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The Relationship Between Job Type and the Incidence of Osteoarthritis at the Unaaha Community Health Center

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ABSTRACT

Osteoarthritis (OA) is a degenerative joint disease characterized by damage to joint cartilage. Osteoarthritis can be influenced by several factors, namely systemic factors (age, sex, and heredity), intrinsic factors (anatomical abnormalities and injuries), and extrinsic factors (obesity, joint overuse, and occupation). This study aims to determine the relationship between job type and the incidence of osteoarthritis at the Unaaha Community Health Center. This study uses an analytical observational method with a cross-sectional approach. This research was conducted in the Konawe Regency area, specifically at the Unaaha Community Health Center. The sample in the study consisted of 68 respondents obtained using the purposive sampling technique. Data were obtained through medical records and then analyzed using the chi-square test and were considered statistically significant if $p < 0.05$. The results of the bivariate analysis examining the relationship between job type and the incidence of osteoarthritis at the Unaaha Community Health Center yielded a value of $p = 0.034$, which is less than α (0.05); thus, it can be stated that there is a statistically significant relationship between job type and the incidence of osteoarthritis. The conclusion of this study is that there is a significant relationship between job type and the incidence of osteoarthritis at the Unaaha Community Health Center.

INTRODUCTION

Joints, also called articulations or arthrons, are the connections between two or more bones that allow movement to occur (Marder, 2026; von Kaeppler, 2022). In a joint, movement can be limited (little) or free (extensive). The joints of the human body can be divided into two groups, namely fixed connections and movable joints (Tangkudung J, 2016). Based on several studies that have been conducted, joints can be affected by certain diseases, such as osteoarthritis (OA), which is a degenerative joint disease related to articular cartilage damage (Alfarisi R, 2018).

Osteoarthritis (OA) is a chronic degenerative joint disease characterized by damage to articular cartilage, subchondral bone remodeling, osteophyte formation, and mild inflammation of the synovial tissue, causing pain, joint stiffness, and limited range of motion (Andraskar, 2024; Puntillo et al., 2024; Semenistaja et al., 2023; ur Rehman et al., 2024; Yao et al., 2023). OA is currently one of the leading causes of musculoskeletal disability in the world. Global data show that in 2019 there were approximately 528 million people living with osteoarthritis, and this number continues to increase as life expectancy rises and lifestyles change across the world's population (WHO, 2023).

Epidemiologically, the burden of osteoarthritis is projected to continue increasing through 2050. The latest Global Burden of Disease study reports a significant increase in the prevalence and incidence of OA over the last three decades, especially in the knee and hip joints (Ackerman et al., 2023; Fu et al., 2022; Ouyang & Dai, 2025; Ren et al., 2025; Steinmetz et al., 2023). This

increase is influenced by population aging, obesity, and exposure to chronic mechanical loads on the joints (GBD 2021 Osteoarthritis Collaborators, 2023).

In the Southeast Asian region, including Indonesia, the trend of increasing OA cases follows the same pattern. A data-driven analysis of the Global Burden of Disease indicates that the number of osteoarthritis cases in Indonesia has more than doubled from 1990 to 2019, with the largest contribution coming from knee OA. This increase has major implications for health financing costs and the productivity of working-age people (Butarbutar et al., 2024).

Clinically, osteoarthritis is more commonly found in individuals over 40 years of age and increases sharply in older age groups. However, in recent years there has been a tendency toward increased cases in the working-age group with long-term exposure to strenuous physical activity. This suggests that in addition to age, environmental and occupational factors play an important role in the pathogenesis of OA (Hunter & Bierma-Zeinstra, 2023).

Occupations involving high mechanical load exposure, such as heavy lifting, prolonged standing, long-distance walking, squatting, kneeling, and repetitive joint movements, have been shown to increase the risk of osteoarthritis, especially in the knee and hip joints. Chronic mechanical stress can accelerate cartilage degradation and trigger degenerative changes in joints (Jahn et al., 2024).

Several previous studies have examined the relationship between occupational factors and the incidence of osteoarthritis in various populations. A meta-analysis by McWilliams et al. (2011) involving 16 studies with more than 60,000 respondents found that occupational activities such as kneeling (OR 1.7), squatting (OR 1.9), and heavy lifting (OR 1.6) were significantly associated with an increased risk of knee osteoarthritis, with occupational biomechanical factors contributing to approximately 60% of the risk in certain job groups. A large-scale study based on the UK Biobank involving more than 280,000 respondents conducted by Hashmi et al. (2025) showed that individuals engaged in heavy physical work have a significantly higher risk of developing osteoarthritis compared to administrative or sedentary workers, with hazard ratios ranging from 1.3 to 1.8 after controlling for age, body mass index, and sex. A recent meta-analysis by D'Souza et al. (2022) examining occupational exposure and knee OA synthesized evidence from 35 observational studies and confirmed that activities such as kneeling, squatting, lifting, and prolonged standing were strongly associated with increased odds of knee OA, confirming that the biomechanical characteristics of work are important determinants in the development of degenerative joint disease. A systematic review and meta-analysis of occupational mechanical exposures and hip osteoarthritis by Jahn et al. (2024) further confirmed that long-term exposure to heavy lifting and standing activities increased the risk of hip OA by 40–60%, emphasizing the importance of cumulative exposure assessment in understanding the relationship between work and OA.

In the Indonesian context, research conducted by Dhaifullah et al. (2023) at a referral hospital in Bali showed a significant relationship between occupational type and the severity of knee osteoarthritis based on the Kellgren-Lawrence radiographic grading scale, where jobs with high physical loads such as those of farmers and laborers showed a tendency toward more severe OA compared to sedentary jobs such as those of civil servants and office employees. Johan (2019) in a study at Puskesmas Gamping 1, Yogyakarta, found that housewives had a high risk of developing osteoarthritis due to daily activities involving repetitive joint movements such as washing clothes, sweeping, mopping, and cooking, with a work duration of

more than 5 hours per day significantly associated with osteoarthritis complaints. Another study by Azizah (2019) at Dr. Soebandi Hospital, Jember, analyzed risk factors for knee osteoarthritis and found that occupational type was one of the dominant factors after age and body mass index, with respondents working as farmers having a 3.2 times higher risk of developing knee OA compared to office workers. These studies consistently demonstrate that occupational physical activity, particularly involving repetitive joint movements and heavy loads, is a significant risk factor for the development and severity of osteoarthritis across different populations and settings.

Although various studies have addressed the link between occupational factors and osteoarthritis, most were conducted in referral hospitals or based on national secondary data. Research at the primary health service level, such as in community health centers, is still relatively limited, even though these facilities are first-line health care providers that handle most OA cases in the community (Ministry of Health of the Republic of Indonesia, 2023).

The Unaaha Health Center, as a first-level health service facility in Konawe Regency, serves a population engaged in a variety of occupations such as farming, manual labor, trading, and other informal sector work, which may result in varying degrees of biomechanical joint exposure. Therefore, research on the relationship between occupational type and the incidence of osteoarthritis at the Unaaha Health Center is important for generating local data that can serve as a basis for planning occupational risk-based promotive, preventive, and early detection programs (WHO, 2023; Hashmi et al., 2025).

Based on data from 2019 at the Unaaha Health Center, joint and connective tissue diseases are among the ten most prevalent diseases at this facility, ranking third. Diseases in this category include osteoarthritis and rheumatoid arthritis. This study aims to determine whether occupational type is associated with the incidence of osteoarthritis at the Unaaha Health Center, with the general objective of examining this relationship and specific objectives including describing the distribution of occupational types, describing the incidence of osteoarthritis, and analyzing the association between them. This research is expected to provide several benefits. For patients and the community, the results of this study can increase awareness of the risk of osteoarthritis based on occupational type, so that preventive measures can be taken early. For the Unaaha Health Center, this research can serve as a basis for developing occupational health programs and early detection of osteoarthritis in at-risk worker groups. For future researchers, this study can serve as preliminary data and a reference for conducting more in-depth research incorporating additional variables such as duration of work, work posture, or other risk factors for osteoarthritis.

RESEARCH METHODS

This study used an observational analytical design with a cross-sectional approach, in which the independent variables (risk factors) and dependent variables (effects) were measured simultaneously. Each subject was observed only once, and risk factors and effects were measured according to the subject's circumstances or status at the time of observation (Irmawartini, 2017).

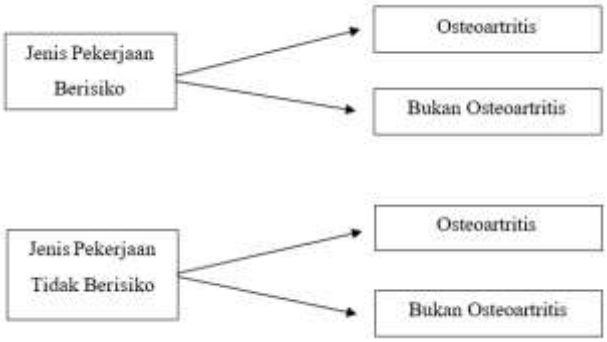

Figure 3. Basic Outline of Cross Sectional Studies
Source: Adapted from Irmawartini & Nurhaedah (2017)

This research was conducted from December 2020 to January 2021 at the Unaaha Health Center in Unaaha District, Konawe Regency.

The population consisted of all patients who visited the Unaaha Health Center during January–December 2019, while the sample comprised patients who had been diagnosed with osteoarthritis by physicians at the Unaaha Health Center. Sampling was conducted using purposive sampling, with a total of 68 samples. The inclusion criteria included residents of Unaaha District aged 15–75 years without anatomical structural abnormalities, injuries, or obesity. The exclusion criteria included individuals residing outside Unaaha District, those under 15 or over 75 years of age, and patients with anatomical structural abnormalities, injuries, or obesity.

Data were analyzed using two approaches. Univariate analysis was performed to describe the frequency distribution of respondents across the variables studied, including age, sex, education level, and occupation. Bivariate analysis was then conducted to examine the relationship between the independent and dependent variables using the chi-square test with Fisher's exact test as an alternative, processed through SPSS for Windows.

The formula for the chi square test according to Ardiana (2017) is as follows:

$$X^2 = \sum_{i=1}^{k} \frac{(fo-fh)2}{fh}$$

Description:

X2 = Chi Square

F0 = Frequency observed

Fh = Frequency expected Interpretation:

a. If p > 0.05 then Ho is accepted and Ha is rejected so there is no meaningful relationship.
b. If the p value ≤ 0.05 then Ho is rejected and Ha is accepted, so there is a meaningful relationship.

RESULTS AND DISCUSSION

1. Univariate Analysis

Univariate analysis is used to describe dependent variables and independent variables to obtain a characteristic picture. The data characteristics of the variables studied were age, type of person, education and occupation. An overview of the characteristics of respondents at the Unaaha Health Center can be seen in table 1.

Table 1. Overview of the characteristics of the study respondents

Sample Characteristics			Osteoarthritis	
		n	No (n)	**Yes (n)**
Age	25 – 34 Years	6	1	**5**
	35 – 44 Years	10	4	**6**
	44 – 54 Years	23	5	**18**
	55 – 64 Years Old	20	7	**13**
	65 – 75 Years Old	9	1	**8**
Gender	Women	23	4	**19**
	Male	45	14	**31**
Education	No School	18	3	**15**
	SD	7	1	**6**
	Junior High School	6	2	**4**
	High School/High School	20	3	**17**
	Diploma	3	2	**1**
	Bachelor	14	7	**7**
Jobs	PNS	16	10	**6**
	Guru	2	0	**2**
	IRT	14	1	**13**
	Farmer	17	3	**14**
	Labor	7	1	**6**
	Merchant	2	1	**1**
	Self-employed	4	2	**2**
Not working/retiring		**6**	**0**	**6**

(Source: Secondary Data, 2019

Age characteristic data was obtained that the highest age of the respondents, namely 45-54 years old, amounted to 23 respondents, of which 78.3% (18) of respondents suffered from osteoarthritis. In the age group of 25–34 years there were 6 respondents and those suffering from osteoarthritis amounted to 5 respondents (83.3%). The age group of 35 – 44 years amounted to 10 respondents and those suffering from osteoarthritis amounted to 6 respondents (60%). The age group of 55 – 64 years amounted to 20 respondents and as many as 65% (13) of respondents suffered from osteoarthritis. The age group of 65 – 75 years amounted to 9 respondents and 88.8% (8) of respondents suffered from osteoarthritis.

People with osteoarthritis are generally over 40 years old and the population will continue to grow with increasing age. According to the researchers' assumption, osteoarthritis is influenced by the age of the respondent where the older the respondent is, the more at risk of suffering from osteoarthritis. In old age, there is a decrease in body function and muscle function which can lead to osteoarthritis.

Characteristic data based on gender, most of the respondents were male with a total of 45 respondents with a prevalence of osteoarthritis of 68.9%. Then there were 23 female respondents with a prevalence of 82.6% who suffered from osteoarthritis.

Characteristic data based on education, it was found that respondents with elementary education had the highest prevalence of suffering from OA, which was 85.7%, then respondents with high school/high school education at 85%. Respondents with out-of-school education had

a prevalence of OA of 83.3%, then junior high school/junior high school education of 66.7%. Respondents with undergraduate education had a prevalence of OA of 50%, then respondents with diploma education of 33.3%. Based on the characteristic data that has been obtained, it is found that respondents who have low education are more likely to suffer from osteoarthritis.

According to the researcher's assumption, this can be caused by the level of knowledge of the respondents and also the ability to understand information, where a high level of education can improve intellect so as to increase a person's understanding of something, this may affect the information that the respondents have related to osteoarthritis, one of which is information or knowledge to prevent the occurrence of osteoarthritis.

Characteristic data based on the type of work, the results obtained by respondents with the most risky types of work are farmers and housewives, but the type of work that is most risky based on the results of the research obtained is the type of teacher work and not working/retiring where the prevalence of respondents who experience osteoarthritis is 100%. According to researchers, this can be influenced by age, gender and physical activities carried out in daily life which can increase the risk of osteoarthritis.

2. Analasis Bivariat

Bivariate analysis was used to find out if there was a relationship between the type of work and the incidence of osteoarthritis at the Unaaha Health Center. The data from the analysis can be seen in table 2.

Table 2. The Relationship between Occupational Type and Incidence of Osteoarthritis at Unaaha Health Center

Job Type	Osteoarthritis				Quantity		P
	No		Ya				
	n	%	n	%	n	%	
No Risk	12	41,4	17	58,6	29	100	**0,034**
Risky	6	15,4	33	84,6	39	100	
Total	**18**	**26,5**	**50**	**73,5**	**68**	**100**	

Source: Primary Data, 2020

From the results of the data in table 2, it is known that from 68 samples, 29 respondents were found who had a non-risky type of occupation, where 17 respondents of the type of occupation were not at risk of suffering from osteoarthritis and 12 respondents of the type of work were not at risk of not suffering from osteoarthritis. Then 39 respondents who had a type of risky occupation, where 33 respondents who had a type of work at risk of suffering from osteoarthritis and 6 respondents who had a type of risky occupation did not suffer from osteoarthritis.

The results of the statistical test obtained a significance value (p) or Sig.(2-tailed) of 0.034 because the value of Sig.(2-tailed) is less than 0.05, so it can be stated that there is a relationship between the type of work variable and the incidence of osteoarthritis.

In the research that has been carried out, eight groups of types of work were obtained, namely civil servants, teachers, IRTs, farmers, laborers, traders, self-employed and non-working/retired. Then the researcher grouped the types of risky jobs, namely farmers, housewives and laborers, then the types of non-risky jobs, namely civil servants, teachers,

traders, self-employed and not working/retired. In accordance with observations through brief interviews with respondents, types of risky jobs such as farmers, housewives and laborers are types of work that can trigger joint damage that causes osteoarthritis. Then based on statistical tests, it was obtained that the significance value (p-value) or Sig.(2-tailed) was 0.034 because the value of Sig.(2-tailed) was smaller than 0.05, so it can be stated that there is a relationship between the type of work variable and the incidence of osteoarthritis.

The results of this study are in line with the research conducted by Mcwilliams (2011) obtained a p value of 0.0001 indicating that there is a meaningful relationship between the type of work and the incidence of osteoarthritis. In a study conducted by Mcwilliams, it was stated that some work activities can increase the risk of osteoarthritis.

According to Mcwilliams, the type of work can cause the occurrence of osteoarthritis due to biomechanical activities so that a person's type of work can increase the risk of osteoarthritis by as much as 60%. The biomechanical activities in question are kneeling for a long time, lifting/carrying things, squatting or other knee-bending activities and biomechanical activities in question are not such as vibrations from machines, working in uncomfortable positions, driving and walking. Mcwilliams said that while a person's job requires a long standing, it does not include risky type of work.

Then the research conducted by Johan (2019), also states that osteoarthritis can be caused by functional decline, where the functional decline of the joints can be caused by factors such as the type of work, length of work, work position and duration of work per day so that this can be a risk of osteoarthritis, when viewed in terms of the type of work according to Johan (2019) research, the type of work of housewives is a type of work that is risky, Because housewives in their daily lives are also diverse, ranging from washing clothes, sweeping the floor, mopping the floor, ironing, cooking, coupled with a history of having side jobs or side activities such as laundry, trading, and farming. So that these activities can trigger the occurrence of osteoarthritis.

Based on the results of the research that has been conducted, it can be said that the riskiest types of jobs are respondents who work as teachers with a prevalence of 100% and respondents who do not work/retire with a prevalence of 100%. This is because all respondents who are teachers and do not work/retire all suffer from osteoarthritis.

The results of this study show that there are several findings that seem to contradict the results of observations through brief interviews with respondents, especially in the group of teachers and non-working/retirees. Based on interviews, respondents with teachers' work stated that the work activities carried out were not strenuous, did not involve squatting or kneeling for more than one hour per day, did not lift heavy weights, and did not walk long distances regularly. Therefore, the type of teacher work and non-working/retirement were initially categorized as non-risky jobs. However, the incidence of osteoarthritis was still found in this group. These conditions suggest that the incidence of OA is not only influenced by physical workload factors, but also other factors such as age and gender (Hunter & Bierma-Zeinstra, 2023).

In the teacher group, all respondents were female and over 50 years old (52 and 54 years old). Recent literature states that women have a higher risk of developing osteoarthritis than men, especially after the age of 50. This is related to postmenopausal hormonal changes that play a role in joint cartilage metabolism (GBD 2021 Osteoarthritis Collaborators, 2023).

Women over the age of 50 have generally entered the perimenopause or menopausal phase, where there is a significant decrease in estrogen hormone levels. Estrogen has a

protective role against cartilage by aiding in the regulation of the synthesis of chondrocytes, proteoglycans, and collagen in the extracellular matrix of cartilage. Decreased estrogen leads to a reduction in the regenerative ability of the cartilage and increases the degradation process through the activity of proteolytic enzymes, thereby increasing the risk of osteoarthritis (Zhang et al., 2022; Hunter & Bierma-Zeinstra, 2023).

In addition to hormonal factors, old age is a strong determinant of the incidence of OA. The aging process causes physiological changes in the form of a decrease in the number and function of chondrocyte cells, reduced cartilage elasticity, decreased muscle mass (sarcopenia), and weakness of ligaments. Cartilage in old age becomes less responsive to mechanical stimulation so that the ability to repair damaged tissue decreases. This condition makes joints more susceptible to biomechanical stress even though exposure to workloads is not classified as severe (WHO, 2023).

In the non-working/retired group, the majority of respondents are over 60 years old and most are male. Although no longer working, it is possible that exposure to strenuous physical activity in previous periods of employment may contribute to joint damage that is cumulative in nature. Longitudinal research suggests that long-term exposure to heavy physical workloads can increase the risk of OA in old age, even after a person stops working (Jahn et al., 2024).

The housewife group (IRT) in this study showed a high proportion of OA incidence. Domestic activities such as lifting weights (moving furniture), carrying children, going up and down stairs, washing in a squat position, and other repetitive activities can put repetitive mechanical stress on the knee and hip joints. Recent epidemiological studies state that repetitive physical activity with repetitive knee flexion positions (kneeling and squatting) is significantly associated with an increased risk of knee OA (D'Souza et al., 2022).

The chronically occurring biomechanical load on the weight-bearing joints causes recurrent microtrauma to the cartilage, which in the long term accelerates the degenerative process. Household activities that are carried out almost every day without an adequate recovery period can increase cumulative stress on the joints. This explains the high proportion of OA in the group of housewives in this study (Hashmi et al., 2025).

Labor groups also show a high proportion of OA incidence. Based on interviews, labor respondents who work as construction workers stated that they often lift heavy weights every day. Continuous exposure to heavy lifting activities is known to increase compressive pressure on the knee and hip joints, thereby accelerating cartilage damage. A recent meta-analysis showed that work with heavy weight-lifting activities has a significant relationship with an increased risk of knee and hip OA (Jahn et al., 2024).

Repetitive heavy lifting activities can lead to increased joint reaction forces as well as excessive axial stress. In the long term, this condition gives rise to the degradation of the cartilage matrix and remodeling of subchondral bones, which are the main mechanisms of osteoarthritis pathogenesis (Hunter & Bierma-Zeinstra, 2023).

In the farmer group, work is classified as heavy because it involves hoeing, planting, harvesting, carrying crops, and working in a squatting or bending position for a long time. Recent global studies show that agricultural sector workers have a higher risk of developing OA due to chronic mechanical exposure and unergonomic working positions (GBD 2021 Osteoarthritis Collaborators, 2023).

Exposure to work from morning to evening, especially during the harvest season, increases the cumulative load on the joints. Mechanical stress that persists without ergonomic modifications or the use of assistive devices increases the risk of joint degeneration. Therefore, the farmer group is theoretically included in the group with a high risk of developing osteoarthritis (Jahn et al., 2024).

In contrast, the group of traders and self-employed in the study showed a relatively lower risk. Work activities that are not performed daily or do not involve heavy physical loads on a continuous basis cause biomechanical exposure to relatively lighter joints. Population studies show that sedentary or light-intensity work has a lower risk of OA than heavy manual work, after controlling for age factors and body mass index (Hashmi et al., 2025).

In self-employed respondents who act as entrepreneurs and are not directly involved in strenuous physical activity, the risk of OA is likely to be influenced more by age and comorbidity factors than by employment factors. This corroborates that the relationship between occupational type and osteoarthritis is multifactorial, influenced by the interaction between mechanical load, age, gender, body mass index, and other metabolic factors (WHO, 2023).

The limitation in this study is that the process of collecting respondent data using medical record data is highly dependent on the completeness of data from the local health center. Then the researcher made observations through brief interviews with respondents, where this interview was not conducive because some interviews were not conducted directly (via telephone) because respondents were doing other activities, and interviews were not conducted with all respondents because there were respondents who were not willing, did not have contact (phone number) of respondents and respondents who were working. Then data related to other risk factors were not obtained because this study only focused on the risk factors of the type of work.

CONCLUSION

This study concluded that there was a significant relationship between occupational type and the incidence of osteoarthritis at the Unaaha Health Center. Based on these findings, the public—particularly those with osteoarthritis—are encouraged to adopt a healthy lifestyle through balanced nutrition, regular exercise, weight management, and avoidance of joint injuries, while health facilities such as the Unaaha Health Center are advised to strengthen health promotion efforts through routine community counseling. Future research should consider exploring other potential risk factors, such as work duration and posture, using cross-sectional or alternative study designs to provide a more comprehensive understanding of the determinants of osteoarthritis in similar community health settings.

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