

FACTORS ASSOCIATED WITH THE OCCURRENCE OF OSTEOARTHRITIS IN ELDERY PEOPLE

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ABSTRACT

Osteoarthritis is a degenerative joint disease with unclear etiology and pathophysiology and can cause pain and disability in sufferers, thereby hampering daily activities. Osteoarthritis usually attacks elderly sufferers in weight-bearing joints, such as the knee, hip, lumbar and cervical joints. WHO recorded that the population experiencing osteoarthritis in Indonesia is 8,1 of the total population. As many as 29% of them underwent a doctor's examination, and the remainder (71%) took over-the-counter pain relievers. The occurrence of osteoarthritis in Central Java is estimated at 5.1% of all residents. This study aims to determine what factors are associated with osteoarthritis in the elderly in Bandarjo Village, Semarang Regency. The factors that been searching in this research are age, gender type, occupation, and body weight. The research design is a Cross-Sectional Study. The population in the study were elderly people who were available and willing to be respondents in Bandarjo Village, Semarang Regency. The sample obtained was 55 people using saturated sampling techniques. How to collect data researcher using a questionnaire. Data were analyzed using univariate and bivariate analysis and the statistical test used was chi-square with $p < 0.05$. From the research results, it can be concluded that gender type, age, occupation, and body mass index have a significant effect on the occurrence of osteoarthritis. The output of this research is articles published in national journals or proceedings. Keywords: elderly; osteoarthritis; knee joint

BACKGROUND

Aging is consequences that cannot be avoided. Aging (becoming old) is a slowly capabilities disappearance process to repair or to replace and maintain the normal function of the body so that it cannot survive infection and repair the damage. Along with the aging process, body will experience various health problems commonly referred to as degenerative disease, like osteoarthritis disease (Riza Prima, 2023). Osteoarthritis is the most common joint disease in the world, including in Indonesia. This disease causes pain and disability in sufferers, thus disrupting daily activities. Osteoarthritis ranks second after cardiovascular disease as a cause of physical disability (such as walking and climbing stairs) in the Western world. Overall, around 10-15% of adults over 60 years of age suffer from Osteoarthritis. According to the World Health Organization (WHO), around 80% of osteoarthritis sufferers are over 65 years of age. The economic, psychological, and social impacts of osteoarthritis are enormous, not only for sufferers but also for their families and the environment (Maharani, 2020).

Osteoarthritis is a most common disease form of inflammation joints. Osteoarthritis usually attacks people aged 60 years and over, but sometime it's also attack young people. The joint that suffering from osteoarthritis, and the overuse of joints can eroding bones protective prone which covers the ends of the bones. Small protrusion bones (so-called osteophytes) are formed at the end of the joint (Davies Kim, 2017). Osteoarthritis is a major cause of morbidity, limited physical activity, and physical disability, can reduce the quality of life of the sufferers, is a source of chronic pain and is a major cause of disability in adults and the elderly over 60 years of age with a prevalence of 60-70%. Risk factors for osteoarthritis include age, gender, genetics, obesity, ethnicity, metabolic disease, occupation, sports, 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 osteoarthritis. (Ra'ida A, 2022).

Individuals who often do certain physical activities for a long time while doing their work such as kneeling, squatting, climbing stairs, standing for a long time and lifting heavy loads can increase the risk of osteoarthritis. According to research conducted by Palmer in 2012, work activities that put a load on the joints, especially squatting and kneeling almost all day and lifting heavy loads regularly play a role in the occurrence of osteoarthritis and worsen the development and worsen the symptoms of osteoarthritis. (Theresia Titin Marlina, 2015). The prevalence of osteoarthritis genu at RSDK is quite high, around 10.3% in 2022, seen from the number of patients who underwent X-ray examinations. Judging from observations and medical records, patients who come for X-rays with clinical osteoarthritis genu are mostly overweight. Other risk factors such as age, gender, physical activity, and smoking habits also play a role in the occurrence of osteoarthritis.

Based on the description above, the author is interested in conducting a study on individual factors related to the occurrence of osteoarthritis genu in Bandarjo Village, Semarang Regency. This study aims to determine the Risk Factors for Osteoarthritis in the elderly in Bandarjo Village, Semarang Regency, to determine the relationship between age, gender, occupation, and body mass index to the occurrence of osteoarthritis in Bandarjo Village, Semarang Regency.

METHOD

Before this research taking placed, we already have an ethical clearance to gave a protection for the researcher and also for the respondent. This research had been done in December 2023 and taking placed in Bandarjo Village in Semarang Regency. This research uses descriptive analytic design study with cross sectional approach to know the correlation between age, type gender, occupation and body weight on the occurrence of Osteoarthritis in elderly people who were living in the Bandarjo village in Semarang Regency. The data which concerning dependent and independent variable are collected in same time. The reason researchers use this plan is because the aim of this research is to see factors that related to Osteoarthritis in elderly people in the Bandarjo village in Semarang Regency. On this research the population amount 55 person and the respondent criteria of this study is the respondent who are willing to involved in this research. The method that had been used in this study is accidental sampling method which has been done by taking case or respondents who happen to be there or available. (Sugiyono, 2016). This study used questionnaire and interviews as tools search statements that connected with the incident of osteoarthritis in elderly people who were living in the Bandarjo village in Semarang Regency. On this study we also provide Informed consent form as a legal protection for the respondent. The data collection tools in this research are using observation sheet, interview sheets and documentation studies which shaped questionnaire that has been arranged in a list, with a purpose to gather the data and then entered it into the master table.

RESULT

1. Age Level

The table below show that from 55 elderly people most of their aged are between (60-74 years) (63,63%). According to the researchers' assumptions, age level related to the osteoarthritis incident because older people got more potential to experience OCCURRENCE of osteoarthritis.

Table 1. Frequency Distribution of Elderly People by Age in Bandarjo Village, Semarang Regency

Age	Frequency	Percentage (%)
45-59 years old	16	29,09
60-74 years old	35	63,63
75-90 years old	4	7,28
>90 years old	0	0
TOTAL	55	100

2. Gender Type

The table below shows that from 55 elderly people the majority of elderly people are female, which is 35 people or 63,64%. Gender is a class or groups formed within a species as a means or as an effect use of the sexual reproduction process to maintain continuity species (Wikipedia, 2020). According to researchers assumptions type of gender is also a factor that influences the incident of osteoarthritis. The results of this research is that the female elderly are more have experienced to occurred osteoarthritis compared to the male elderly people.

Table 2. Frequency Distribution of Elderly by Age in Bandarjo Village, Semarang Regency

Gender	Frequency	Percentage (%)
female	35	63,64
male	20	36,36
TOTAL	55	100

3. Occupation

From this table below we can see that from 55 elderly people most of them work as a housewives, which is 33 person or 60% of them. The kind of work or occupation that needs requires physical movement weight and use of one joint at a time constantly, like lifting heavy weights or kneeling is one of the risk factors for knee osteoarthritis

Table 3. Frequency Distribution of Elderly by Occupation in Bandarjo Village, Semarang Regency

Occupation	Frekuensi	Presentase (%)
Housewives	33	60
Labor	10	18,18
Government Employment	4	7,27
Self employee	8	14,55
TOTAL	55	100

4. Body weight

This table shows that most of elderly people have an obesity in their weight, which is 23 people or 41,82 of them. Obesity is one the risk factor of osteoarthritis. Knee joint support half of the body weight while walking. Weight gain will increase a person's chances of experiencing osteoarthritis.

Table 4. Frequency Distribution of Elderly Based on Body Weight in Bandarjo Village, Semarang Regency

Obesitas	Frekuensi	Presentase (%)
Underweight	4	7,27
Normal	16	29,09
Overweight	12	21,82
Obesity	23	41,82
TOTAL	55	100

5. The correlation between age and osteoarthritis occurrence in Bandarjo Village, Semarang Regency

Based on the table below shows that the group frequency of the age between 60-74, from 35 peoples, 20 of them experienced osteoarthritis and those who doesn't experienced osteoarthritis are 15 people's. The statistical test results obtained p value = $0.036 \leq 0.05$ It can be concluded that age or age group has an significant influence to the occurrence of osteoarthritis. According to the researchers' assumptions many elderly people experienced osteoarthritis during increasing age directly related to the degenerative process in the joints, remembering the ability of joints and bones to survive with repeated loads causing wear and tear on the joints and bones

Table 5. The correlation between age and osteoarthritis occurrence in Bandarjo Village, Semarang Regency

Ages	Occurrence of Osteoarthritis				Total	alue
	Osteoarthritis		Not Osteoarthritis			
	n	%	n	%	N	%
45-59 years old	9	16,36	7	12,72	16	29,09
60-74 years old	20	36,36	15	27,28	35	63,64
75-90 years old	4	7,28	0	0	4	7,27
Total	33	60	22	40	55	100

6. The correlation between gender type and the occurrence of osteoarthritis in the elderly people in Bandarjo Village, West Ungaran District, Semarang Regency

The table shows that the results of the gender type factor had a correlation with the occurrence of osteoarthritis. It's shows that from 35 elderly people with women gender there were 23 elderly women who experienced an incident of osteoarthritis, and the elderly who don't experienced an incident of acquired Osteoarthritis as many as 12 people (21,82%). And from 20 male elderly people there was 12 people or 21,82% experienced the incident of osteoarthritis, and the mens elderly who don't experienced an incident of acquired Osteoarthritis as many as 8 people (14,54%). The statistical test results obtained a p-value of $0.033 \geq 0.05$, which means that there is a significant correlations between the gender of elderly people and the occurrence of osteoarthritis in Bandarjo Village.

Table 6. Correlation between gender and the occurrence of osteoarthritis in the elderly people in Bandarjo village, Semarang regency

Gender	Occurrence of Osteoarthritis				Total	value
	Osteoarthritis		No Osteoarthritis			
	n	%	n	%	N	%
Male	12	21,82	8	14,54	20	36,36
Female	23	41,82	12	21,82	35	63,64
Total	35	63,64	20	36,36	55	100

7. The Correlation between occupation and the occurrence of osteoarthritis in the elderly people in Bandarjo Village, Semarang Regency

Based on the table below shows that, 4 respondent who work as a laborers suffering osteoarthritis and 6 people doesn't experienced osteoarthritis. And the respondents who work as housewives experienced osteoarthritis as many as 23 people and those who doesn't experienced osteoarthritis are 10 person. The respondent who work as government employment with osteoarthritis as many as 1 person and who doesn't experienced osteoarthritis 3 person. Respondent who become an self employee experienced osteoarthritis as many as 2 people and who doesn't suffer from osteoarthritis as many as 6 people. The correlation between occupation with the occurrence of osteoarthritis the Sig (value) value obtained is 0.001 or < 0.05. Can be taken Conclusion that occupation has a significant effect on the occurrence of osteoarthritis

Table 7. The Correlation between occupation and the occurrence of osteoarthritis in the elderly people in Bandarjo Village, Semarang Regency

Occupations	Occurrence of Osteoarthritis				Total	value
	Osteoarthritis		No Osteoarthritis			
	n	%	n	%	N	%
Housewives	23	41,82	10	18,18	33	60
Labor	4	7,27	6	10,91	10	18,18
Government Employment	1	1,82	3	5,45	4	7,27
Self employee	2	3,65	6	10,90	8	14,55
Total	28	54,56	27	45,44	55	100

8. The correlation between body weight and osteoarthritis occurrence in the elderly people in Bandarjo Village, Semarang Regency

Based on the table below shows that, 18 respondent who has an obesity suffering an osteoarthritis, and 5 of them doesn't experienced osteoarthritis. The statistical test results showed that the p value was $0.009 \leq 0.05$, which means that there is a significant correlations between the body weight of elderly people and the osteoarthritis occurrence in Bandarjo Village.

Table 8. The correlation between body weight and osteoarthritis OCCURRENCE in the elderly people in Bandarjo Village, Semarang Regency

BMI	Occurrence of Osteoarthritis				Total	value
	Osteoarthritis		No Osteoarthritis			
	n	%	n	%	N	%
Underweight	1	1,82	3	5,45	4	7,27
Normal	4	7,27	12	21,82	16	29,09
Overweight	8	14,55	4	7,27	12	21,82
Obesitas	18	32,73	5	9,09	23	41,82
Total	31	56,37	24	43,63	55	100

DISCUSSION

1. The correlation between age and the occurrence of osteoarthritis in elderly people in Bandarjo Village, Semarang Regency.

From the data analysis obtained that the factors affect or related to the occurrence of osteoarthritis. From 35 elderly people aged between 60-74, it was found that 20 people (36.36%) of the elderly experienced Osteoarthritis. After statistical testing, a P-value of 0.000 was obtained ($p < 0.05$). This means that there is a significant correlation between age factors and the occurrence of osteoarthritis in the elderly in Bandarjo Village, Semarang Regency. Increasing age is related with the appearance of osteoarthritis due to degenerative processes. Age is one of the main factors occurrence of osteoarthritis with incidence rates which increases progressively as a person ages (Departemen Kesehatan RI, 2013). Besides that increasing age causes the thinning of articular cartilage and strength decreasing of muscles that maintain stability from the knee. Radiography image that related to osteoarthritis cases found narrowing of the joint space that appears as a result of damaged or disappearance of articular cartilage. The damages occurs in the patient's articular cartilage osteoarthritis is based on several mechanism, one of the most important imbalance between synthesis and matrix degradation (Dieppe P, 2018).

This research is in line with the research that conducted by Claudia, 2020 at Sanglah General Hospital, Denpasar. It says that osteoarthritis patient were dominated by patients with aged range 60–69 years.(Claudia G, Saturti TI., 2020). It's also in line with research that has been conducted by Dhaifullah in 2022 where the age group 55- 64 years old constitute the majority of research sample (46.2%). (Dhaifullah, M, 2020). Beside that this study also in line with research result performed by Agrasan Duha in 2019 where the majority of patients are at aged 51-60 years as many as 24 people (72.7%)(Duha, 2019).

This occurs due to the loss of the ability of tissues and cells in the body to maintain homeostasis with age, especially when under pressure. These changes can result in a narrowing of the joint space and small osteophytes. In addition, there can be decreased muscle strength, loss of proprioception, degenerative changes in the menisci and joint ligaments, and calcification of joint tissue. So that all of the above can accelerate and worsen the occurrence of osteoarthritis. The results of this study indicate that the older the age, the greater the risk of osteoarthritis. The aging process is considered to be the cause of increased weakness around the joints, decreased joint flexibility, cartilage calcification and decreased chondrocyte function, all of which support the occurrence of osteoarthritis. The prevalence and severity of osteoarthritis increase with age.(Rezha Wahyu Nugraha, 2023)

2. The correlation between gender type and the occurrence of osteoarthritis in the elderly in Bandarjo Village, Semarang Regency.

From the data, it was found that the results of the analysis of gender type factors that affected to the occurrence of osteoarthritis from 35 elderly women were obtained as many as 23 people (41.82%) elderly who experienced Osteoarthritis. After statistical testing, a P-Value of 0.033 was obtained ($p < 0.05$). This means that there is a significant relationship between gender factors and the occurrence of osteoarthritis in the elderly in Bandarjo Village, Semarang Regency. The result of this study is in line to the research result that has been done by Reza Wahyu in 2023. The research found that the frequency based on the gender type of the respondent who were patients at Abdul Moeloek Hospital, Lampung Province, was mostly female with a total of 30 people with a percentage of 66.7 % and the male gender was obtained as many as 15 people with a percentage of 33.3%. The study is also in line with the study conducted by (Claudia, 2020) at Sanglah General Hospital, Denpasar. The same research results were also found in this study, the percentage of female that experienced the osteoarthritis reached 70.4%. The study is in line with the study conducted by Dhaifullah in 2022 where the number of female samples had a higher percentage compared to men (76.9%) (Dhaifullah, 2022). The research is in line with the research conducted by Agrasan Duha in 2019 where the majority of patients were female, 26 people (78.8%), and 7 male patients (21.2%) (Duha, 2019).

Women are very susceptible to osteoarthritis because women experience the menopause process. The occurrence of osteoarthritis and the occurrence of menopause in women have significant correlations because they are related to the presence of the hormone estrogen which plays a role in the onset of osteoarthritis symptoms in menopausal women. Women experience decreased estrogen levels after menopause, where estrogen has a protective effect on bones through a paracrine mechanism involving osteoclast cell activity by inhibiting osteoclast function. Menopause has a significant role in the onset and progression of osteoarthritis.(Ad'dhien Surya, 2023).

3. The correlations between occupation and the occurrence of osteoarthritis in the elderly people in Bandarjo Village, West Ungaran District, Semarang Regency.

From the results of the analysis of work factors that affect the occurrence of osteoarthritis from 33 elderly people who work as housewives and retirees, it was found that 23 people (41.82%) elderly people experienced Osteoarthritis.

After statistical testing, a P-value of 0.001 ($p < 0.05$) was obtained, this indicates that there is a significant relationship between work and the occurrence of osteoarthritis. It can be concluded that work has a significant effect on the occurrence of osteoarthritis. This category includes several types of work, one of which is housewives. Although included in the moderate category, housewives in their daily lives also do a lot of physical activities related to an increased risk of osteoarthritis such as squatting, climbing stairs, lifting weights, and other activities. This correlation is based on a biomechanical mechanism, one of which is excessive and repeated use of joints at work can cause non-physiological stress on the structure of the knee joint (Atik Swandar, 2022).

4. The correlations between body weight and the occurrence of osteoarthritis in the elderly in Bandarjo Village, Semarang Regency.

The analysis of body weight factors that influence the occurrence of osteoarthritis from 23 obese elderly people showed that 18 elderly people (32.73%) experienced osteoarthritis. After carrying out statistical tests, the P-value value was 0.009 ($p < 0.05$), this shows that there is a significant relationship between body mass index and the occurrence of osteoarthritis. This is because elderly people who are overweight will cause their joints to have to work harder. For this reason, every elderly person needs a balanced nutritional intake so that the elderly can maintain their weight.

Excess body weight is associated with an increased risk of developing osteoarthritis in both women and men. In people who are obese, their body weight will be placed on them more and this will result in an increased load on the knee joints when walking. The Chingford study showed that for every increase in Body Mass Index (BMI) of 2 units (approximately 5 kg of body weight), the odds ratio for suffering from radiographic knee osteoarthritis increased by 1.36 points. The study concluded that the heavier the body, the greater the risk of suffering from knee osteoarthritis. Losing 5 kg of body weight will reduce the risk of symptomatic knee osteoarthritis in women by 50%. (Ra'ida A, 2022).

Therapy for osteoarthritis sufferers with obesity using weight loss is no less important than other non-pharmacological therapies. This is very important to reduce the burden on joints affected by osteoarthritis and increase the patient's agility when moving. In obese patients, weight loss can prevent the risk of osteoarthritis, the weight loss program must be included in the exercise program for osteoarthritis with obesity, namely walking at a moderate pace, cycling and exercising in water. (Gordon, 2019)

CONCLUSION AND SUGGESTION

Based on the results of the study conducted Bandarjo village, Semarang Regency, it can be concluded. it was found that most (63,63%) of the elderly were elderly age (60-74 years), more than half (63,64%) of the elderly were female, most of the elderly (41,82%) had an obesity, more than half (60%) of the elderly work as a housewives. There was a significant relationship between age and the incidence of osteoarthritis in the elderly with a p-value of 0.036. There was a significant relationship between gender and the incidence of osteoarthritis in the elderly with a p-value of 0.033. There is a significant correlation between body weight and the incidence of osteoarthritis in the elderly with a p-value = 0.009. and also there is a significant correlation between occupation and the incidence of osteoarthritis with p value 0,001.

For elderly people are advised to exercise while paying attention to the risk of fractures and balance problems and for health workers who work in the Bandarjo Village area, West Ungaran District, Semarang Regency, they can provide information and educational counseling about osteoarthritis to elderly people and their families, to be aware of the symptoms that arise due to osteoarthritis and prevent osteoarthritis from occurring.

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