



FACTORS ASSOCIATED WITH MUSCULOSKELETAL DISORDERS OF SOPPENG DISTRICT POPULATION AND CIVIL REGISTRATION SERVICES

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ABSTRACT

Musculoskeletal disorders are problems that cause discomfort in striated muscles, joints and other soft tissues ranging from mild to severe complaints. According to WHO in 2021, around 1.71 billion people have Musculoskeletal Disorders (MSDs) worldwide. Musculoskeletal conditions are the leading cause of disability worldwide with low back pain being the leading cause of disability in 160 countries. This study aims to determine the association between sitting position, body mass index, and working period with musculoskeletal disorders. This research is an analytical research with a cross sectional study design. The population is all computer workers with a sample size of 45 respondents using total sampling. The measuring tools used are the Nordic Body Map (NBM) and the Rappid Office of Strain Assessment (ROSA). The statistical test used is the Fisher exact test. The results of the study showed that there was a association between sitting position ($p=0.033<0.05$), body mass index ($p=0.031<0.05$) and working period ($p=0.023<0.05$) with musculoskeletal disorders. The conclusion of the research is that there is a association between sitting position, body mass index and working period with musculoskeletal disorders of Soppeng Regency Population and Civil Registration Services employees.

Keywords: body mass index; musculoskeletal disorders; sitting position; working period

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INTRODUCTION

Disorders of the muscular and skeletal system are problems that cause discomfort in striated muscles, joints and other soft tissues ranging from mild to severe complaints. Disorders of the Muscular and Skeletal System or known as musculoskeletal disorders (MSDs) are health problems in the workplace. Musculoskeletal disorders (MSDs) complaints felt by workers are complaints about skeletal muscles such as the muscles of the neck, shoulders, arms, hands, fingers, back, waist and lower muscles that a person feels. Today's use of computers plays a big role in work. Many office workers spend 75% of their time sitting in front of a computer (Putri and Amalia, 2022). Around 1.71 billion people have Musculoskeletal Disorders (MSDs) worldwide. Musculoskeletal conditions are the leading cause of disability worldwide with low back pain being the leading cause of disability in 160 countries (WHO, 2021).

Data on work-related disease cases reported and managed as part of the BPJS Employment Work Accident Insurance (JKK) program in Indonesia is quite large and tends to be higher from year to year. Meanwhile, the number of workers experiencing work-related illnesses decreased from 4,007 cases in 2019 to 3,410 in 2020 and increased to 6,552 in 2021. (Kementerian Ketenagakerjaan RI, 2022). Based on data from Dinas Tenaga Kerja dan

Transmigrasi Sulawesi Selatan (2021) it can be seen that the number of musculoskeletal disorders cases increased each year in 2019 by 807 cases, in 2020 by 850 cases, and in 2021 by 870 cases. Based on data from BPJS Employment Soppeng Regency (2022), there were 154 complaints of musculoskeletal disorders in 2019, an increase of 264 cases in 2020, 282 cases in 2021, and 298 cases in 2022. Data from the Community Health Center in the working area of the Population and Civil Registration Service of Soppeng Regency, there were 37 cases of back and joint pain at the Salotungo Community Health Center, around 15 cases of back pain at the Malaka Community Health Center, and 29 cases of joint pain at the Sewo Community Health Center.

This disorder is rarely life-threatening, but can increase absenteeism thereby reducing work productivity, reducing quality of life, increasing financial burden and public health problems (Q.R. Salsabila & Wartono, 2020). There are several things that can influence the possibility of musculoskeletal disorders occurring in humans, one of which is individual factors that can increase the risk of musculoskeletal disorders such as work posture, age, gender, length of service, length of work, exercise habits, smoking habits and body mass index. Computer users or office workers often experience health problems related to musculoskeletal disorders (MSDs), which are health problems that can disrupt the function of muscles, tendons, nerves, blood vessels, bones and ligaments due to awkward postures that are not considered to have major consequences. This assumption occurs because they only work in the office using devices such as computer screens, keyboards, chairs and the like. (Sholeha *et al.*, 2022)

Based on the results of an initial survey through interviews with the Head of the Services Section at the Soppeng Regency Population and Civil Registration Service, almost everyone works using computers, especially service employees. The workplace implements an 8 hour work day with 5 work days a week with a total of 45 employees working in front of computers and there is no clinic available in the office so data regarding symptoms of musculoskeletal disorders is not yet available. Employees who work in front of a computer with an unnatural working attitude, repetitive activities and an unsafe work environment such as chairs that are not ergonomic or not easy to adjust, the body distance from the monitor is quite far and the head is too high which can cause pressure. If the lower back is quite heavy, the neck and shoulders feel stiff, typing activities can cause cramps and soreness of the fingers and wrists. The aim of this research is to determine the the association between sitting position, body mass index, and working period with musculoskeletal disorders of Soppeng Regency Population and Civil Registration Services employees.

METHOD

The type of research used is analytical observational with a Cross Sectional Study approach. The research location was at the Population and Civil Registration Service of Soppeng Regency on 05 July-10 August 2023. The population used in this research was 45 employees using personal computers with a sampling technique using total sampling, the sample in this study was all employees using personal computers computer. The method of data collection carried out by researchers was the variable disorders of the muscular and skeletal system. I gave a Nordic body map questionnaire for respondents to fill in. The validity test of the questionnaire is the value $r = 1.000 > r 0.388$ and the reliability test of the questionnaire is $0.894 > 0.6$. This shows that the questionnaire is valid and reliable. The variable body mass index I directly measured body weight and height using a microtoise and scales, then I observed the sitting position. workers while working at the computer by assessing using the Rapid Office Strain Assessment sheet. Data were analyzed using the Fisher exact test.

RESULTS

Table 1.
Distribution of Respondent Characteristics at the Soppeng Regency Population and Civil Registration Service

Respondent Characteristic	f	%
Age (Year)		
21-30	8	17,8
31-40	14	31,1
41-50	12	26,7
51-60	11	24,4
Sex		
Male	12	26,7
Female	33	73,3
Education		
SMA	6	13,3
D3	3	6,7
D4	2	4,4
S1	28	62,2
S2	6	13,3
Smoking Habit		
Yes	7	15,6
No	38	84,4
Exercise Habits		
Yes	19	42,2
No	26	57,8

Table 1 shows that the highest age is 31-40 years as many as 14 respondents (31.1%) and the lowest is 21-30 as many as 8 respondents (17.8%), the female gender is more than male, namely 33 respondents (73, 3%), the highest education was S1 as many as 28 respondents (62.2%) and the lowest was D4 as many as 2 respondents (4.4%), more respondents did not smoke as many as 38 respondents (84.4%), and more There were 26 respondents who did not exercise regularly (57.8%).

Table 2.
Distribution of Research Variables for Soppeng Regency Population and Civil Registration Service Employees

Research Variable	f	%
Musculoskeletal Disorders		
Risk	28	62,2
No risk	17	37,8
Sitting Position		
Moderate Risk	11	24,4
High Risk	34	75,6
Body Mass Index		
Normal	28	62,2
Abnormal	17	37,8
Working Period		
Long	29	64,4
New	16	35,6

Table 2 shows that of the 45 respondents who experienced the most disorders in the muscular and skeletal system compared to those who did not experience disorders, namely 28 respondents (62.2%), the high risk sitting position was more than the medium risk, namely 34 respondents (75.6%), Body mass index was more in the normal category than in the abnormal category as many as 28 respondents (62.2%) and the length of service was in the old category compared to the new category as many as 29 respondents (64.4%).

Table 3.
Association between Sitting Position and Musculoskeletal Disorders in Soppeng Regency Population and Civil Registration Service Employees

Sitting Position	Musculoskeletal Disorders				Amount		p-value
	Risk		No risk		f	%	
	f	%	f	%			
High Risk	18	52,9	16	47,1	34	100,0	0,000
Moderate Risk	10	90,9	1	9,1	11	100,0	

Table 3 shows that of the 11 respondents with a moderate risk sitting position there were more people at risk of experiencing musculoskeletal disorders compared to respondents who were not at risk, namely 10 respondents (90.0%), likewise of the 34 respondents with a high risk sitting position there were more There were 18 respondents (52.9%) at risk of experiencing musculoskeletal disorders. The Fisher Exact test results show a p value = 0.033 <0.05) which means there is a association between sitting position with musculoskeletal disorders.

Table 4
Association between Body Mass Index and Musculoskeletal Disorders in Soppeng Regency Population and Civil Registration Service Employees

Body Mass Index	Musculoskeletal Disorders				Amount		p-value
	Risk		No Risk		f	%	
	f	%	f	%			
Abnormal	7	41,2	10	58,8	17	100,0	0,000
Normal	21	75,0	7	25,0	28	100,0	

Table 4 shows that 28 respondents with a normal body mass index were more at risk of experiencing musculoskeletal disorders, namely 21 people (75.0%) compared to respondents who were not at risk, while more than 17 respondents with an abnormal body mass index were at risk. 10 people (58.8%) were not at risk of experiencing musculoskeletal disorders compared to those at risk. The Fisher Exact test results show a p value = 0.031 <0.05, which means there is a assosiation between body mass index with musculoskeletal disorders.

Tabel 5.
Association Working Period with Musculoskeletal Disorders in Soppeng Regency Population and Civil Registration Service Employees

Working Period	Musculoskeletal Disorders				Amount		p-value
	Risk		No Risk		f	%	
	f	%	f	%			
Long	22	75,9	7	24,1	29	100,0	0,008
New	6	37,5	10	62,5	16	100,0	

Table 5 shows that respondents with a long period of work are more at risk of experiencing musculoskeletal disorders than those who are not at risk, namely 22 people (75.9%) while there are more respondents with a new period of work who are not at risk, namely 10 people (62.5%). The results of the Fisher Exact test show a p value = 0.023 <0.05, which means there is a association between working period with musculoskeletal disorders.

DISCUSSION

Association between Sitting Period with Musculoskeletal Disorders.

Sitting position is a working position when doing work at work when using a computer. If the working system conditions are unsafe, workers will experience musculoskeletal complaints. Incorrect sitting position is often caused by the location of facilities that are not in accordance with anthropometry, thus affecting unnatural performance causing discomfort. The sitting

working position can put quite a lot of pressure on the lower back and cause lower back pain in workers. Likewise, sitting for too long can cause excessive stress on the lumbar vertebrae, causing pain in the lower back. Work postures that cause musculoskeletal problems are inappropriate sitting positions or work attitudes that are carried out continuously at regular times. Sitting for long periods of time increases the risk of experiencing musculoskeletal disorders due to sitting statically for hours to pursue targets every day. (Akbar *et al.*, 2021)

The results of the study showed that of the 11 respondents with a moderate risk sitting position, there were more people at risk of experiencing musculoskeletal disorders compared to respondents who were not at risk, namely 10 respondents (90.0%), likewise, of the 34 respondents with a high risk sitting position, there were more. There were 18 respondents (52.9%) at risk of experiencing musculoskeletal disorders. The Fisher Exact test results show a p value = 0.033 < 0.05) which means there is an association between sitting position with musculoskeletal disorders. This is in line with research conducted by (Aulia *et al.*, 2023), shows that the results of the chi square test analysis show that the p-value is 0.001 < 0.05, which means that H_0 is rejected, which means there is a significant relationship between work posture and musculoskeletal complaints in office employees at PT. X and is also in line with research conducted by (Claudya dkk., 2023) shows that there is a significant relationship between work posture and complaints of Musculoskeletal Disorders ($p=0.000 < 0.05$) meaning that the data is declared significant and H_1 is accepted, meaning that there is a relationship between work posture and complaints of Musculoskeletal Disorders in workers at CVX Kota Malang.

The results of measurements using ROSA showed that most were in the high category and were at risk. Working more than 4 hours per day in front of a computer or laptop without taking a break can trigger muscle complaints in workers. The availability of work facilities that are not ergonomic, with chairs that cannot be adjusted in height, there is no elbow support on the chair and the armrests are not adjusted to suit the worker's elbow position, so they cannot support the worker's entire arm, causing pain in the hands and shoulders. The backrest cannot be adjusted, so it cannot support the bones. The backrest cannot be adjusted, so it cannot support the spine properly. For monitor, keyboard and mouse users overall it is good. There are computer users who use their computer at an angle so that the neck forms a 30° angle and the monitor is too low or high so that the neck is susceptible to complaints in the neck muscles. Based on the results of this study, the researcher believes that workers have an awkward posture when sitting continuously for more than 1 hour in front of a computer and an unergonomic position can result in complaints that the neck is too upwards and the distance between the worker and the monitor is less than 40 cm, so there are complaints of stiffness in the upper neck and pain in the shoulders, wrists raised < 150 and the keyboard angle is too tilted which causes pain in the hands and wrists, as well as a backrest that is too upright which causes pain in the lower back. Working posture, in this case an inappropriate sitting position, will increase the risk because it requires maintaining muscle strength. If this condition is repeated for a long time, the risk of experiencing musculoskeletal disorders is eight times higher than workers who maintain an inappropriate sitting position for a short period of time. (Abdillahtulkhaer *et al.*, 2022)

Association between Body Mass Index with Musculoskeletal Disorders.

Body mass index is the result of calculating a person's weight and height. Body weight, height and body mass are factors that can cause musculoskeletal disorders. The relationship between body mass index and musculoskeletal disorders is that if a person's body mass index is abnormal, the person's risk of experiencing musculoskeletal disorders will increase. This is

because someone with an abnormal body mass index will try to support their body weight by contracting their back muscles. If this is done continuously it can cause pressure on the spinal cord. Even though the effect is small, Body Mass Index is a factor that can cause musculoskeletal disorders. The results of the study showed that 28 respondents with a normal body mass index were more at risk of experiencing disorders of the muscular and skeletal system, namely 21 people (75.0%) compared to respondents who were not at risk, while more than 17 respondents with an abnormal body mass index were at risk. There are 10 people (58.8%) who are not at risk of experiencing musculoskeletal disorders compared to those who are at risk. Fisher exact test results show a p value = 0.031 <0.05, which means there is a association between body mass index with musculoskeletal disorders. This is in line with research conducted by (Rahmawati, 2020) that was obtained (p=0.044). Thus, it can be concluded that there is a relationship between body mass index and musculoskeletal disorders, the more abnormal a person's body mass index is, the greater the risk of experiencing musculoskeletal disorders.

Based on the results of this study, researchers are of the opinion that workers who have an abnormal body mass index have a tendency to increase pressure on the musculoskeletal system which can result in fatigue and even injury in the form of disorders of the muscular and skeletal systems. This is because the body is unable to support the weight of the upper body working repeatedly in front of the computer, which can result in complaints in the lower back, pain in the buttocks, and pain in the buttocks. A person who has good nutritional conditions will also have good work capacity and body endurance. The fatter a person is, the greater the risk of experiencing disorders of the muscular and skeletal systems, causing mechanical stress on the body. According to Andriyono, in 2021 workers who have a BMI in the fat category are more at risk of experiencing musculoskeletal disorders. (Andriyono *et al.*, 2021)

Association between Working Period with Musculoskeletal Disorders

The working period is the length of time starting from the first time the worker comes to work until the time the research takes place. Working period has a strong relationship with muscle complaints and increases the risk of musculoskeletal disorders, especially for jobs that use high work forces. For workers who have worked for quite a long time and repetitive work will cause pressure on parts that experience continuous movement. Working period is a risk factor for the occurrence of musculoskeletal disorders because working period shows the worker's exposure to risk factors in the workplace. Workers who work > 5 years are more at risk of suffering from musculoskeletal disorders compared to workers with < 5 years working period, because of excess load on the musculoskeletal over a long period of time. can cause pain in certain parts of the body for a long time. The longer a person works in an unergonomic position, the more it will affect the muscles and bones, especially if it is done repeatedly every day. Conditions like this will cause repetitive injuries and will cause pain in the neck and shoulders. (Rachmat *et al.*, 2019)

The results of the study showed that respondents with a long period of work were more at risk of experiencing musculoskeletal disorders than those who were not at risk, namely 22 people (75.9%) while more respondents with a new period of work were not at risk, namely 10 people (62.5%). The results of the Fisher Exact test show a p value = 0.023 <0.05, which means there is a association between working period with musculoskeletal disorders. This is in line with research conducted by (Wildasari and Nurcahyo, 2023) that the significant value obtained was 0.009 (p-value <0.05), which means that there is a relationship between length of service and complaints of Musculoskeletal Disorders in workers at CV. Sada Wahyu

Bantul. It is known that the Odds Ratio (OR) = 7.333 (95% CI 1.815-29.630). which means that the risk of developing complaints of Musculoskeletal Disorders in workers with a long working period (≥ 5 years) is 7,333 times greater than workers with a medium working period (< 5 years). According to researchers, workers who have worked for more than 5 years are susceptible to disorders of the muscular and skeletal systems. This is because disorders of the muscular and skeletal systems do not appear spontaneously or immediately, but gradually until the human ability begins to feel pain in the back which becomes increasingly painful over time. The longer the working period, the greater the exposure to musculoskeletal disorders.

CONCLUSION

The conclusion of the research is that there is an association between sitting position, body mass index, and working period with musculoskeletal disorders of Soppeng Regency Population and Civil Registration Services employees. Workers are expected to do relaxation movements for 5 minutes every time they work 1.5 to 2 hours if the muscles feel cramped and stiff, workers are expected to maintain food patterns and intake and exercise regularly so that their body weight remains ideal, workers are expected to prioritize rest if complaints are felt and provide work chair cushions when working.

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