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Relationship Between Age, Gender, Obesity, And Occupation With The Incidence Of Knee Osteoarthritis At Bhayangkara Hospital In 2023

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ABSTRACT

Osteoarthritis (OA) is inflammation of the joints due to degenerative damage to the cartilage and surrounding tissue. The degenerative nature of osteoarthritis develop slowly, but this can cause disability and failure of joint function accompanied by pain. risk factors for OA are age, gender, genetics, obesity, ethnicity, metabolic disease, work, exercise, joint injuries, and growth disorders. Osteoarthritis can attack various joints in the body, but more often affects joints that support the body's weight, such as the knee joint and hip joint. The knee joint is a joint that is very often affected by OA. Data from the Central for Disease Control and Prevention (CDC) shows that as much as 40% of the population aged > 70 years suffer from knee OA. To determine the incidence, risk factors and relationship between risk factors for the occurrence of Knee Osteoarthritis at Bhayangkara Hospital Makassar in 2023. This Method Description research using a Cross Sectional approach. The incidence of Knee Osteoarthritis at Bhayangkara Makassar Hospital in 2023 there were 186 patients, the presentation of patient age <40 years in this study was 28.5% and >40 years is 71.5%, the gender presentation of patients in this study were male as much as 31.7% and women as much as 68.3%, the distribution of obesity in this study was 68.3% and not obese as much as 31.7%, the presentation of work patients on the incidence of osteoarthritis where in this study 33.9% worked and 66.1% did not work and there was a relationship between age, gender, obesity and work on the incidence of osteoarthritis. Based on the research results, it can be concluded that there is a relationship between age, gender, obesity and occupation with the incidence of Knee Osteoarthritis at Bhayangkara Hospital in 2023.

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INTRODUCTION

Osteoarthritis (OA) is an inflammation of the joints due to the degenerative damage to cartilage and surrounding tissue. The degenerative nature of osteoarthritis develops slowly, but it can cause disability and joint failure accompanied by pain[1]. Risk factors for OA include age, sex, and sex. gender, genetics, obesity, ethnicity, metabolic disease, occupation, exercise,

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joint injuries, and growth disorders. Jobs that require heavy physical movement and continuous use of one joint, such as kneeling or lifting heavy loads, are one of the risk factors for knee OA.[2,6]

Osteoarthritis can affect various joints in the body, but more often affects joints that support the body's weight, such as the knee joint and hip joint. is very frequent joints affected by OA. Data from *The Centers for Disease Control and Prevention (CDC)* indicates that as much as 40% of population aged > 70 years suffering from OA of the knee[3] . Based on WHO study number The population experiencing OA is recorded as 7 % of the total population, meaning more of the 500 million people worldwide experience OA. An estimated 9.6% of men and 18% of women aged over 60 years worldwide. [4]

Based on report Riskesdas 2018, osteoarthritis including into the disease joints together with painful consequence sour veins, and rheumatoid arthritis. Prevalence disease joints based on the doctor's diagnosis on the population age ≥15 years in Indonesia is 7.3%. The highest is in Aceh 13.26%, followed by Bengkulu 12.11%, Bali 10.46%, and Papua 10.43%. In South Sulawesi, the prevalence is 6.39% of the total population. If seen from characteristics, prevalence the highest at the age of >75, namely 18.95%, sufferers woman more many (8.46%) compared to with men (6.13%), based on level education highest at no / not yet Once attending school (13.66%), work farmer / laborer farmers (9.86%), and living in rural areas (7.83%). [5.6]

Based on research conducted in Regency Bengkayang by Ra'ida et al. 2022 obtained As many as 30 % of farmers experience knee OA enter in group aged 45-56 years and as many as 27% entered in group age 58-71 years. While according to type the sex of 38 people is women and 29 men. And based on nutritional status 25.4% were found to have excess BMI (obesity). [7]

Research conducted in Surabaya by Hairil great et al. 2019 obtained that There is connection between knee OA incidence with Employment History Where From a total of 124 respondents, it was found that as many as 59 respondents were diagnosed with knee OA have a history of habits Work with lift heavy objects. [8]

Research conducted at Ibnu Sina Hospital Makassar by Ashila et al. 2022 obtained as much as Patient *Osteoarthritis* is most commonly found in groups age elderly (>65 years), female, nutritional status *overweight* and *obesity* I, location joints at *the genu,* results Photo radiography conventional *grade* II, education last high school/ equivalent. work as a housewife, and with non-surgical management. [9]

METHOD

The design of this research is a quantitative approach and the type of research is descriptive correlational, meaning that this research aims to find whether or not there is a relationship between one variable and another variable. In this case, it is the relationship between age, gender. gender, obesity and occupation on the incidence of knee osteoarthritis at Bhayangkara Hospital Makassar in *2023.* Technique taking sample the method used is *total sampling* where the entire population is used as a sample. The research instrument used in this study is in the form of medical records (secondary data).

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RESULTS

Analysis Univariate

Distribution Patient Osteoarthritis Knee Based on Age at Bhayangkara Hospital Makassar in 2023

Osteoarthritis patients based on age is described in table 4.1.1 showing that patients participating in this study were distributed as follows: <40 years 53 people and >40 years 133 people.

Table 4.1.1 Distribution knee osteoarthritis patients based on age at Bhayangkara Hospital Makassar in 2023

Variables	Subgroup	Amount	
		Frequency	Percentage (%)
Age	<40 years	53	28.5
	>40 years	133	71.5

Distribution Patient Osteoarthritis Knee Based on Gender at Bhayangkara Hospital Makassar in 2023

Osteoarthritis patients based on gender is described in table 4.1.2 showing that the patients who participated in this study were distributed as follows: 59 men and 127 women.

Table 4.1.2 Distribution knee osteoarthritis patients based on type sex at Bhayangkara Hospital Makassar in 2023

Variables	Subgroup	Amount	
		Frequency	Percentage (%)
Gender	Man	59	31.7
	Woman	127	68.3

Distribution Patient Osteoarthritis Knee Based on Obesity at Bhayangkara Hospital Makassar in 2023

Osteoarthritis patients based on obesity is described in table 4.1.3 showing that the patients who participated in this study were distributed as follows: 59 people were not obese and 127 people were obese.

Table 4.1.3 Distribution knee osteoarthritis patients based on obesity at Bhayangkara Hospital Makassar in 2023

Variables		Amount	
		Frequency	Percentage (%)
Obesity	Not obese	59	31.7
	Obesity	127	68.3

Distribution Patient Osteoarthritis Knee Based on Jobs at Bhayangkara Hospital Makassar in 2023

Osteoarthritis patients based on occupation is described in table 4.1.4 showing that patients who participated in this study were distributed as follows: 63 people were unemployed and 123 people were employed.

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Table 4.1.4 Distribution knee osteoarthritis patients based on Jobs at Bhayangkara Hospital Makassar in 2023

Variables	Subgroup	Amount	
		Frequency	Percentage (%)
Work	Work	63	33.9
	Doesn't work	123	66.1

Analysis Bivariate

Relationship Age to Knee Osteoarthritis Incident at Bhayangkara Hospital Makassar in 2023

Osteoarthritis patients at Bhayangkara Hospital in 2023 are described in table 4.2.1, showing that the significance value or Asymp Sig. (2-sided) of 0.000. Asymp.Sig. (2-sided) value of 0.021 <0.05, it can be interpreted that in this study there is a significant relationship or correlation between age and knee osteoarthritis patients at Bhayangkara Hospital in 2023.

Table 4.2.1 Relationships age to Knee Osteoarthritis patients at Bhayangkara Hospital Makassar in 2023

Variables	Subgroup	Age		P value
		<40 years	>40 years	
Osteoarthritis	Non-OA	49	18	0.021
	O.A.	4	115	

Relationship type sex to Knee Osteoarthritis Incident at Bhayangkara Hospital Makassar in 2023

The results of the relationship between gender and knee osteoarthritis patients at Bhayangkara Hospital in 2023 are described in table 4.2.2, showing that the significance value or Asymp Sig. (2-sided) of 0.017. Asymp.Sig. value. (2-sided) 0.017 < 0.05, it can be interpreted that in this study there is a significant relationship or correlation between gender and knee osteoarthritis patients at Bhayangkara Hospital in 2023.

Table 4.2.2 Relationships type sex to Knee Osteoarthritis patients at Bhayangkara Hospital Makassar in 2023

Variables	Subgroup	Gender		P value
		Man	Woman	
Osteoarthritis	Non-OA	47	20	0.017
	O.A.	12	107	

Relationship obesity to Knee Osteoarthritis Incident at Bhayangkara Hospital Makassar in 2023

Osteoarthritis patients at Bhayangkara Hospital in 2023 are described in table 4.2.3, showing that the significance value or Asymp Sig. (2-sided) of 0.020. Asymp.Sig. value. (2-sided) 0.020 < 0.05, it can be interpreted that in this study there is a significant relationship or correlation between obesity and knee osteoarthritis patients at Bhayangkara Hospital in 2023.

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Table 4.2.3 Relationships obesity to Knee Osteoarthritis patients at Bhayangkara Hospital Makassar in 2023

Variables	Subgroup	Obesity		P value
		Not obese	Obesity	
Osteoarthritis	Non-OA	55	12	0.020
	O.A.	4	115	

Relationship work to Knee Osteoarthritis Incident at Bhayangkara Hospital Makassar in 2023

Osteoarthritis patients at Bhayangkara Hospital in 2023 are described in table 4.2.4, showing that the significance value or Asymp Sig. (2-sided) of 0.011. Asymp.Sig. value. (2-sided) 0.011 < 0.05, it can be interpreted that in this study there is a significant relationship or correlation between work and knee osteoarthritis patients at Bhayangkara Hospital in 2023.

Table 4.2.4 Relationships work to Knee Osteoarthritis patients at Bhayangkara Hospital Makassar in 2023

Variables	Subgroup	Work		P value
		Work	Doesn't work	
Osteoarthritis	Non-OA	57	100	0.011
	O.A.	6	113	

Discussion

Osteoarthritis patients based on age shows that those participating in this study were distributed as follows: <40 years 53 people and >40 years 133 people. The research results are in line with research conducted by Sananta et al at Baptist Hospital Malang in 2020, out of 49 osteoarthritis patients, 8.1% were aged <45 years while 91.9% were aged >45 years. This is also supported by research conducted by Widhiyanto et al at Dr. Soetomo Hospital Surabaya where 26 people (86.67%) were women, and 4 people (13.33) of them were men. [25,26]

This is in accordance with the theory that osteoarthritis is a disorder caused by abnormal mechanisms of the aging process. Based on the literature, age is one of the risk factors for someone suffering from osteoarthritis, this is related to changes in joint cartilage. As age increases, cartilage thins and muscles weaken, affecting the stability of major joints, such as the knees. 10,17

Osteoarthritis patients based on gender shows that those participating in this study were distributed as follows: 59 men and 127 women. The results of the study are in line with research conducted by Samma et al at Wahidin Sudirohusodo Hospital Makassar, where 42 people (70%) were female, while 18 people (30%) were male. These results are in accordance with research by Nugraha et al. al at Dr. H Abdul Moeloek Hospital, Lampung, where out of 45 patients, 30 people (66.7%) were women, and 15 people (33.3%) were men. [27, 39]

The results of the study are in line with the literature stating that women are more often affected by osteoarthritis than men. The frequency of women and men suffering from OA under the age of 45 is approximately the same, but over 50 years (after menopause) the

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frequency of OA is higher in women. The decrease in estrogen hormone causes a decrease in bone and joint density because it is a protective factor from cartilage degradation. [13,17]

Osteoarthritis patients based on obesity showed that those participating in this study were distributed as follows: 59 people were not obese and 127 people were obese. The results of the study are in line with research conducted by Samma et At Wahidin Sudirohusodo Hospital in Makassar, out of 60 patients, 57 people (95%) were in the *overweight* BMI category and 3 people (5%) were in *the normal body category. weight.* This is also in line with the research of Khairani et al at Raden Mattaher Regional Hospital, Jambi, where out of 74 knee OA patients, 41 people (55.4%) had obese BMI, 17 people (23%) had overweight BMI, 16 people (21.6%) had normoweight, and 0 patients were underweight. [27,28]

The results of the study are also in line with the literature where excess body weight (obesity) is a very strong risk factor, especially for knee and hand OA. This is influenced by mechanical factors and metabolic factors. This happens because during walking, half of the body weight will be supported by the knee joint. Increased body weight will double the joint load when walking. [13,17, 28]

Osteoarthritis patients based on occupation showed that those participating in this study were distributed as follows: 63 people were unemployed and 123 people were employed. The research results are in line with research by Isty et. al at the Rejosari Health Center in Pekanbaru City, which found that out of a total of 100 OA patients, 67 people (65.7%) were working and 35 people (34.3%) were not working. This is also supported by research by Ghassani et al. al at Mitra Hospital, which found that 11 people (28.9) OA patients were housewives, while 27 people (71.15) of them had jobs including 2 civil servants (5.3%), 22 retirees (57.9%), and 3 private sector (7.9%). [48.49]

This is in accordance with the literature, where excessive joint activity is a risk factor for OA. Certain jobs that involve excessive use of a joint can affect OA. The knees of workers who do work while bending, or in workers with heavy equipment that vibrates can cause microtrauma that affects the structure of the joint. The main strength of the joint cartilage in providing a cushion against loading lies in the contraction of the muscles that stabilize the joint. When doing work that uses support on the knee joint, especially squatting, the weight of the body is loaded on the knee will increase up to 10 times. The cartilage in the joint is too thin to be an effective mechanical cushion against excessive loads. Excessive loads can cause microfractures in the subchondral trabeculae, resulting in callus formation and bone remodeling. This causes stiffness in the bone, so that it is no longer effective as a mechanical cushion and becomes a predisposing factor for joint cartilage degeneration. [13,19, 29]

However, the results of the study contradict the research conducted by Ismail at Dr. Sardjito General Hospital Yogyakarta where out of 70 patients, 37 people (52.9%) were unemployed and 33 people (47.1%) were employed. This can be influenced by the level of education and lifestyle, where from the research of Kasumayanti et al, the level of education can affect a person's awareness in maintaining their health and improving their lifestyle. People with low levels of education will have more difficulty getting a job and the work they do involves heavy physical activity. [30,31]

The results of the study of the relationship between age and osteoarthritis patients who

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participated in this study showed that in patients aged <40 years, 49 people did not suffer from OA and 4 people suffered from OA. While in patients >40 years, 18 people did not suffer from OA and 115 people suffered from OA.

The results of the research conducted showed that the significance value or Asymp Sig. (2-sided) of 0.021. Asymp. Value. Sig. (2-sided) 0.021 <0.05, it can be interpreted that in this study there is a significant relationship or correlation between age and the incidence of knee osteoarthritis at the Bhayangkara Hospital Makassar in 2023.

The results of the study are in line with the study conducted by Purnamasari at the Muhammadiyah Hospital in Palembang in 2016, where the results of the study found a significant relationship between suai and the incidence of knee osteoarthritis with a value of p = 0.003 (p <0.05). Patients aged >50 years 78.7% experienced knee OA and 21.3% did not experience knee OA. Patients aged <50 years 44.4% had OA, and the other 55.6% did not suffer from OA. This is also supported by the research of Christina et al in 2022 at the Santa Elisabeth Hospital found that there was a significant relationship between age and knee OA in women with a p value = 0.000. [32, 33]

The results of the study are in line with various existing studies and literature. A global epidemiological study conducted by Cui et al in 2020 found that age is one of the risk factors for knee OA. The prevalence of knee OA peaks at age >50 years. [34] OA is a slowly progressive disease of the synovial joints characterized by focal damage to the joint cartilage causing osteophyte formation and subchondral sclerosis, varying degrees of synovial inflammation, thickening of the joint capsule, and damage to soft tissue structures including ligaments and menisci in the knee. Cartilage damage in OA is triggered by an imbalance in the production and activity of pro-inflammatory and catabolic mediators, including various cytokines and chemokines, with the activity of anabolic factors, including insulin- like growth factor. growth factor 1 (IGF-1) and osteogenic protein 1 (OP-1). This imbalance causes excessive production of matrix degradation enzymes including matrix metalloproteinase (MMP) and aggrecanase. MMP-13 has the ability to degrade type II collagen, a structural protein in cartilage that plays a role in tissue strength, while aggrecanase is able to degrade aggrecan proteoglycans that play a role in cartilage resilience. The aging process causes oxidative stress in joint cartilage. This triggers an imbalance in chondrocyte catabolic and anabolic signaling that causes increased production of MMPs and aggrecanase. [35,36]

However, research contradicts the results conducted by Sananta. et al at Baptist Hospital in 2022, where the results of the study did not find a significant relationship between age and the incidence of osteoarthritis with a P value > 0.05, namely p = 0.189. This is also supported by research conducted by Sibarani et al in 2021 found that there was no significant relationship between age and the degree of knee osteoarthritis with P = 0.115. This indicates that there are other factors that influence the degree of primary knee osteoarthritis more than age. [25, 37]

The results of the study of the relationship between gender and osteoarthritis patients who participated in this study showed that in male patients, 47 people had non-OA and 12 people had OA. While in female patients, 20 people had non-OA and 107 people had OA.

The results of the research conducted showed that the significance value or Asymp Sig.

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(2-sided) of 0.017. Asymp. Value. Sig. (2-sided) 0.017 <0.05, it can be interpreted that in this study there is a significant relationship or correlation between age and the incidence of knee osteoarthritis at the Bhayangkara Hospital Makassar in 2023.

The results of the study are in line with the study conducted by Aliya at RSI Sultan Agung Semarang where the results of the study found a significant relationship between gender and OA with a value of p = 0.026 (p <0.05). There were 8 male patients experiencing OA. While there were 10 female patients experiencing OA. This is also supported by research conducted by Nugraha et al at Moeloek Regional Hospital, Lampung, which found a significant relationship between gender and the incidence of OA with a p value = 0.032 (p <0.05). [38.39]

Some literature has also discussed the influence of gender on knee OA disease. Study by Tschon et al. analyzed the differences in morphometrics, kinematics, pain, functional outcomes after arthroplasty, and health care needs due to OA in both sexes. The study showed that women used health care more often due to OA, had a higher prevalence of OA, higher clinical pain and inflammation, decreased cartilage volume, difficulty in physical activity, and smaller joint parameters and dimensions, compared to men. The study also summarized the main characteristics that were determinants of sex. The study showed that the PI3K-Akt signaling pathway, osteoclast differentiation, and focal adhesion may play an important role in the development of knee OA in postmenopausal women. [35, 40, 41]

However, the study contradicts the results obtained by Murtadha at the Orthopedic Polyclinic of Dr. Sardjito General Hospital Yogyakarta which found that there was no significant relationship between gender and the severity of knee OA with a p value of 0.683. Similar research was obtained by Laksmitasari et al at RSU PKU Muhammadiyah Surakarta which found that there was no relationship between gender and the degree of *Kellgren Lawrence* (p = 0.644). The insignificant results are thought to be due to the multifactorial causes of OA, in men there can be risks such as due to trauma or injury when doing work or previous heavy activities that women do not do. [42, 43]

The results of the study on the relationship between obesity and osteoarthritis patients who participated in this study showed that in non-obese patients, 55 people did not suffer from OA and 4 people suffered from OA. While in obese patients, 12 people did not suffer from OA, and 115 people suffered from OA.

The results of the research conducted showed that the significance value or Asymp Sig. (2-sided) of 0.020. Asymp. Value. Sig. (2-sided) 0.020 <0.05, it can be interpreted that in this study there is a significant relationship or correlation between obesity and the incidence of knee osteoarthritis at the Bhayangkara Hospital Makassar in 2023.

The results of the study are in line with research conducted by Samma et al who found a significant relationship between BMI and knee OA (p=0.039). A meta-analysis conducted by Zheng et al found that obesity is a strong risk factor for knee OA. The results of the meta-analysis showed that overweight and obesity were significantly associated with a higher risk of knee OA, 2.45 and 4.55 times, respectively. The risk of knee OA increased by 35% with a BMI increase of 5 kg/m2. Structural damage to the joint is thought to be due to both mechanical factors, including increased forces around the joint, decreased muscle strength

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and biomechanical changes during daily activities, and metabolic factors, where obesity also increased the risk of OA in non-weight-bearing joints such as the hands. [27, 35, 44]

However, the results contradict research conducted by Widhiyanto. et al at Dr. Soetomo Hospital which concluded that there was no relationship between BMI and the degree of OA genu because the p value>0.05 (p=0.822). The absence of a relationship between BMI and the degree of OA genu indicates that the degree of OA is not only influenced by BMI, but also other factors such as knee injury, physical activity, and foot position. [26]

The results of the study of the relationship between work and osteoarthritis patients who participated in this study showed that in unemployed patients, 57 people did not suffer from OA and 6 people suffered from OA. While in patients who worked, 10 people did not suffer from OA and 113 people suffered from OA.

The results of the research conducted showed that the significance value or Asymp Sig. (2-sided) of 0.011. Asymp. Value. Sig. (2-sided) 0.011 <0.05, it can be interpreted that in this study there is a significant relationship or correlation between work and the incidence of knee osteoarthritis at the Bhayangkara Hospital Makassar in 2023.

The results are in line with research conducted by Nugraha et al at Dr. H. Abdul Moeloek Hospital, Lampung, which found that work had a significant effect on the occurrence of osteoarthritis with a p value of 0.027. The results of the study were also in accordance with systematic review conducted by Gignac et al who found that of the 69 studies synthesized, heavy or moderate work activity was associated with an increased risk of developing OA. [39,45]

Several studies have shown that heavy physical work, especially that which places mechanical loads on the knees, can cause and worsen knee osteoarthritis. A cohort study by Perry et al. showed that heavy physical work is associated with a 2-fold increased risk of radiological knee OA incidence. Various activities that provide mechanical load on the knee include kneeling or squatting, standing for a long time (≥2 hours per day), walking ≥3 km / day, often climbing stairs, lifting weights (≥10), jumping, and vibration. [35, 46]

However, the research results do not match those obtained by Manurung et al. al at RS Bhayangkara Tk.II Medan which found that there was no significant relationship between work and knee OA. This can be influenced by the distribution of work and type of work. Light work usually does not cause excessive burden and pressure on the knees. Therefore, work with light activity does not trigger knee OA because it does not cause damage to the knees.[47]

CONCLUSION

Based on results research that has been done about connection between age, type gender, obesity and work with incident of knee osteoarthritis at Bhayangkara Hospital in 2023 can concluded that: Got it that number The incidence of Knee Osteoarthritis at Bhayangkara Hospital Makassar in 2023 was 186 patients. Got it presentation age patients <40 years in study This as much as 28.5% and >40 years as much as 71.5%. Got it presentation type sex patient in study This that is man as much as 31.7% and women as much as 68.3%. Got it presentation distribution obesity in study This as much as 68.3% and not obesity as much as 31.7%. Got it presentation work patient to osteoarthritis incident where in study This as many as 33.9% worked and 66.1% did not Work. There is connection between age, type gender,

obesity, and work to osteoarthritis incident. Suggestion; It is expected to power health to be better intense in promotion health about osteoarthritis disease so that prevention can done especially in connection with the variables studied that have relatedness with incident osteoarthritis. For study furthermore need under review Again other factors that become reason osteoarthritis disease, so that the result can used For planning a prevention program addition. Can done study in amount more samples big

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