderate pain, with 34 respondents accounting for 45.3%. Table 3 shows that the majority of knee osteoarthritis patients experienced moderate depression, with 22 respondents accounting for 29.3%.

Table 2. Frequency Distribution of Respondent Characteristics Based on Pain Level in Knee Osteoarthritis Patients at RSI Siti Rahmah Padang

Pain Level	F	%
Severe	21	28
Moderate	34	45.3
Mild	20	26.7
Total	75	100

Table 3. Frequency Distribution of Respondent Characteristics Based on Depression Levels in Knee Osteoarthritis Patients at RSI Siti Rahmah Padang

Depression Level	F	%
Severe	20	26.7
Moderate	22	29.3
Mild	19	25.3
Normal	14	18.7
Total	75	100

The results in Table 4 indicate that patients with severe pain levels mainly also experienced severe depression, with a percentage of 52.4%. Patients with moderate pain levels mainly experienced moderate depression, with a rate of 41.2%. Additionally, patients with mild pain levels tended to experience mild depression, with a percentage of 50.0%. Data analysis uses Chi-Square because research data is categorical. The statistical test using the chi-square test resulted in a Pearson chi-square p-value of <0.001, less than 0.05, indicating a significant relationship between pain and depression levels in knee osteoarthritis patients at RSI Siti Rahmah Padang.

Table 4. Relationship Between Pain Levels and Depression Levels in Knee Osteoarthritis Patients at RSI Siti Rahmah Padang

Variable	Depression Level								Total	%	P Value
	Severe	%	Moderate	%	Mild	%	Normal	%			
Pain level											
Severe	11	52.4	6	28.6	3	14.3	1	4.8	21	26.7	<0,001
Moderate	8	23.5	14	4.2	6	17.6	6	17.6	34	29.3	
Mild	1	5.0	2	10.0	10	50.0	7	35.0	20	25.3	
Total	20	26.7	22	29.3	19	25.3	14	18.7	75	100	

DISCUSSION

Based on research conducted at Siti Rahmah Padang Hospital, it shows that of the 75 knee osteoarthritis patients, based on gender, the most are female. The results of this study are in line with research conducted by Jannatul Ma'wa (2022) in Karang Anyar Village, Kwanyar Health Center Working Area, Kwanyar District, Bangkalan Regency, it was found that female was the most common gender with 18 respondents with a percentage (52.9%) (7).

In addition, this study is also in line with the research conducted by Hilda Bramila Ratimaya at the South Klaten Health Center, which found that female is the most common gender of 25 people (69.4) (12). Females have a higher risk of osteoarthritis than men, because when females have entered the menopause phase, there is a decrease in the production of the hormone estrogen. The hormone estrogen functions to synthesize chondrocytes. If the hormone estrogen decreases, the proteoglycan and collagen synthesis will also decrease so that the activity of lysosomes will increase and increase the occurrence of knee osteoarthritis (13). Decreased estrogen levels during menopause can affect the production and activity of IL6 and TNF- α , which can ultimately accelerate bone resorption and lead to a decrease in bone density. This can worsen the symptoms of knee osteoarthritis in female patients who are going through menopause (14).

Based on research conducted at Siti Rahmah Padang Hospital, it shows that of the 75 knee osteoarthritis patients, based on the most age group, namely 66-74 years old. The results of this research are in line with research conducted by Jannatul Ma'wa (2022) in Karang Anyar Village, Kwanyar Health Center Working Area, Kwanyar District, Bangkalan Regency, it was found that the most age group of 66-74 was 15 people (44,1%) (8). Age is the most important risk factor for OA, where the prevalence is higher with age. The aging process is considered to be the cause of increased muscle weakness around the joints, calcification of cartilage and decreased chondrocyte function, all of which favor the occurrence of OA. Increasing age causes biological changes in the knee joint, such as thinning of the cartilage, resulting in greater pressure on the basal layer, increasing the risk of more severe cartilage damage (15).

Based on research conducted at Siti Rahmah Padang Hospital, it was found that from 75 patients with knee osteoarthritis, the most common group was 65 people (86.7%). The results of this study are in line with the research conducted by Asrul Ismail at Dr. Sardjito Hospital Yogyakarta, the largest group of non-working people is 37 people (52,9%) (16). This research is also in line with the research conducted by Maruli Taufandans at the Godean I Sleman Health Center in Yogyakarta, the largest group of 14 people who are not working (77,8%) (17).

In the study, it was found that many respondents did not work. The activities carried out by the respondents were daily activities such as climbing stairs, cooking, and sweeping because the respondents were retirees so they did not do many strenuous activities. This limited activity can refer to the occurrence of a decrease in synovial fluid. Decreased synovial fluid in the joints will cause pain and stiffness in the joint area. This happens because the biomechanical mechanism of using joints that are not in accordance with their capacity repeatedly during work causes non physiological stress on the structure of the knee joint (17).

Based on research conducted at Siti Rahmah Padang Hospital, it was found that from 75 patients with knee osteoarthritis, it was found that the old group suffered from knee osteoarthritis from the most group over 1 year. The results of this study are in line with research conducted by Hilda Pratiwi in the Working Area of the Pangean Health Center, Kuantan Singingi Regency with the old group suffering from knee osteoarthritis, the most knee osteoarthritis is 1 - 5 years, namely 46% (18). This study is also in line with a study conducted by Ester, Rosa & Gil (2017) in Metropolitan San Juan, Puerto Rico which found that the majority of respondents suffered from OA around 1-5 years old as many as 72 people (50,7%) (19). Prolonged knee osteoarthritis can restrict a person's movements. Knee osteoarthritis is a

condition in which the cartilage in the knee begins to wear out and break down, causing pain, stiffness, and swelling. This condition can make it difficult for a person to walk, stand, or do other physical activities. The length of time suffering from knee osteoarthritis can be attributed to the factors of age, occupation, and the patient's adherence to treatment (14).

Based on research conducted at Siti Rahmah Padang Hospital, it shows that of the 75 patients with knee osteoarthritis, the highest level of pain is moderate pain level as many as 34 people (34.3%). The results of this study are in line with research conducted by Salma Nur Afina (2019) at Al-Islam Hospital Bandung, which also shows that the most common level of pain experienced by knee osteoarthritis patients is moderate pain as many as 43 people (51%) (4). The pain felt by each patient is different because the perception of pain varies starting from mild, moderate, and severe pain. Pain in knee osteoarthritis patients is caused by damage to the cartilage of the knee joint. Cartilage that should protect Risk factors experienced by study respondents such as age and occupation may increase cause pain (4).

The study shows that of the 75 patients with knee osteoarthritis, they experienced the highest level of depression, namely 22 people (29.3%). The results of this study are in line with research conducted by Jannatul Ma'wa (2022) in Karang Anyar Village, Kwanyar Health Center Working Area, Kwanyar District, Bangkalan Regency that, that, the highest level of depression in knee osteoarthritis patients is moderate depression of 17 people (50%). This result is different from the research of Siti Aulia Ramadhani (2023) at Raden Matta Her Hospital and H. Abdul Manap Hospital in Jambi city, namely the depression rate of the majority of knee osteoarthritis patients is classified as normal with 33 people (62,3%) (20).

Depression that occurs in knee osteoarthritis patients is influenced by several factors, namely pain that causes discomfort in knee osteoarthritis patients, resulting in insomnia, fatigue, and decreased mood. Limitations in movement and physical activity limit knee osteoarthritis patients from doing daily activities, sports, or hobbies that they prefer, which has an impact on the patient's emotional health. Physical limitations and pain can make it difficult for patients to participate in social activities and interactions with others, which can lead to feelings of loneliness. These things increase the incidence of depression in knee osteoarthritis patients (7).

This study showed a relationship between pain level and depression level in knee osteoarthritis patients at Siti Rahmah Padang Hospital. This study is in line with the research of Faikhah Hastuti (2018) at Tugurejo Hospital Semarang that there is a relationship between pain degree and depression level in knee osteoarthritis patients (21). This research is also in line with research conducted by Shuang Zeng (2022) in Australia that there is a relationship between pain degree and depression level in knee osteoarthritis patients (22).

Pain in knee osteoarthritis includes chronic pain, known as "pain chronology" which is the process of transitioning acute pain to chronic pain. Pain is felt continuously from a tissue so that it causes changes in the nervous system that result in physical limitations, affect psychological, social, and knee osteoarthritis patients cannot work optimally which results in mental emotional disorders that trigger depression. In this study, most of the respondents had knee osteoarthritis for more than 1 year which means they are most likely to experience chronic pain, not just acute pain. The longer a person has had osteoarthritis, the higher the chances of them experiencing pain with a greater intensity (10).

When patients with knee osteoarthritis are confronted with stressors causing an increase in cortisol levels, if it lasts for a long time it can result in a decrease in serotonin levels. Serotonin (5-HT), dopamine (DA), and norepinephrine (NE) are neurotransmitters involved in neuroplasticity pathways between pain and depression. Adrenergic and serotonergic pathways from the brainstem to the spinal cord can inhibit pain stimuli entering the nervous system, so a decrease in serotonin levels can result in increased pain perception (23).

Depression can worsen the prognosis of knee osteoarthritis patients, hinder the patient's ability to fulfill family, social, and work roles, and reduce the patient's motivation to seek treatment for the pain they feel. Psychological support, stress management, and cognitive behavioral therapy can help in managing stress and maintaining neurotransmitter balance, thereby reducing pain perception and improving patients' quality of life (24).

CONCLUSION

There is a relationship between pain levels and depression levels in knee osteoarthritis patients at Siti Rahmah Padang Regional Hospital. Further research is needed on the causative factors of knee osteoarthritis using other variables to provide varied and in-depth information using a larger sample. Health workers are expected to provide education and counseling services to the community or knee osteoarthritis patients regarding good pain management so that they can prevent depression.

ACKNOWLEDGMENTS

We thank all staff of Siti Rahmah Islamic Hospital, Padang and also thanks to all those who contributed to this study.

CONFLICT OF INTEREST

This study has no conflict of interest.

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