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THE RELATIONSHIP BETWEEN BODY MASS INDEX AND THE SEVERITY DEGREE OF PRIMARY KNEE OSTEOARTHRITIS IN …

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THE RELATIONSHIP BETWEEN BODY MASS INDEX AND THE SEVERITY DEGREE OF PRIMARY KNEE OSTEOARTHRITIS IN THE ELDERLY AT PHC SURABAYA HOSPITAL

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ABSTRACT

Introduction: Osteoarthritis is a disease characterized by abnormalities in bones and joints, known as a degenerative condition, because it is frequently encountered in the elderly. Factors that increase the risk of osteoarthritis include age, excessive joint usage, anatomical structural abnormalities, humoral, genetic, and metabolic factors, trauma, Body Mass Index (BMI), endocrine disorders, primary joint diseases, and cultural factors. One modifiable risk factor is Body Mass Index. **Objective**: Analyzing the relationship between Body Mass Index and the severity degree of primary knee osteoarthritis in the elderly at PHC Surabaya Hospital. **Method**: This research employs an analytical study approach with an observational study type using a cross-sectional research design. Data analysis is conducted using SPSS version 26. **Result**: Out of the 36 samples in this study, 35 (97%) patients with primary knee osteoarthritis in the elderly were female, and 1 (3%) patient was male. The most common severity level of primary knee osteoarthritis was grade III (47.2%). The analysis of the relationship between Body Mass Index and the severity of primary knee osteoarthritis in the elderly at PHC Surabaya Hospital yielded a p-value of 0.187. **Conclusion**: There is no significant relationship between Body Mass Index and the severity degree of primary knee osteoarthritis in the elderly at PHC Surabaya Hospital.

Keywords: Body Mass Index, severity of primary knee osteoarthritis, elderly

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INTRODUCTION

Elderly refers to individuals aged 60 years and older. According to the Regulation of the Minister of Health of the Republic of Indonesia Number 25 of 2016, Indonesia is classified as one of the five countries with the largest elderly population in the world.[1]

According to the 2018 Basic Health Research (RISKESDAS) data, the most common non-communicable diseases suffered by the elderly include high blood pressure, oral and dental disorders, joint diseases, diabetes mellitus, heart diseases, and strokes.[2] One of the joint diseases affecting the elderly is osteoarthritis, a degenerative bone and joint disorder frequently found in the elderly.[3] Based on the 2013 RISKESDAS data, the prevalence of osteoarthritis in Indonesia is 27.5% in females and 21.8% in males.[4]

Factors that increase the risk of osteoarthritis include age, excessive joint-use physical activities, anatomical, humoral, genetic, metabolic abnormalities, trauma, body mass index (BMI), endocrine system disorders, primary joint diseases, and cultural factors. One modifiable risk factor is BMI.[5]

Considering the data indicating a high incidence of osteoarthritis in the elderly in Indonesia, which can affect their health and quality of life, and previous research showing contradictions in the relationship between BMI and the severity of knee osteoarthritis, the researchers are interested in analyzing the relationship between BMI and the degree of severity of primary knee osteoarthritis in the elderly. Unlike most previous studies, this research specifically focuses on patients with primary knee osteoarthritis.

METHOD

The design of this study utilizes an analytical approach with an observational study type and a cross-sectional research design. The study population comprises all elderly patients diagnosed with primary knee osteoarthritis by Orthopedic Specialist doctors at the orthopedic clinic of PHC Surabaya Hospital who meet the inclusion and exclusion criteria and are willing to participate in this study. The minimum sample size for this study is calculated using the Lemeshow formula, which yields a result

RESULT

Table 1. Distribution of gender among elderly patients with primary knee osteoarthritis at PHC Surabaya Hospital

Gender	Frequency (n)	Percentage (%)
Female	35	97
Male	1	3
Total	36	100

Table 1 shows the distribution of gender among elderly patients with primary knee osteoarthritis at PHC Surabaya

Hospital. Out of 36 patients, 35 (97%) were female, and 1 (3%) was male.

Table 2. Distribution of Body Mass among elderly patients with primary knee osteoarthritis at PHC Surabaya Hospital

BMI	Frequency (n)	Percentage (%)
Underweight	-	-
Normal	11	30,6
Overweight	8	8,22
Obese	17	47,2
Total	36	100

Table 2 presents the distribution of Body Mass Index (BMI) among elderly patients with primary knee osteoarthritis at PHC Surabaya Hospital. Out of the total 36 samples, no patients were underweight. There were 11 patients with normal BMI, 8 overweight patients, and 17 obese patients.

Table 3. Distribution of the Degree of Primary Knee Osteoarthritis at PHC Surabaya Hospital

Degree	Frequency (n)	Percentage (%)
Degree I	-	-
Degree II	6	16,7
Degree III	19	52,8
Degree IV	11	30,6
Total	36	100

Table 3 displays the distribution of the degree of severity of primary knee osteoarthritis among the elderly at PHC Surabaya Hospital. No respondents were found with a severity grade of I. Respondents with severity grade II were 6 (16.7%), severity grade III was 19 (52.8%), and severity grade IV was 11 (30.6%). In this study, the most common severity degree observed was grade III.

Table 4. Analysis of the relationship between Body Mass Index and degree of severity of primary knee osteoarthritis at PHC Surabaya Hospital

BMI	Degree Of osteoarthritis				Total
	I (%)	II (%)	III (%)	IV (%)	
Underweight	0 0%	0 0%	0 0%	0 0%	0 0%
Normal	0 0%	4 11,1%	5 13,9%	2 5,6%	11 30,6%
Overweight	0 0%	0 0%	5 13,9%	3 8,3%	8 22,2%
Obese	0 0%	2 5,6%	9 25%	6 16,7%	17 47,2%
Total	0 0%	6 16,7%	19 52,8%	11 30,6%	36 100%

DISCUSSION

In this study, the majority of respondents were females, aligning with previous research by Tivalen Dwirara Anggraini and Umi Sjarqiah, which showed that knee osteoarthritis is more common in female respondents.[6]

The occurrence of osteoarthritis in the elderly is more prevalent in females, consistent with the theory suggesting a hormonal role in osteoarthritis formation.[7] As women enter old age, there is a reduction in estrogen hormones, which play a crucial role in maintaining bone mass.[6] Estrogen enhances osteoblast activity, and its deficiency decreases the number of osteoblasts in bones, leading to a reduction in bone matrix, calcium, and phosphate deposits.[8] Additionally, estrogen is protective as chondrocytes have estrogen receptors that enhance the synthesis and production of proteoglycans.[6]

In this study, the majority of respondents had an obese BMI, aligning with previous research by Rahmad Randi Aldo and Rahmi Kurnia, indicating a relationship between obesity and the occurrence of osteoarthritis.[9]

The knee joint bears the weight during walking, and increased body weight makes the knee joint work harder, impacting the strength of the joint's cartilage. Cartilage damage can result in biochemical changes such as collagen tissue fractures and proteoglycan degradation.[10]

The Spearman test was applied in this study, and the analysis showed a p-value of 0.187. The p-value in this study exceeds 0.05, indicating no significant relationship between the two variables. This finding aligns with a previous study by Widhiyanto et al. (2017).[11] However, it contradicts research by Mutiwara et al. (2016), which claimed a relationship between BMI and the severity of knee osteoarthritis.[12]

The contrasting results may be due to differences in location, sample size, and other uncontrolled factors during the research. In this study, the severity of primary knee osteoarthritis is not solely influenced by BMI, and other factors, such as the physical activity of respondents, were not controlled.

Research by Dhaifullah et al. (2023) suggests that occupations can influence the severity of knee osteoarthritis. Jobs requiring prolonged kneeling and squatting may increase meniscal or ligament damage in the knee, leading to cartilage degeneration and an increase in osteoarthritis severity.[13]

According to Laksmitasari et al. (2021), age influences the severity of knee osteoarthritis due to the aging process causing an imbalance in signals in the cartilage. Inflammatory and catabolic signals increase compared to anti-inflammatory and metabolic signals, leading to chondrocytes increasing enzyme production to degrade the cartilage matrix.[14]

The results of this study indicate that the severity of osteoarthritis is not only influenced by BMI but can also be affected by occupation, age, and other unexplored factors such as knee trauma or injury history, genetics, and knee anatomical abnormalities.[15]

CONCLUSION

The results of this study indicate that the severity of osteoarthritis is not solely influenced by BMI but is multifactorial and can be affected by occupation and age, as well as other factors not explored in this study, such as a history of knee trauma or injury, genetics, and knee anatomical abnormalities.

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