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ORIGINAL RESEARCH

THE CORRELATION BETWEEN SMOKING BEHAVIOUR AND THE BODY MASS INDEX IN RELATION TO THE INCIDENCE OF KNEE OSTEOARTHRITIS IN THE ELDERLY, UTILIZING THE WESTERN ONTARIO AND MASTER INDEX

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ABSTRACT

Osteoarthritis is a progressive condition affecting the joints, where there is an accumulation of cellular stress, breakdown of the extracellular matrix, and gradual deterioration of the articular cartilage. This leads to the bones rubbing against each other, causing pain, stiffness, and impaired mobility. The Kwanyar Community Health Center documented a total of 194 instances of knee osteoarthritis between July and September 2022. The objective of this research is to examine the correlation between body mass index and smoking habits, as well as the occurrence of knee osteoarthritis in older individuals, using the Western Ontario and McMaster index. The study design employs analytics using a cross-sectional methodology. The survey had a total of 86 participants. There were 54 responders from whom samples were obtained. The sample approach employs probability sampling with the Simple Random sample technique. The data collecting method employs a questionnaire form. The statistical analysis employs the Spearman Rank test with a significance level of 0.05. The ethical testing of this study has been conducted by the KEPK STIKes Ngudia Husada Madura team. The study findings indicate that the analysis is conducted using the Spearman Rank statistical test, yielding a significant result (p=0.000) which is lower than the significance level (a=0.05). It may be inferred that there is a correlation between body mass index and smoking habits in connection to the occurrence of knee osteoarthritis in older individuals, as measured by the Western Ontario and McMaster index. For the aged, it is advisable to enhance their body mass index and modify their smoking habit as a preventive measure against knee osteoarthritis. The study aims to investigate the correlation between the respondents' understanding of body mass index and smoking habits, and the occurrence of knee osteoarthritis in older individuals.

Keywords

Osteoarthritis, smoking, body mass index

INTRODUCTION

Osteoarthritis (OA) is a degenerative joint disease characterized by cellular stress, extracellular matrix degradation, and gradual loss of articular cartilage resulting in bones rubbing against each other, resulting in pain, stiffness, and movement disorders (El-Tawi et al., 2016; Lespasio, 2017; WHO, 2013). OA is a major cause of chronic pain and physical disability in old age (Wallace et al., 2017). OA manifests first as metabolic derangement in abnormal cartilage tissue followed by anatomical and physiological abnormalities characterized by cartilage degradation, bone sclerosis, joint space narrowing, osteophyte formation, joint inflammation and loss of physiological joint function (El-Tawil et al., 2016).

How to assess the functional degree of the knee can use the Western Ontario and McMaster (WOMAC) and Algofunctional lequesne. However, between the two instruments, WOMAC is more effective for assessing knee function, because WOMAC is a tool designed to measure functional disorders and pain associated with OA of the lower extremities. There are five questions related to pain, two questions related to joint stiffness and seventeen questions related to functional activities. WOMAC is the most sensitive instrument for assessing knee OA and is widely used in clinical trials (Ebrahimzadeh, 2014)

Osteoarthritis ranks 50th globally among diseases that cause disability and injury affecting 250 million people or 4% of the world's population (Kohn et al., 2016). In Indonesia, radiologically the incidence of knee OA in women reaches 12.7% while in men it is 15.5% (Setiati, 2014). Based on research by Hasiibi (2015), in East Java it is 27% at the age of 60 years and the incidence increases to 80% at the age of 75 years (Hasiibi, 2015).

Risk factors that cause knee OA include age, gender, genetics, previous knee injury, lifestyle (smoking), and Body Mass Index (BMI), excess body weight causes increased mechanical load on the knee joint which can accelerate bone structure damage. (Arismunandar, 2015). Other factors such as smoking can cause knee OA due to cartilage damage (Agus, 2017).

The impact of knee osteoarthritis without serious treatment is the risk of Osteonecrosis, Baker cyst rupture, Bursitis, Symptomatic and bone malfunction, the worst of which is Meniscal Tear paralysis (Agus, 2017).

Efforts that can be made to manage patients with OA aim to eliminate complaints, optimize joint function, reduce dependency and improve quality of life, inhibit disease progression and prevent complications. Pillars of therapy: non-pharmacological (education, physical therapy, diet/weight loss), pharmacological (analgesics, local, systemic, chondroprotective and biologic corticosteroids), and surgery (Kapoor, 2011).

METHOD

The design used in this research is an analytical survey with a cross sectional approach. The total population was 86 with a sample of 54 respondents in the working area of the Kwanyar Health Center, Bangkalan Regency. The instruments in the research used a questionnaire, namely smoking behavior, incidence of knee osteoarthritis using WOMAC and body mass index using weight and TB scales.

RESULTS

Table 1 based on characteristics patient

Age	Frequency	(%)
Elderly	31	57.4
Young old	18	33.3
Old	5	9.3
Total	54	100
Education		
No school	22	40.7

Base	28	51.9
Intermediate	4	7.4
Total	54	100
Work		
Doesn't work	19	5.2
Farmer	24	44.4
Self-employed	9	16.7
Retired	2	3.7
Total	54	100

From table 1 above, based on age, the majority were aged 55-65 years, numbering 31 (57.4%). The majority of respondents' last level of education was elementary school, numbering 28 (51.9%). Nearly half of the respondents' occupations were 24 farmers (44.4%).

Table 2 is based on body mass index, smoking behavior and the incidence of knee osteoarthritis

Body Mass Index	Frequency	Percentage (%)
Thin	2	3.7
Normal	24	44.4
Fat	28	51.9
Total	54	100
Behavior smoke	Frequency	Percentage (%)
Light	18	33.3
Currently	21	38.9
Heavy	15	27.8
Total	54	100
Osteoarthritis knee	Frequency	Percentage (%)
Light	18	33.3
Currently	21	38.9
Heavy	15	27.8
Total	54	100

From table 2 above it shows the Body Mass Index for the most part 28 (51.9%) showed obesity, almost half of the respondents' smoking behavior 21 (38.9%) showed moderate and almost half of the respondents showed knee osteoarthritis 21 (38.9%) showed moderate.

DISCUSSION

Relationship between body mass index and the incidence of knee osteoarthritis in the elderly

Spearman Rank statistical test, it was obtained that the p value = 0.000, meaning the *p value* = < α (0.05). Thus it can be concluded that H0 $_{is}$ rejected and Ha is accepted, which means there is a relationship between Body Mass Index (BMI) and the incidence of knee osteoarthritis in the elderly using the *Western Ontario and McMaster index.* in the Kwanyar Community Health Center Working Area

This research is supported by research conducted by Rosdiana (2019). The results of the study show that the body mass index of the elderly is almost half of the respondents, 48.5% have an obese body mass index, the incidence of osteoarthritis is more than half of the respondents, 55.6% have the incidence of osteoarthritis and there is a significant relationship significant relationship between body mass index and the incidence of osteoarthritis in the elderly in the Handapherang Health Center Working Area in 2019).

Cici (2020) also said that based on the results of her research analysis , the p value obtained was 0.021 (p value ≤ 0.05). Thus, this study shows that there is a relationship between body mass index and the incidence of knee osteoarthritis at the Zainoel Abidin General Hospital in the city of Banda Aceh.

This is because body mass index can influence the fulcrum on the legs, the greater the body mass capacity, the greater the load placed on the legs, making it possible for knee osteoarthritis to occur in the elderly .

One factor that can influence body mass index is gender. Based on the research results, it was found that the gender of all respondents was male (100%). BMI in the overweight category is more common in men. However, obesity rates are higher in women compared to men. The distribution of body fat is also different between the fat of women and men, men suffer from viscelar obesity more often than women (Asil, E et al., 2014). This happens because men tend to pay less attention to body posture than

women, therefore this can happen because of the lifestyle they live.

Another factor that can influence body mass index is age. Based on the research results, it was found that the age of the respondents was mostly 55-65 years old, numbering 31 (57.4%). Research conducted by Tungtrochitr and Lotrakul shows that there is a significant relationship between older age and BMI in the obesity category. Research subjects in the 40-49 and 50-59 year age groups had a higher risk of obesity than those in the age group less than 40 years. This situation is suspected due to slow metabolic processes, reduced physical activity, and more frequent food consumption (Hidayati, 2017). In this case, the function of the body plays a role in the metabolic processes that occur, because the older a person gets, the function will decrease, such as a decrease in metabolic processes.

Relationship between smoking behavior and the incidence of knee osteoarthritis in the elderly

Spearman Rank statistical test, it was obtained that the p value = 0.000, meaning the *p value* = < α (0.05). Thus, it can be concluded that H0 $_{is}$ rejected and Ha is accepted, which means that there is a relationship between smoking behavior and the incidence of knee osteoarthritis in the elderly using the *Western Ontario and McMaster index.* in the Kwanyar Community Health Center Working Area .

This research is supported by Erita (2017). The results of the chi square analysis show that the p value = 0.036, meaning that there is a significant influence of smoking habits on the incidence of osteoarthritis. This means that smokers have a 2.679 times risk of developing osteoarthritis compared to non-smokers.

The results of research by Amin et al (2006) in Niken (2014) stated that smokers were twice as likely to have significant cartilage loss compared to non-smokers. The relationship between smoking and osteoarthritis is because smoking can damage cells and inhibit the proliferation of joint cartilage cells, smoking can increase oxidant pressure which affects cartilage loss, and smoking can increase carbon monoxide content in the blood which causes tissue to lack oxygen and can inhibit bone formation. vulnerable. Smokers have higher levels of pain than non-smokers because joint pain will increase due to loss of cartilage, smoking may affect other structures in the knee or may have an effect on pain perception.

According to the explanation above, the smoking habit can still be said to be a risk factor for osteoarthritis because in this study the results showed that there was a significant relationship because the proportion of respondents who smoked was less and there were only respondents who had a light smoking habit and did not smoke. There were no respondents in the category of having a moderate and non-smoking habit. The smoking habit is heavy so there is no comparison in the data analysis. Apart from smoking, there are also other variables that play a role as risk factors for osteoarthritis.

One factor that can influence smoking behavior is knowledge that can be obtained from education. Based on the results of educational data, it was found that the majority of respondents' last type of education had elementary school education, numbering 28 (51.9%). Public knowledge is still low because low education means minimal information regarding the dangers of smoking behavior. Even though it has been clearly proven about the dangers of smoking, only a few smokers understand that smoking harms almost every organ in the body and causes many diseases. Most think that smoking only causes a few diseases (Zaenabu, 2014). Individuals with

low education will experience a lack of knowledge, especially about the dangers of smoking being one of the reasons for smoking, because information regarding the dangers is not well known.

CONCLUSIONS

There is a relationship between smoking behavior and the incidence of knee osteoarthritis in the elderly using *the Western Ontario and McMaster index* in the Kwanyar Community Health Center Working Area

There is a relationship between Body Mass Index (BMI) and the incidence of knee osteoarthritis in the elderly using *the Western Ontario and McMaster index.* in the Kwanyar Community Health Center Working Area

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