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Analysis of Factors Affecting Musculosceletal Disordersto Female Seaweed Workers

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Abstract

The purpose of this study was to examine the factors affecting the occurrence of musculoskeletal disorders in female seaweed workers in Mangarabombang District, Takalar Regency.The design used in this study used a mix method with a sample size of 103 quantitative respondents and 10 qualitative informants. Quantitative data obtained through direct observation by filling out the questionnaire, then the data is processed using SPSS, then presented in tabular from through its explanation, while qualitative data is focus group discussion and obtained through interviews, then interpreted and presented in narrative form.The results showed that the factors that influence musculoskeletal disorders are age (0,0001), anthropometry of the upper arm (0.008), anthropometry of the forearm, wrist and back (0,0001), BMI (0.007), length of work (0,001), workload (0,0001), work posture (0,0001), then it was discovered that workload was the most influential variable on musculoskeletal disorders (OR = 58.098), then the informants supported that age, anthropometry, length of work, workload and work posture were the causes of musculoskeletal disorders among female seaweed workers in Mangarabombang District, Takalar Regency. There is a significant relationship between age, anthropometry of the upper arm, anthropometry of the forearm, wrist and back, BMI, length of work, workload, work posture, then workload isthe variable that most influential variable on musculoskeletal disorders.

Keywords: *MSDs, BMI, length of work, workload, work posture.*

1. Introduction

Work-related accidents and illnesses can have a profound impact on individuals and their families. Potential hazards in the workplace can pose risks that affect the health of workers(ILO, 2013).One of the hazards in the workplace is causing health problems, in which ergonomic factors are one of the causes(Rachmawati, 2019). Work processes that are not ergonomic can cause musculoskeletal disorders(Tarwaka, 2015).

Work-related musculoskeletal disorders (MSDs) refer to injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal discs associated with exposure to risk factors in the workplace(Maimaiti et al., 2019).MSDs are a significant problem for workers(Prawira et al., 2017).

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These disruptions are associated with social and economic costs, ultimately impacting the quality of life(Liao et al., 2016). Work-related musculoskeletal disorders affect the back, neck, shoulders, and upper and lower limbs. They cover up damage or abnormalities in joints or other tissues(European Agency for Safety and Health at Work, 2020).

In 2018 the World Health Organization (WHO) stated that musculoskeletal disorders were the second highest cause in the world(World Health Organization, 2018). The prevalence of musculoskeletal diseases in Indonesia based on data that has been diagnosed by health personnel is 11.9% and based on diagnosis or a symptom is 24.7%. The highest prevalence of musculoskeletal diseases is among workers such as farmers, fishermen, and laborers, which are 31.2%(Riskesdas, 2013). The informal sector business is one business that has a very high health risk. The workforce in 2000 was 95,650,691 people, of which 70–80% was in the informal business sector. Informal sector workers are the population that does not get health services, especially occupational health(Icsal et al., 2016).

One of the workers in the informal sector is a seaweed farmer. Currently, the seaweed industry is one of the commodities that attract many people to enter the world of work. Seaweed cultivation has recently become the main occupation of farmers in many coastal areas including Takalar District, South Sulawesi. The district produced 996,550 tonnes in 2017 from a harvested area of around 17,448 hectares(Thamrin et al., 2020). The work process of seaweed cultivation for seaweed workers in Takalar Regency is still manual handling; in this case, it includes seeding, planting, and harvesting (drying). Traditionally, farmers rely on their feet and hands when doing their work(Faujiyah, 2020).

Many factors can influence the occurrence of musculoskeletal disorderss as has been done in previous studies, such as individual factors, occupational factors, environmental factors, and psychosocial factors(Tarwaka, 2015; Kuswana, 2014). Research conducted by Wijnhvon, et al (2020) shows that the prevalence rate of musculoskeletal problems for all occupational groups of women is greater than men. This is due to physiological factors of muscle strength in women, which are around 2/3 the muscle strength of men. Work posture can trigger muscle complaints in workers(Tarwaka, 2015). Things that are often done by humans in doing work include standing, sitting, squatting, bending, walking, and others(Nurmianto, 2004).Work postures that are not ergonomic when done at work can often cause problems for workers such as complaints of the musculoskeletal muscles felt by workers(Tarwaka, 2015).

Based on the background description above, the author wants to examine more deeply about ergonomic problems, in this case, to find out what affects the occurrence of musculoskeletal disorders in female seaweed workers in Takalar Regency so that it can be a prevention for seaweed workers from experiencing musculoskeletal disorders.

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Unqualified	39	37,9
Workload		
Mild	47	45,6
Heavy	56	54,4
Work Posture		
Ergonomic	39	37,9
Not Ergonomic	64	62,1
Musculoskeletal Disorders		
Mild	29	28,2
Heavy	74	71,8

Source: Primary Data, 2020

Table 1 above shows that from 103 samples, female seaweed workers who are older, are 78 people (75.7%). Anthropometric measurements on the upper arm were more in the unsuitable category as many as 65 people (63.1%), for the forearm the most were in the unsuitable category of 68 people (66.0%), the wrist part was the most in the unsuitable category. as many as 72 people (69.9%), and on the measurement of the back there were 73 people (70.9%) who were at most in the unsuitable category. BMI of female seaweed workers is more in the fat category, namely as many as 52 people (50.5%). The length of work done by the farmers is more, that meets the requirements, namely 64 people (62.1%). The most moderate workload felt by female seaweed workers was 56 people (54.4%). Work posture is more in the non-ergonomic category of 64 people (62.1%) and MSDs was mostly in the heavy category of 74 people (71,8%).

Tabel 2. The Results of the Bivariate Analysis

Variabel	**Musculoskeletal Disorders**				**Total**		***p-value***
	Mild		**Heavy**				
	n	**%**	**N**	**%**	**n**	**%**	
Age							
Young	22	88,0	3	12,0	25	100	0,0001
Old	7	9,0	71	91,0	78	100	
Anthropometry (upper arm)							
Appropiated	17	44,7	21	55,3	38	100	0,008
Unappropiated	12	18,5	53	81,5	65	100	
Anthropometry (forearm)							
Appropiated	18	51,4	17	48,6	35	100	0,0001
Unppropiated	11	17,5	57	83,8	68	100	
Anthropometry (wrist)							
Appropiated	17	54,8	14	45,2	31	100	0,0001
Unappropiated	12	16,7	60	83,3	72	100	
Anthropometry (Back)							

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Appropiated	19	63,3	11	36,7	30	100	0,0001
Unppropiated	10	13,7	63	86,3	73	100	
BMI							
Normal	21	41,2	30	58,8	51	100	0,007
Fat	8	15,4	44	84,6	52	100	
Length of worth							
Qualified	26	40,6	38	77,2	64	100	0,001
Unqualified	3	7,7	36	84,8	39	100	
Workload							
Mild	25	53,2	22	46,8	47	100	0,0001
Heavy	4	7,1	52	92,9	56	100	
Work Posture							
Ergonomics	19	48,7	20	51,3	39	100	0,0001
Not Ergonomics	1	1,6	63	98,4	64	100	

Source: Primary Data, 2020

Table 2 shows the chi-square test results show that there is a significant influence between musculoskeletal disorders and age, upper arm anthropometry, forearm anthropometry, wrist and back, BMI, length of work, workload, and work posture.

Table 3. Multivariate Analysis

Variables	B	S.E.	Wald	Df	Sig.	Exp(B)
KAT_age	3.951	1.378	8.219	1	.004	52.011
KAT_workposture	2.246	1.084	4.296	1	.038	9.452
KAT_workload	4.062	1.420	8.179	1	.004	**58.098**
Constant	-4.630	1.444	10.279	1	.001	.010

Source: Primary Data, 2020

Table 3 show, it is known that workload is the most influential variable on musculoskeletal disorders with an OR value of 58.098, which means that the risk workload variable is 58.098 times greater and has an effect on musculoskeletal disorders in female seaweed workers in Mangarabombang District, Takalar Regency.

Musculoskeletal disorders are one of the most common and costly occupational (Saberipour et al., 2019). Many different factors contribute to the risk of MSD (Panel on Musculoskeletal Disorders the Workplace, & Institute of Medicine (2001). Musculoskeletaldisorderssystem will usually be felt in workers aged 35 years and the level of complaints felt can continue to increase with age(Tarwaka, 2015).This is the same as what was obtained from informants during the FGD:

"*Because I'm old, my body hurts sometimes ...* "

"*Yes, it usually hurts my back and calves when I work...*"

Symptoms are generally experienced at age 35 years and continue to increase. This is because, during the middle age phase, muscle strength and endurance tend to decrease(Arifin et al., 2020).The

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body mass index of workers also has the risk of developing pain in their body parts if a person is overweight because the load on the joints for weight will be increased, thus allowing pain in the body, especially at the waist. This is in line with research conducted by Sumardiyonoetal(2018) on written batik workers who found that there was a significant relationship between IMT and musculoskeletal disorders.

Anthropometry of workers' bodies can also affect the occurrence of musculoskeletal disorders, such as research conducted by Susana (2016) on fish drying workers which found that anthropometry is not in accordance with the work aids used by drying workers causes musculoskeletal disorders. In-depth interviews, the informant also revealed that;

"*When I do the nursery I have to sit on a short stool, so it keeps my legs bent for hours...* "

Occupational diseases arise because of work relationships or those caused by work and work attitudes(Suryadi & Rachmawati, 2020). The working posture done by the female seaweed workers is bending over and arms pointing upwards and resting on her legs. The position of the head is down and the back is slightly bent. This kind of work posture is carried out for hours by female seaweed workers in the nursery. This is consistent with the results of in-depth interviews and FGDs, where the informant said:

"*All of us who work on the nursery process are short stools for long hours..*"

"*In the nursery process, usually the position of the arms is bent and then rotated while doing the seeding, and this position is carried out continuously...*"

Women seaweed workers usually do their work for more than 8 hours. This is because the wages received will be more when workers can maximize the yield from tying seaweed seeds. The addition of working hours can reduce productivity, worker efficiency, cause fatigue, and can lead to illness and accidents(Suma'mur, 2009).These results were obtained from informants during the FGD:

"*In a day I used to do my work from morning to evening..*"

The physical load that is justified is that it does not exceed 30-40% of the maximum work capacity of the workforce in 8 hours a day by observing the prevailing working hours regulations. More heavy the load, the shorter the work time[22]. The results of the FGD showed that female seaweed workerss have a heavy workload because in addition to working as a seaweed workers she is also a housewife who has to take care of her home and family. As the informant said:

"Before this job, I had to clean my house first, prepare clothes for my children who wanted to go to school, I also had to cook for my family first. After everything was finished I continued to go to work as a seaweed farmer.. "

This is in line with the research conducted by Tjahayuningtyas (2019) on informal workers who found that there is a significant relationship between workload and musculoskeletal disorders.MSDs can be reduced in various ways, for example, by paying attention to work posture while working, increasing physical fitness, adjusting diet, exercise, and adequate rest(Hanif, 2020).

4. Conclusion

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There is a significant relationship between age, anthropometry of the upper arm, anthropometry of the forearm, wrist, and back, BMI, length of work, workload and work posture, then it was discovered that workload was the most influential variable on musculoskeletal disorders. Then the informants supported that age, anthropometry, length of work, workload, and work posture were the causes of musculoskeletal disorders among female seaweed workers in Mangarabombang District, Takalar Regency. It is recommended for seaweed workers to notice to work posture and rest time while working.

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