The Correlation between Age and Body Mass Index and the Incidence of Osteoarthritis in the Elderly at Outpatient Unit of PKU Muhammadiyah Sekapuk Hospital

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Abstract

Aging is often considered as a factor in the occurrence of osteoarthritis because of weakness increased around the joints, cartilage calcification, joint flexibility and chondrocyte function decreased. Osteoarthritis can also be caused by obesity or overweight that occurs in a person with excessive or abnormal amount fat which can be detrimental to health. The aim of this study is to analyze the correlation between ages also BMI and the incidence of knee osteoarthritis disease in the elderly at the outpatient unit of PKU Muhammadiyah Sekapuk Hospital.The design was used cross sectional approach, sampling using random sampling method and the number of samples as many as 31 respondents. The analysis used the Chi Square Test with a significant value of < 0.05. The results showed that p-value was 0.025 in the correlation between age and the incidence of osteoarthritis also p-value was 0.023 in the correlation between BMI and the incidence of osteoarthritis which means that there was correlation between age and body mass index and the incidence of osteoarthritis in the elderly at outpatient unit of PKU Muhammadiyah Sekapuk Hospital.

Keywords: Aging; Body Mass Index; Osteoarthritis

1.Introduction (Capitalized first letter, Times New Romans, Bold, 10 pt)

Elderly as the final stage of development in human life, it can be said the golden age, because not everyone can reach that age, in order to elderly people need nursing actions, both promotive and preventive (Maryam et al., 2011). According to Kusumo Putro in Siti Partini (2011), the process of aging is a natural process which is accompanied by physical, psychological and social decline that interact each other. It means, physical decline affects psychological and social, while psychological decline affects physical and social and vice versa.

Osteoarthritis is a degenerative joint disease due to biochemical breakdown of the articular (hialine) cartilage in the synovial joints of the knee that made the damage of joint cartilage. This disorder develops slowly, is asymmetrical and non-inflammatory, characterized by degeneration of joint cartilage and the formation of new bone (osteophytes) at the edges of the joints (Marlina, 2015). Osteoarthritis is also estimated to be the fourth leading cause of disability worldwide.

The incidence of osteoarthritis in the world is quite high. In radiographic studies in America and Europe, people aged 45 years and over found a prevalence of knee osteoarthritis of 22.8% in women and 14% in men. In Indonesia, osteoarthritis affects at least 10% of men and 18% of women aged over 60 years (Glyn-Jones et al., 2015). Based on existing data in the outpatient unit of PKU Muhammadiyah Sekapuk Hospital, the number of people who experience osteoarthritis between the ages of 49-60 years is quite high and is always included in the top 10 most diagnoses. From January to October 2021 there were 1,509 cases of patients experiencing osteoarthritis out of 15,888 elderly patients.

Osteoarthritis prevalence in men and women is the same until the age of 50 years, but after the age of 50 years (post-menopause), osteoarthritis is often found in women. Some sources associate that there are hormonal changes during menopause, such as the hormone estrogen. Estrogen itself has a direct effect on joint tissue which results in the presence of estrogen receptors in human cartilage chondrocyte cells (Maharani, 2017). In general, factors that can cause knee osteoarthritis include age, obesity, gender, metabolic disease, physical activity, etc. One of the strongest risk factors for osteoarthritis is obesity. Obesity is a worldwide problem, and potentialy to increase from year to year. The World Health Organization (WHO), revealed that worldwide obesity rates have doubled since 1980. Then in 2008 more than 200 million men and nearly 300 million women worldwide suffer from obesity (WHO, 2014). Indonesia itself has a prevalence of 19.1%.

Body Mass Index (BMI) is a tool and a simple way to monitor the nutritional status of adults, especially with regard to underweight and overweight (Supariasa, 2013). The use of BMI only applies to adults aged 18 years and over with a classification underweight, normal, overweight and obesity. The study at Chingford showed that for every 2 unit

increase in body mass index (BMI) (approximately 5 kg body weight), the radiographic odds ratio for patients with knee osteoarthritis increased. The study concluded that the heavier the body weight, the greater the risk of developing knee osteoarthritis (Annas, 2015). Based on the above background, the researcher intends to conduct research on the risk of osteoarthritis in the elderly entitled "The Correlation between Age also Body Mass Index and the Occurrence of Osteoarthritis in the Elderly at the Outpatient Unit of PKU Muhammadiyah Sekapuk Hospital".

2.Method

2.1. Study Design and Sampling

The design was used analytic methode with cross sectional approach. The population of all patients with complaining of pain in the knee at Neurology polyclinic, outpatient unit of PKU Muhammadiyah Sekapuk Hospital were 34 respondents. The sample size were 31 respondents. The sampling was simple random sampling.

2.2. Instruments and Data Collection

The research instrument in this study used weight scale, microtoys, observation sheets and questionnaire.

2.3. Data Analysis

Data on weight and height and symptoms felt by respondents were collected on the observation sheet and then BMI was calculated to determine the classification of respondents. The collected data were then analyzed using the Chi Square test with a significant value of < 0.05.

3. Findings and Discussion

3.1.1 The age of elderly at outpatient unit of PKU Muhammadiyah Sekapuk Hospital

Table 1. Characteristics of Respondents Based on Age Criteria

Age Criteria	E	%
60 – 74 year	435	27.9
75 – 90 year	134	8.6
Over 90 year	5	0.3
Total	574	36.8

Table 1 shows that the majority of respondents were 60-74 years old with 51.6%, 25.8% respondents were 75-90 years with and 22.6% respondents over 90 years.

Aging is a process in which a person experiences a decrease in organ function. the process of aging is a natural process which is accompanied by physical, psychological and social decline that interact each other. It means, physical decline affects psychological and social, while psychological decline affects physical and social and vice versa (Kusumo Putro in Siti Pariani, 2011). The emergence of problems in the body caused by several disorders in the musculoscletal, cardiovascular, and neurophsychiatry results in the elderly being isolated due to disabilities from various diseases such as dementia, stroke, osteoarthritis, and various other degenerative diseases (Anies, 2018).

The aging process is considered to be one of the causes of increased laxity around the joints, decreased joint flexibility, calcification of cartilage and reduced chondrocytic function, all of which contribute to the occurrence of osteoarthritis. Osteoarthritis (OA), the most prevalent chronic joint disease, increases in prevalence with age, and affects majority of individuals over the age of 65 and is a leading musculoskeletal cause of impaired mobility in the elderly (Bingjiang Xia, 2014). The Framingham Study showed that individuals aged 63-70 years had radiographic evidence of knee osteoarthritis in 27%, which increased to 40% at age 80 years and older. Another study proves that a person's risk of experiencing symptoms of knee osteoarthritis starts at the age of 50 years. Studies on flexibility in osteoarthritis, have explained that a decrease in knee osteoarthritis flexibility was found in elderly patients.

3.1.2 The Body Mass Index (BMI) of elderly at outpatient unit of PKU Muhammadiyah Sekapuk Hospital

Table 2. Characteristics of Respondents Based on BMI

BMI Criteria	E	%
Underweight	12	38,7
Normal	8	25,8
Overweight	8	25,8
Obesity	3	9,7
Total	31	100

Table 2 shows that the majority of respondents with body mass index (BMI) criteria underweight (38.7%), 25.8% respondents at Normal criteria, 25,8% respondents at overweight criteria and 9,7% respondents at obesity criteria.

The use of BMI as an indicator of overweight is based on extensive research linking BMI with associated health risks. BMI is calculated by dividing the patient's weight in kilograms is divided by height in meters, squared. According to the guidelines, overweight is a BMI of 25-29.9 while obesity is a BMI of 30 or greater. (A BMI of 30 is about 30 lbs overweight). It is recommended that BMI be calculated in all adults to assess overweight and those who are normal weight should be reassessed every 2 years.

An increase in body mass index creates a bad condition for the body such as fatigue, various diseases, especially osteoarthritis. Obesity is defined as abnormal or excessive fat accumulation that has the opportunity to pose several health risks to an individual. In other words, obesity is a condition in which body fat has accumulated which can have an adverse effect on health (Nurmalina, 2011). Obesity is a risk factor for osteoarthritis and being overweight is a clear risk factor for developing osteoarthritis. Data from the first National Health and Nutrition Examination Survey (HANES I) indicated that obese women had nearly 4 times the risk of knee OA as compared with non-obese women; for obese men, the risk was nearly 5 times greater. The study in Chingford showed that for every 2 unit increase in body mass index (approximately 5 kg body weight), the radiographic odds ratio for patients with knee osteoarthritis increased. The study concluded that the heavier the body weight, the greater the risk of developing knee osteoarthritis (Annas, 2015).

Recent prospective studies demonstrate obesity as a primary risk factor for incident knee osteoarthritis. The potential mechanisms to link obesity and knee osteoarthritis, as both a biomechanical and metabolic condition are strongly linked. It has been established that weight loss for obese patients with knee osteoarthritis is clinically beneficial, for pain reduction, and for improved function (Lee R, 2012). Obesity is a modifiable risk factor. Being overweight significantly adds to the load on the knee, especially when it is used for active mobilization. Excessive load on the knee in the long term as we age will increase the risk of osteoarthritis of the knee so it becomes important to control body weight. Weight control will be directly proportional to the health benefits obtained.

3.1.3 Osteoarthritis incidence of elderly at outpatient unit of PKU Muhammadiyah Sekapuk Hospital

Table 3. Characteristics of Respondents Based on Osteoarthritis Incidence

Osteoarthritis Incidence	E	%
Occured	22	71
Not Occured	9	29
Total	31	100

Table 3 shows that the majority of respondents suffer from osteoarthritis (71%) and 29% respondents not have osteoarthritis.

Osteoarthritis is a degenerative disease of the joints due to biochemical breakdown of the articular (hialine) cartilage in the synovial joints of the knee so that the joint cartilage is damaged. Primary osteoarthritis is also known as idiopathic osteoarthritis, which means that the cause of primary osteoarthritis is not known with certainty and has nothing to do with systemic disease, inflammation or local changes in the joints. This disorder develops slowly, is asymmetrical and non-inflammatory, characterized by degeneration of joint cartilage and the formation of new bone (osteophytes) at the edges of the joints. The increase in global lifespan increased the prevalence of osteoarthritis which is now the most common type of arthritis (Sachitaran, PK, 2019). Signs and symptoms according to The American College of Rheumatology (1986) a person is positive for idiopathic knee osteoarthritis if at least 3 of the 6 following criteria was found: Age > 50 Year, Morning stiffness < 30 minutes, Crepitus and Tenderness.

Osteoarthritis is a chronic disease that develop slowly. Prevention can be done to prevent osteoarthritis such as controlling symptoms such as pain, stiffness and swelling, increasing joint mobility and flexibility, maintaining body weight so that you are not overweight, doing sufficient amounts of activity. The first treatment that needs to be done is to provide non-pharmacological therapy in the form of complete education about the disease, then provide pharmacological therapy which aims to reduce the pain, namely by providing analgesics and then proceed with physiotherapy.

3.1.3 The Correlation between Age and Body Mass Index and the Incidence of Osteoarthritis in the Elderly at Outpatient Unit of PKU Muhammadiyah Sekapuk Hospital

The results showed that p-value was 0.025 in the correlation between age and the incidence of osteoarthritis also p-value was 0.023 in the correlation between BMI and the incidence of osteoarthritis which means that there was correlation between age and body mass index and the incidence of osteoarthritis in the elderly at outpatient unit of PKU Muhammadiyah Sekapuk Hospital.

The nature of body weight is a very unstable anthropometric parameter. Under normal circumstances, where the state of health is good and the balance between consumption and nutritional needs is guaranteed, body weight develops with

age. On the other hand, in abnormal circumstances, there are two possibilities for body weight development, which can develop sooner or later than normal. Body weight must always be monitored in order to provide information that allows preventive nutritional interventions as early as possible to overcome unwanted trends in weight loss or gain. Weight should always be evaluated in the context of a weight history which includes both lifestyle and recent weight status. Weight determination is done by weighing (Anggraeni, 2012).

Fat distribution can increase the risk that will be associated with various degenerative diseases. Obesity is a state of imbalance between incoming energy and outgoing energy in the long term. The large amount of energy consumption from digested food is not balanced with the energy used for metabolism and also for carrying out daily activities. This excess energy will be stored in the form of fat and adipose tissue so that it will result in weight gain (Arovah, 2012).

Arthritis is a joint disease that many complain about. One form of arthritis found in the knee joint is osteoarthritis. Osteoarthritis itself is a disorder that exists in the knee joint, which means that it experiences a change or reduction in joint cartilage, so that bony protrusions form on the joint surface (osteophytes).

An unhealthy lifestyle will cause various kinds of diseases occured. Lack of nutrition can cause a lack of body weight so that the metabolism in the body will not be perfect, causing an imbalance between the input nutrients and the energy expended and vice versa. Elderly is a time when a person experiences a decrease in organ function, one of which is osteoarthritis. This incident causes a person to have joint movement disorders that give pain. The older a person, the older the organs of the human body. Therefore it is important for a person to maintain body fitness so that various diseases do not occur, especially osteoarthritis.

4. Conclusion

The majority of patients in the neurology polyclinic at outpatient unit of PKU Muhammadiyah Sekapuk Hospital were 60-74 years old, with an overweight and obesity body mass index (BMI). The result of the study shows that there was correlation between age and body mass index and the incidence of osteoarthritis in the elderly at outpatient unit of PKU Muhammadiyah Sekapuk Hospital.

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