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THE RELATIONSHIP BETWEEN WORK POSTURE AND NUTRITIONAL STATUS WITH COMPLAINTS OF MUSCULOSKELETAL DISORDERS IN THE DRIVER

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ABSTRACT
Work posture is a reference to the position of the body when carrying out activities in a job, the driver profession really needs more attention to this. Good work posture is able to adjust the sitting or standing position to be ergonomic, keep the back straight, and avoid tension in certain parts. This study aims to determine the relationship between work portur and nutritional status with complaints of musculoskeletal disorders in trans metro deli medan drivers. This research method uses Cross-sectional study. The study runs from February to March in 2024. Located at Trans Metro Deli Medan Bus Stop corridors 1 to 5. Populasai in this study amounted to 151 drivers using stratified random sampling techniques. The determination of the number of samples in this study used the table determining the number of samples of Issac &Michael which obtained a sample of 105 samples with an error rate of 5%. The results of statistical analysis using the chi square test Based on the results of bivariate analysis of work posture has a relationship with complaints of musculoskeletal disorders (p = 0.034), as well as nutritional status can be concluded to have a relationship with complaints of musculoskeletal disorders (p = 0.048), so it can be known that there is a significant relationship between nutritional status and complaints of musculoskeletal disorders On Trans Metro Deli Medan driver. The relationship between work posture and nutritional status with complaints of musculoskeletal disorders in trans metro deli medan drivers, each driver is expected to stretch and rest enough to avoid work fatigue and musculoskeletal disorders, trans metro deli medan drivers are also expected to maintain body mass index in normal nutritional status.

Keywords: musculoskeletal disorders; nutritional status; work posture

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INTRODUCTION

Work posture is a reference to body position when carrying out activities in a job, the driver profession really needs more attention to this. Good work posture is able to adjust the sitting or standing position to be ergonomic, keep the back straight, and avoid tension in certain parts. Work posture can be influenced by several indicators such as body size, work area design, work needs, and equipment used while working. Work posture is very influential on the effectiveness of a job. Nutritional status is related to body size which is an indicator in adjusting good work posture, therefore every worker should understand this. The ideal body size certainly affects the work posture, as the ideal body size then the nutritional status will certainly be good, but if the nutritional status is not good it will affect the size of the body that is one of the indicor. Work posture can determine effectiveness in work. Improper body position can increase the risk of *musculoskeletal disorders*. (Aisha et al., 2023)

Based on WHO (World Health Organization) data in 2021 as many as 568 million people The results of the most systematic scientific study Global *Burden of Disease (GBD)* stated that MSDs are one of the main causes of loss of life time due to disability (*Years Lived with Disability*), especially in Indonesia (WHO, 2021).

According to *Global Burden of Disease* (GBD) data, there are about 1.71 billion people in the world who suffer from musculoskeletal disorders. The prevalence of musculoskeletal disorders by age and severity of diagnosis varies widely. Musculoskeletal disorders are statistically the largest contributor to disability status (YLDs) worldwide, totaling 149 million (17% of accumulated YLDs worldwide) (Cieza et al., 2020). Based on Riskesdas data in 2018, the prevalence of musculoskeletal diseases in Indonesia is 7.9%. The highest prevalence based on diagnosis was in Aceh (13.3%) then Bengkulu (10.5%) and Bali (8.5%). Musculoskeletal Disorders (MSDs) are complaints felt by a person ranging from mild complaints to severe pain in the musculoskeletal area due to working unnaturally. (Riskesdas , 2018); (Tarwaka, 2015) .

According to Law of the Republic of Indonesia No. 01 Year 1970 Work Safety states that every worker has the right to protection for his safety in doing work, welfare, and increased productivity. This makes everyone in the work environment need to get a guarantee of safety. So that companies or business entities that have risks and dangers are obliged to provide safety protection for each worker (Indonesia & Indonesia, 1970). Every job has risks depending on factors that can encourage a person's condition to the realization of occupational diseases / health problems. Some health problems experienced by workers due to non-ergonomic work positions are complaints of joints and skeletal muscles commonly referred to as *musculoskeletal* disorders. This particular disorder can appear if the worker's body receives loads continuously over a long period of time, since it can harm the health of the body's ligaments and joints (E. I. Tarwaka , 2019).

The type of profession that can cause *musculoskeletal disorders* is a profession that has long activity hours and requires employees to lean for a long duration in a certain leaning position, such as pc operators, tailors, bank employees, drivers. Employees who are in charge of sitting for a long duration have a risk of developing back pain. Stools that are not ergonomic also affect the formation of back pain because it is felt insecure as a result of which the muscles become stiff (Paradise et al., 2020). *Musculoskeletal Disorders* is one of the ergonomic hazards in the body's movement system which is the highest cause of morbidity rates of diseases related to the workplace. *Musculoskeletal Disorders (MSDs)* are disorders of damage to the muscular and skeletal systems of the human body caused by an imbalance in activity load on muscle and skeletal abilities that significantly directly or indirectly reduce work productivity (Science, et al., 2023). Musculoskeletal *disorders* can occur due to several factors related to individuals such as age, gender, fitness, anthropometry, and occupational factors such as repetition of movements while working, non-ergonomic work positions, and physical environmental factors such as vibration and temperature. which leads to complaints of musculoskeletal disorders (Sekaaram and Ani, 2017; Tarwaka, 2019; Indica Danida et al., 2020).

Factors that influence *Musculoskeletal Disorders* are age, Body Mass Index (BMI), disease history, *workstation* design, length of work, length of work, and smoking habits. *Musculoskeletal disorders* often occur in various occupations, such as those experienced by drivers. Driving is a profession that involves various risk factors such as sitting too long, lack of rest periods, traffic jams, and static sitting positions and work chair designs that are less or

not ergonomic (Rabbihim & Malik, 2023). Transportation is a very influential element in the economy. All aspects of the nation's life depend on this one sector, which serves as a driver, supporter and driver of economic growth. Therefore, the role of transportation is very important in everyday life. One of the transportation needs in a city is the use of public transportation. Public transportation, especially Trans Metro DeIi Bus. has a very important role in reducing the use of private vehicles and also congestion in the city of Medan (Ary Fabrian , 2022).

Occupational Diseases (PAK) generally occur in Indonesia as seen from an inefficient work environment. Occupational diseases are caused by a lack of understanding of the workforce and labor competence that is not yet comprehensive. Based on Law No. 23 of 1992 concerning health, "every workplace must carry out occupational health efforts, so that there are no health problems in workers, families, communities and the surrounding environment". PAK is caused by 2 factors, namely the environment and work relations. PAK that has a relationship to work due to exposure to the work environment (Hardianty, 2021). Based on the results of the study, it is known that the work posture of 55 respondents, the most respondents have a risk level of medium category work posture of 27 workers (49.1%). Based on the results of the study, it is known that the nutritional status of 55 respondents, the most respondents have normal nutritional status of 28 workers (50.9%). Based on the results of the study, it is known that complaints of musculoskeletal disorders from 55 respondents, respondents had the most low complaint rates of 43 workers (78.2%). There is a significant relationship between work posture and complaints of musculoskeletal disorders in administrative workers at PT. Jamu Air Mancur Karanganyar with p-value = 0.000 and correlation value of 0.375 (Aini, 2022). According to Devi Krismayani's research, respondents who have a work attitude at a high risk level are the work attitude of the back (71.43%) and neck (40.48%). Meanwhile, all respondents (100%) have a low risk level of work attitude on the right and left shoulders. The highest proportion of work duration is in the ≤40 hours/week category of 59.52% (Krismayani & Muliawan, 2021).

In one study, it is known that individual factors that influence the incidence of *musculoskeletal disorders* include age, length of work, length of work, gender and nutritional status. In this study, it was known that most respondents aged >35 years who experienced complaints of *musculoskeletal disorders* were 68.5%. These results show that the older a person is, the greater the risk of musculoskeletal complaints. This happens because bone degeneration begins to occur at the age of 35 years which results in a decrease in bone elasticity which will be at risk of *muscoskeletal disorders* (*Diana_Aldo Agro Aug 2020*, n.d.). Obesity results in weight gain which makes the burden of the body increase resulting in pressure on the spine which makes the condition of the spine unstable. Being overweight can increase resistance of movement and impede a person's movement. This is in line with Setyawati's research at the polyneurology of RSPAD Gatot Subroto Jakarta which shows a relationship between BMI factors and the incidence *of musculoskeletal disorders* (OR=BMI ≥ 25 kg/㎡risk 22.44 times (Rahmadina, et al., 2023). If a person has excess weight, try to support his weight by contracting the muscles of the lower back. If this condition lasts for a long period of time to put pressure on the spinal cord, it causes fatigue and muscle pain. 13 Based on the results of statistical tests using chi-square, the value of p = 0.095 was obtained. Because the p value > 0.05, it can be interpreted that there is no significant relationship between Body Mass Index (BMI) and complaints of MSDs in farmers (Hayuni, 2022).

Results were obtained from a study, nutritional status, length of work and work attitude related to the occurrence of musculoskeletal complaints felt by tailors in CV. Surya Jaya

Lestari Bandung City. The nutritional status of workers in obese conditions is stated to be higher against musculokeletal complaints felt compared to workers who are in normal nutritional status conditions. Attitude to workers is the most impactful factor in causing musculokeletal complaints. The risky work attitude carried out by workers will increase the perceived musculokeletal complaints. The riskier the respondent's work attitude, the higher the chance of musculoskeletal complaints felt by the worker (Ibrahim, et al., 2020). From the results of an initial survey conducted on 10 drivers of the deli medan metro with interview and observation methods on February 3, 2024, there were drivers who experienced complaints *of musculoskeletal disorders* with different levels of incidence, from the interview results found 7 complaints in the back pain, and 9 people experienced complaints in the calf pain. This is due to the work posture in the driver during work. In addition, it was found that 2 drivers had obese BMI and 1 driver had obese BMI. Looking at problems related to work posture, nutritional status with complaints of musculoskeletal disorders in workers that are quite serious and there has been no research conducted on transmetro deli medan drivers. The objective is interested in conducting a research entitled "The Relationship between Work Posture and Nutritional Status with Complaints *of Musculoskeletal Disorders* in Transmetro Deli Medan Drivers".

METHOD

This research method uses *Cross-sectional study*. The study runs from February to March in 2024. Located at Trans Metro Deli Medan Bus Stop corridors 1 to 5. Populasai in this study amounted to 151 drivers using *stratified random sampling techniques*. The determination of the number of samples in this study used the table determining the number of samples *of Issac &Michael* which obtained 105 samples with an error rate of 5%, with sample details in corridor 1 totaling 17 samples, corridor 2 totaling 17 samples, corridor 3 totaling 34 samples, corridor 4 totaling 25 samples, and corridor 5 totaling 12 samples. Work Posture Assessment is carried out using *the Rapid Entire Body Assessment (REBA) assessment sheet*. The nutritional statu assessment was carried out by categorizing the body mass index (BMI) of each Trans Metro Deli Medan Driver, as well as data on *Musculoskeletas Disorders (MSDs)* in the assessment using the Nordic Body Map Questionaire (NBM) questionnaire. The analysis used in this study was in the form of univariate and bivariate analysis using the *Chi Square test*.

RESULTS

Table 1.
Frequency Distribution of Respondent Characteristics

Age	Number of Drivers	%
21-30 Years	1	1
31-40 Years	56	53
41-50 Years	42	40
51-60 Years	6	6
Period of Service		
<1 Year	23	22
1-3 Years	60	57
4-6 Years	22	21

Based on the results of the study in table 1 shows that respondents aged in the category (21-30 years) as many as 1 person (1%), in the age category (30-40 years) as many as 56 people (53%), in the age category (41-50 years) as many as 42 people (40%), in the age category (51-60 years) as many as 6 (6%), The working period in this study is calculated based on the years workers start working until the research takes place. This period of work shows the length of time the individual was exposed to exposure at work until the study. with the majority of working period categories (<1 year) as many as 23 people (22%), working period categories

(1-3 years) as many as 60 people (57%), and working period in the category (4-6 years) as many as 22 people (21%).

Table 2.
Distribution of Risk Categories of Work Posture, Nutritional Statu, and MSDs Complaints

Risk Categories	f	%
Work Posture		
Low	17	16
Keep	60	57
Tall	28	27
Nutritional Status		
Thin	15	14
Usual	57	54
Fat	23	22
Obesity	10	10
MSDs Complaints		
Minor Complaints	40	38
Moderate Complaints	65	62

Based on the table 2, the results showed that in measuring work posture using the REBA method in Deli Medan trans metro drivers, 17 people (16%) had a low risk, 60 people (57%) had a medium risk, and 28 people (27%) had a high risk. In addition, the results of research on nutritional status using body mass index (BMI) showed that 57 people (54%) had normal categories, 23 people (22%) were obese, 15 people (14%) were thin, and 10 people (10%) were obese. Regarding complaints of Musculoskeletal Disorders (MSDs), as many as 40 people (38%) experienced mild complaints and 65 people (62%) experienced moderate complaints. From these results, it can be concluded that Deli Medan trans metro drivers are dominated by the category of light work posture and normal body mass index, but experience complaints of MSDs which are dominated by moderate complaints.

Table 3.
Results of Risk Measurement Work Posture with MSDs Complaints

Work Posture	MSDs Complaint Rate				Total		P Value
	Minor Complaints		Moderate Complaints				
	f	%	f	%	f	%	
Low Risk	3	18	14	82	17	100	
Medium Risk	29	48	31	52	60	100	0,034
High Risk	8	28	20	72	28	100	

Statistical tests in this study used Chi-Square to analyze the relationship between work posture and complaints of Musc*uloskeletal disorders* (MSDs). Based on the results of the study in table 3 of the results of statistical analysis using *the chi square test* the relationship between work posture and musculoskeletal complaints in trans metro deli medan drivers, the results were obtained from p values (0.034) < 0.05.

Table 4.
Results of Nutritional Status Measurement with MSDs Complaints

Nutritional Status	MSDs Complaint Rate				Total		P Value
	Minor Complaints		Moderate Complaints				
	N	%	N	%	n	%	
Thin	5	33	10	67	15	100	
Usual	16	28	41	72	57	100	
Fat	13	56,5	10	43,5	23	100	0,048
Obesity	6	60	4	40	10	100	

Statistical tests in this study used Chi-Square to analyze the relationship between nutritional status and complaints *of Musculoskeletal Disorders* (MSDs). Based on the results of the study in table 4 based on the results of statistical analysis using the chi square test the relationship between nutritional status and *musculoskeletal complaints* in trans metro deli medan drivers, the results were obtained from p values (0.048) < 0.05.

DISCUSSION

Analysis of respondents' identity characteristics showed that of the total 105 drivers who were the subjects of the study, the majority were aged between 31 to 50 years, with the peak being in the age range of 31-40 years (53%) and followed by the age range of 41-50 years (40%). The number of respondents aged 21-30 years only reached 1%, while those aged 51-60 years as much as 6%. This indicates that most respondents are in productive age in jobs as drivers. When looking at tenure, the majority of respondents have between 1 to 3 years of work experience (57%), followed by those with less than 1 year of experience (22%) and 4-6 years (21%). This shows that most respondents are relatively new to the job as a driver, with few having more than 3 years of work experience.

Univariate analysis showed that the majority of drivers experienced moderate work posture risk (57%), with a small percentage having low risk (16%) and high risk (27%). The nutritional status of the majority is normal (54%), followed by obese (22%), underweight (14%), and obese (10%). Musculoskeletal Disorders (MSDs) were dominated by moderate complaints (62%), compared to mild complaints (38%). Bivariate analysis showed a significant association between work posture and complaints of MSDs in drivers, with p values < 0.05. Similarly, there was a significant association between nutritional status and complaints of MSDs in drivers, with p values < 0.05. This study highlights the importance of ergonomics in the driver's work environment, with non-ergonomic work postures potentially causing complaints of MSDs. Nutritional status also plays an important role, with obesity contributing to a higher risk of MSDs. These findings are consistent with previous research showing that non-ergonomic work posture and poor nutritional status can increase the risk of MSDs complaints in workers. In this context, there is a need for preventive measures and ergonomic interventions aimed at reducing the risk of complaints of MSDs in drivers, including improvements in seating design and work posture control, as well as the promotion of healthy lifestyles to manage nutritional status. Thus, greater attention to these factors can improve the welfare and performance of drivers, as well as reduce costs associated with work injuries and absenteeism.

Statistical tests in this study used Chi-Square to analyze the relationship between work posture and complaints of Musc*uloskeletal disorders* (MSDs). Based on the results of the study in table 3 of the results of statistical analysis using *the chi square test* the relationship between work posture and musculoskeletal complaints in trans metro deli medan drivers, the results were obtained from p values (0.034) < 0.05. This shows that Ho was rejected and Ha was accepted so that it can be known that there is a significant relationship between work

posture and complaints *of musculoskeletal disorders* in trans metro deli medan drivers. Work posture or body posture when working in this study was measured using REBA by scoring the body parts used to carry out work activities. After summing, it can be known whether the respondent's work attitude is risky or not with very high risk, high risk, medium risk, and low risk categories.

The data obtained from this study the body parts most complained by trans metro deli medan drivers are the waist, buttocks, and also the left calf. From the results of this study, the body parts that are often complained by drivers are the waist (50.5%), buttocks (49.5%), and left calf (54.6%). The sitting position while working can put pressure on the lower back which is quite heavy and cause low back pain in workers. Just like sitting too long can cause excessive load on the lumbar spine, causing pain in the lower back. An ergonomic sitting position will cause isometric (resistance-resisting) contraction of the back muscles in the main muscles involved in the work. (Mulyati Invironmental Polytechnic Health Government department Health Bengkulu Bengkulu, 2019).

This study shows different conclusions from research conducted on fishermen in Borgo village, one Belang sub-district. Based on the results of the study, it can be seen from the bivariate analysis that has been carried out resulting in p value = 0.712 (p> 0.05) which shows that there is no significant or insignificant relationship between work posture and musculoskeletal complaints. This shows that fishermen who have *musculoskeletal* complaints are lower than the work posture of fishermen. (Engka et al., 2022). Work and static work attitudes that can cause musculoskeletal complaints and work fatigue should be avoided, because if it lasts for a relatively long time it can cause the emergence of permanent / permanent diseases and damage, especially to the muscles of the body. Workers who have a static work attitude and are carried out for a long time cause the body to have to do muscle contractions in the long term, as well as pressure on the limbs that can cause *musculoskeletal complaints* (Bridger, 2008).

Work postures that are not ergonomic will make workers do a forced attitude in doing their work. The farther the position of the piece from the midpoint of gravity, the higher the likelihood of MSDs occurring. The cause of complaints of *Musculoskeletal Disorders (MSDs)* can cause considerable injury which is then expressed as pain or tingling, tenderness, swelling, and muscle weakness. Tissue trauma that arises due to repetitive, overstretching, or stress on one of the tissues. The results of the analysis are also appropriate that there is a strong relationship between operating posture and complaints in employees due to non-ergonomic posture (Mallapiang et al., 2021). This research is in line with research conducted by Sheren et al. Which shows there is a relationship between work posture and complaints of *musculoskeletal disorders* in bus drivers at power regional terminals. The results of statistical tests obtained results from p values (0.024) <0.05 so that it can be known that there is a significant relationship between work posture and *musculoskeletal disorder* complaints. The amount of contribution can be seen in the estimated value of 0.265 (26.5%) (Sheren Mary Birgita et al., 2022).

Fatigue is a form of defense of the body so that the body does not suffer further damage and recovery can occur after rest. Prolonged work fatigue can lead to complaints of *musculoskeletal disorders*. Work postures that are not ergonomic can cause fatigue and if done repeatedly will cause complaints of musculoskeletal disorders. Complaints *of musculoskeletal disorders* can be influenced by fatigue and muscle trauma due to work activities (Wiranto et al., 2019).

Statistical tests in this study used Chi-Square to analyze the relationship between nutritional status and complaints *of Musculoskeletal Disorders* (MSDs). Based on the results of the study in table 4 based on the results of statistical analysis using the chi square test the relationship between nutritional status and *musculoskeletal complaints* in trans metro deli medan drivers, the results were obtained from p values (0.048) < 0.05. This shows that Ho was rejected and Ha was accepted, so it can be known that there is a significant relationship between nutritional status and complaints of musculoskeletal disorders in trans metro deli medan drivers.

This study shows different conclusions from research conducted on farmers in Talulolo Village, Kesu District, North Toraja Regency. Based on the results of statistical tests using chi-square, the value of p = 0.095 was obtained. Because the p value > 0.05, it can be interpreted that there is no significant relationship between *Body Mass Index (BMI)* and complaints of MSDs in farmers (Muhsanah & Joseph, 2023). Anthropometric body measures, such as height, weight and body mass are factors that are very likely to cause *musculoskeletal* complaints in workers. These three factors have a relatively small influence on the occurrence of musculoskeletal complaints (Tarwaka, 2014).

Although the effect is relatively small, body weight, body size and body mass affect complaints of *musculoskeletal disorders*. For example, workers who are categorized on the fat body mass index have a risk of complaints in the muscles 2 times compared to workers with a normal body mass index. Large body dimensions usually often experience pain in the back (Imam Fahreza , 2022). Body mass index can affect *musculoskeletal complaints*. Because it is caused by the condition of the balance of the frame structure in receiving a load, both body weight and other additional loads. Research conducted by pasa on *Ground Handing operators* from 10 respondents who have normal body mass, there were 7 people (29.17%) who experienced complaints of MSDs with the medium category, 2 people (8.33%) with the high category, and 1 person (4.15%) with the very high category. Of the 10 respondents who had more body mass, there were 6 people (25%) who experienced complaints of MSDs with the high category and 4 people (16.67%) with the very high category. As for the 3 respondents who had obese body mass, there were 3 people (12.5%) who experienced complaints of MSDs with the very high category, while 1 person (4.16%) of respondents who had less body mass did not experience complaints of MSDs (normal) (Pasa, 2024). This study is in line with those conducted by Permana et al which showed a significant relationship between nutritional status and *musculoskeletal* complaints in Fertilizer Picking Workers, it was known that the results of the spearman correlation test with p *value* 0.023 which is smaller than 0.05 (sig<0.05). The closeness of the relationship between the two variables of 0.383 indicates that the strong relationship is in the weak category. The coefficient value of r has a direction of positive and significant correlation coefficients which means the relationship of the two variables is unidirectional (Putra, et al., 2020).

Obesity can cause respiratory problems and shortness of breath, this is because excessive fat accumulation under the walls of the thorax and diaphragm can press on the lungs even though the patient only does light activity. Respiratory disorders can cause obstruction of the airway at certain times (sleep apneu) and result in sufferers often feeling sleepy during the day. In a drowsy state, the body usually becomes weak and when you want to lift weights, the pressure on the waist is usually very heavy. Weak abdominal muscle tone caused by excessive weight (overweight / obesity), this is a risk of *musculoskeletal disorders* (Justitia et al., 2022).

CONCLUSION

The findings obtained from the results of research on the relationship between work posture and nutritional status with complaints *of musculoskeletal disorders* can be concluded that the age of trans metro deli medan drivers is dominated in the age range (30-40 years) as much as (53%), the length of service in drivers is dominated (1-3 years) by (57%). Based on the results of univariate analysis, work posture was obtained with the most levels in the medium category as many as 60 drivers (57%), and *musculoskeletal disorders* complaints were obtained with the most levels in the medium category as many as 65 drivers (62%). Based on the results of bivariate analysis, work posture has a relationship with complaints *of musculoskeletal disorders* (p = 0.034), as well as nutritional status can be concluded to have a relationship with complaints *of musculoskeletal disorders* (p = 0.048).

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