



Musculoskeletal disorders and management based on local wisdom for seaweed farmers in sanrobone district, Takalar Regency

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ABSTRACT

Jobs that force workers to be in work postures that are not ergonomic cause workers to experience fatigue more quickly and cause musculoskeletal complaints (MSDs). The purpose of this research is to find out the body parts of seaweed farmers who experience MSD complaints and examine the handling of MSDs using local wisdom in Sanrobone District, Takalar Regency. This study employs mixed methods research which combines both quantitative and qualitative methods. Quantitative data was collected by giving questionnaires to 706 respondents using the Nordic body map method to describe MSDs complaints felt by seaweed farmers. Qualitative data was obtained through in-depth interview, using an ethnographic approach to examine the handling of complaints of musculoskeletal disorders (MSDs) based on local wisdom. The results of data analysis showed that 328 seaweed farmers experienced complaints of MSDs (46.5%), with a working period of > 1 year. The most common MSDs complaints were back pain (33.1%), low back pain (36%), and pain in the lower body (thighs to feet) as much as 19.5%. The most risky work positions experienced were bending (50.3%), sitting for a long time (54.8%), and lifting (55.2%). Based on the results of in-depth interviews, it is known that seaweed farmers prefer not to access health facilities in handling MSDs complaints and tend to relax in the traditional way through massage methods using massage oil, rest and consume coffee or tea in warm conditions. It is hoped that the relevant agencies will provide education regarding the prevention and handling of MSDs complaints to seaweed farmers.

Keywords: MSDs, Seaweed Farmers, Local Wisdom

1. INTRODUCTION

Indonesia has a very wide sea area with beaches rich in various biological natural resources. Biological natural resources are one of the potentials that can support the welfare of society. The management of natural resources and the environment has shown significant progress in improving people's welfare. One of the areas of aquaculture that has developed to date is seaweed cultivation (Thamrin et al., 2020).

South Sulawesi is the largest seaweed producer in Indonesia. Total seaweed production in Indonesia in 2018 was 10,320,255.57 tons, of which around 30% of the total (3,287,893.85 tons) came from South Sulawesi. Seaweed commodity is the main interest in export activities in South Sulawesi supported by environmental conditions that have great potential in several places in South Sulawesi. Takalar Regency is the main contributor to producing seaweed commodities (KKP, 2019).

Indonesia has great potential for seaweed cultivation but lacks infrastructure and a competent

workforce. The main obstacles to seaweed production come from the traditional methods used by farmers and the low mastery and application of technology, inadequate promotion, and limited capital ownership (Rimmer et al., 2021).

Seaweed farming is one of the jobs in the informal sector that is at risk of experiencing health

problems as a result of working in a standing, bending and squatting position, which is done repeatedly with a monotonous working attitude for a long time. Working attitudes that are not ergonomic pose a risk to the health of seaweed farmers, such as complaints of muscle pain (MSDs) and fatigue (Adriyansyah et al., 2019). Seaweed farmers' work activities include seeding, planting, maintenance, harvesting, sorting and drying. All these activities are carried out with an unnatural work attitude that is repetitive and monotonous for a long time, so that there is a risk of experiencing MSDs complaints (Kusgiyanto et al., 2017; Mallapiang & Muis, 2021). Lifting seaweed ashore and to the drying area carried out in the morning, afternoon and evening makes seaweed farmers vulnerable to various health problems (Pratiwi, 2020). This is also supported by a research report which states that all respondents who are seaweed farmers experience complaints of Musculoskeletal Disorders (MSDs) (Permatasari, et al., 2021).

Jobs that force workers to be in non-ergonomic work postures cause workers to tire more

quickly and indirectly provide additional workload (Mallapiang & Muis, 2021). Applying a good working position will reduce workload and significantly reduce fatigue or health problems related to work posture and provide a sense of comfort (Fachrin et al., 2019) to workers, especially in monotonous and long-lasting workers (Mallapiang & Muis, 2021), if the application of ergonomic work postures cannot be fulfilled it will cause discomfort or pain in certain parts of the body. One of the health impacts that arise as a result of non-ergonomic work postures is musculoskeletal disorders (MSDs) (Arminas & Basri, 2018).

In Takalar Regency's Sanrobone District, many individuals make their living as seaweed farmers. This is supported by the geographical location of the region, which is in the coastal area. Therefore, research on musculoskeletal disorders and management was conducted based on local wisdom for seaweed farmers in Sanrobone District, Takalar Regency. This study aimed to assess the body parts that experience MSDs complaints and to find out how MSDs are handled using local wisdom for seaweed farmers in Sanrobone District, Takalar Regency.

2. METHODS

This study employs mixed methods research which combines both quantitative and qualitative methods. Quantitative research was carried out using a descriptive approach to find out the body parts of seaweed farmers who experience MSDs complaints based on the Nordic Body Map questionnaire (Sofyan & Amir, 2019), while qualitative research was carried out using an ethnographic study approach to examine the handling of complaints of musculoskeletal disorders (MSDs) in seaweed farmers based on local wisdom. This methodology describes subjects and their behavior, either as individuals or as part of a group, which is influenced by the culture or subculture in which they live.

This research was conducted in Sanrobone District, Takalar Regency, which is one of the coastal

areas with the majority of people working as seaweed farmers. A total of 706 respondents participated in filling out the Nordic Body Map questionnaire to identify and assess members of the body with MSD complaints who were assisted by enumerators in the field, and as many as 9 key informants and

three additional informants were willing to conduct in-depth interviews to gather information on handling

MSDs using local wisdom. In the quantitative research, the sample selection was carried out by simple random sampling on 706 respondents, while the determination of

informants was carried out through a purposive sampling method with the following criteria: 1). Key informants are seaweed farmers who are still actively working and are local natives with a working period of ≥ 1 year, and have experienced several MSD complaints, who live in Sanrobone District, Takalar Regency, 2). Additional informants are community leaders/religious leaders/village officials/health workers.

There are various data sources in this study that assist in gathering information including primary data obtained from the results of filling out questionnaires, in-depth interviews, and observations of informants; and secondary data, namely data obtained from the internet by conducting literature

studies by reading, recording, and studying complementary or reference books such as journals, websites, and proceedings.

The stages carried out in this study include the following.

- 1). Management of research licensing administration, 2). Advocacy with local government, 3). Determination of respondents and research informants, 4). Collecting data through quantitative questionnaires, in-depth interviews, observation, and qualitative documentation, 5). Cleaning data results from measuring questionnaires, 6). Data entry results from questionnaire measurements, 7). Descriptive data analysis results from filling out the questionnaire, 8). Reduction of data from in-depth interviews, observations, and documentation qualitatively, 9). Preparation of research results, 10). Preparation of discussion, 11). Drawing conclusions and research recommendations.

In an ethnographic study, some data is collected by spending time at the research site to understand the best pattern of a cultural group of the Sanrobone people. The data collection techniques were in-depth interviews, library research, observation and documentation. the low mastery and application of technology, inadequate promotion, and limited capital ownership (Rimmer et al., 2021).

3. RESULTS AND DISCUSSION

Data collected using a questionnaire or in-depth interview results were then processed and analyzed. The following are the results of the analysis of the data that has been collected quantitatively.

a. Characteristics of Seaweed Farmers

Data related to the characteristics of seaweed farmers were collected through a questionnaire instrument. The results of data collection can be seen in the following table.

Table 1. Distribution of Respondents Based on the Characteristics of Seaweed Farmers in Sanrobone District, Takalar Regency

Characteristics	Mean ± SD	Min - Max	n (N =706)	
% Age				
16 – 26 years old			84	11,9
27 – 36 years old	43,21±		169	23,9
37 – 46 years old	13,86	16 - 84	175	24,8
>46 years old			278	39,4
Working Duration				
1 – 4 hours			197	27,9
5 – 8 hours	6,20 ± 2,43	1 - 12	408	57,8
>8 hours			101	14,3
Length of Working				
1-10 years			393	55,7
11 – 20 years	13,66 ±	1 - 55	187	26,5
21 – 30 years	11,34		65	9,2
>30 years			61	8,6

Source: Primary Data, 2023

The data analysis results showed that most seaweed farmers were in the age category >46 years, with 278 people (39.4%). In working as seaweed farmers, the majority have worked in the 1-10 year category, namely 393 people (55.7%) with an average of around 13 years. As for the average duration of work is about 6 hours a day, the majority worked 5-8 hours a day, with 408 people (57.8%). Here is the distribution in the form of a pie chart.

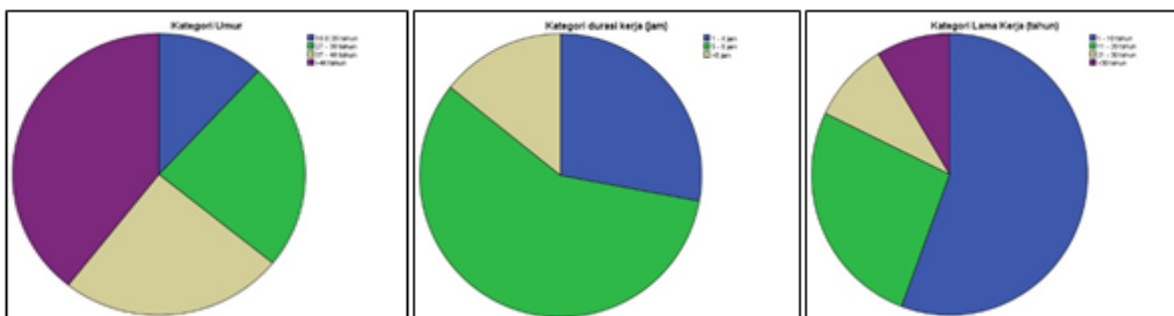


Figure 1. The distribution of respondents based on the characteristics of seaweed farmers in Sanrobone District, Takalar Regency

b. MSDs Complaints of Seaweed Farmers

Data related to Musculoskeletal disorders (MSDs) complaints from seaweed farmers were collected through an interview questionnaire instrument. The respondent's length of work as a seaweed farmer is at least 1 year of work. Some respondents still have a working period

of 1 year, especially those who are still <20 years old. The results of data collection can be seen in the following table.

Table 2. Distribution of Respondents Based on MSD Complaints to Seaweed Farmers in Sanrobone District, Takalar Regency

MSDs Complaints	n (N = 706)	
% Feeling Complaints		
Yes	328	46,5
No	378	53,5
Itchy		
Yes	27	3,8
No	679	96,2
Back Pain		
Yes	234	33,1
No	472	66,9
Low Back Pain		
Yes	254	36
No	452	64
Fever		
Yes	13	1,8
No	693	98,2
Fever Pain Thigh – Leg		
Yes	138	19,5
No	568	80,5

Source : Primary Data, 2023

The results of the data analysis showed that 328 seaweed farmers experienced MSDs (46.5%). The most common MSDs complaints were back pain (33.1%), low back pain (36%), and pain in the lower part of the body (thighs to feet) (19.5%).

In the following, data is presented regarding postures or positions that are at risk of causing MSDs complaints.

Table 3. Distribution of Respondents Based on Work Positions at Risk for MSDs Complaints to Seaweed Farmers in Sanrobone District, Takalar Regency

Work Position	n (N =706)	
% Looked Up		
Yes	55	7,8
No	651	92,2
Look Down		
Yes	288	40,8
No	418	59,2
Bend Over		
Yes	355	50,3
No	351	49,7
Long Sitting		
Yes	387	54,8
No	319	45,2
Elevate		
Yes	390	55,2
No	316	44,8
Stand Up		
Yes	51	7,2
No	655	92,8

Source: primary Data, 2023

Based on the results of data collection, it is known that the most risky work positions experienced by seaweed farmers are bending (50.3%), sitting for a long time (54.8%), and lifting (55.2%).

In addition to risky working positions or postures, MSDs complaints can also be felt by seaweed farmers due to the practice of using Personal Protective Equipment (PPE) while

working. The following shows the distribution of PPE use, the types of PPE used, and the reasons for not using PPE.

Table 4. Distribution of Respondents Based on PPE Use, Types of PPE Used, and Reasons for Not Using PPE on Seaweed Farmers in Sanrobone District, Takalar Regency

PPE Use Practices	n (N = 706)	%
Using PPE		
Yes	348	49,3
No	358	50,7
Mask		
Yes	155	22
No	551	78
Glasses		
Yes	24	3,4
No	682	96,6
Hand Gloves		
Yes	185	26,2
NO	521	73,8
Shoes/ Footwear		
Yes	123	17,4
NO	583	82,6
Hat		
Yes	199	28,2
No	507	71,8
Work Clothes		
Yes	93	13,2
No	613	86,8

Source: Primary Data, 2023

Based on the collected data, the table above shows that fewer (49.3%) use PPE when working compared to those who use PPE. The same thing can be seen in the distribution of each PPE, which shows that those who use PPE are much lower than those who do not use PPE.

As a maritime country, Indonesia has diverse biodiversity. In coastal areas, recently, the industry that manages marine products is growing rapidly, and one of them is the seaweed industry. Takalar Regency has become one of the centers for the development of the seaweed industry in Indonesia, especially in South Sulawesi. However, there is a lack of attention to occupational health and safety issues, especially ergonomic work attitudes and musculoskeletal disorders (MSDs) among seaweed farmers (Thamrin, 2020).

However, in Takalar Regency, this industry is still dominant as a home industry. As the informal sector, it is generally assumed that workers in this industry are prone to injury or other occupational health and safety problems (Thamrin et al., et al., 2020). Workers may face all kinds of physical, chemical, biological, ergonomic and psychosocial hazards. In addition, seaweed workers are required to carry out various types of work with an ergonomic work attitude when carrying out activities in seeding, planting, maintenance, harvesting, processing and drying.

It can be seen in the table of work duration that some of them work more than 8 hours which exceeds the national provisions for a safe and comfortable working duration. However, because working as a seaweed farmer is a home industry, some people work overtime (Tullberg et al., 2022). Drying work, for example, requires excessive force. The work involves lifting the harvested seaweed and spreading it on the ground covered with plastic sheeting. Bending and squatting are the main work postures that can potentially cause MSDs and work fatigue. In addition, during the drying process, farmers are exposed to direct sunlight for a long time without a break, so they are at risk of experiencing fatigue, dehydration and heat cramps.

The main causes of work-related musculoskeletal disorders are mainly from physical stress and unnatural working attitudes such as lifting, gripping, twisting, bending, squatting and kneeling. In the process of planting, harvesting, drying and sorting seaweed, they predominantly work with a bent posture, sitting for a long time, standing for a long time and lifting weights. Sorting seaweed is done manually and repeatedly in a sitting/turning and bending position for hours (Adriyansyah et al., 2019).

This study found that more than 50% of seaweed farmers did their job by bending, stooping and lifting loads for a long time and doing it repeatedly. Workers who work with an unnatural work attitude are at risk of experiencing MSDs complaints (Mallapiang & Muis, 2021). In addition, in carrying out their activities, they use very little Self-Protection Equipment in the form of masks, hats and work clothes. Even though using PPE is one way of preventing Occupational Diseases or work accidents (Anggelina et al., 2023). This triggers the high number of MSD complaints felt by seaweed farmers

c. Handling MSDs with Local Wisdom

The characteristics of the informants are inherent in each individual, which in this study included gender, age, duration of work and length of work for seaweed farmers. The characteristics of research informants can be seen in the following table:

Table 5. Informants Characteristics

No	Informants	Sex	Age (yo)	Work Periode	Job
1.	SA	M	51	> 1 years	Seaweed Farmer
2.	MN	M	40	> 1 years	Seaweed Farmer
3.	RD	F	66	> 1 years	Seaweed Farmer
4.	DL	F	45	> 1 years	Seaweed Farmer
5.	MD	M	60	> 1 years	Seaweed Farmer
6.	SG	F	59	> 1 years	Seaweed Farmer
7.	FD	M	35	> 1 years	Seaweed Farmer
8.	RK	M	49	> 1 years	Seaweed Farmer
9.	MM	M	29	> 1 years	Seaweed Farmer
10.	ND	M	62	0	Public Figure
11.	MA	M	49	0	Religious Leader
12.	AR	F	35	0	Health Worker

Source: Data Primay, 2023

The table above shows that all informants have worked for more than 10 years with variations in gender, male and female informants. Based on the quantitative data, in-depth interviews were conducted with informants who experienced a lot of MSD complaints. The results of the in-depth interviews showed that most respondents experienced complaints of MSDs, but they did not access healthcare facilities to deal with complaints of MSDs they felt. The results of the interview are presented below.

"Not going to the Primary Health Service, not going to a health service. I have a health insurance card, but I am lazy. You must get ready to return to the health center, find a pillion there, pay for the motorcycle taxi again, and queue up there again. It's just more tired."

RD. Female. 66 Years Old

Almost all informants stated similar answers. Lengthy preparations, transportation costs, and queuing at the registration counter are factors that reduce people's interest in accessing health services.

"There's no insurance. If it's really necessary, you can just pay at the counter for fifteen thousand during registration, he said, the cost of medicine. But I rarely have to go to the health center let alone the hospital. Alhamdulillah healthy, unfortunately, Allah is on me. At least if you're tired, it's called work; everyone is tired too. If the aches are sorted out using rubbing oil, it's not bad. It's also good to sleep. Instead of going to the Puskesmas, we were given medicine. Too often, taking medicine is also not good; it is dangerous for the body. It's better drink hot coffee, massage it with rubbing oil, the soreness will go away."

MD. Male. 60 Years

"How come, it's rare to go to the health center or to the hospital, even though complaints of body aches due to work are common. That's how people work. Take it easy. If after work, it's great to drink hot sweet tea. Immediately lost feeling tired. If you have body aches, you need rest. Don't go to the doctor little by little, take medicine little by little. Precisely that gives rise to another disease again. We're just traditional."

SG. Female. 59 years.

"More people use herbs or natural ones. Reduce the consumption of chemicals such as drugs from the hospital, right? If it is natural, there are no side effects, so it is good for health."

ND. Male. 62 Years.

From the results of the interviews, it was found that the community's awareness regarding the use of drugs with chemicals was very good. Because they tend to avoid taking chemical drugs and prefer relaxation in traditional ways, such as consuming coffee or tea in warm conditions or with massage methods using massage oil.

"Yes, that's my mother usually does at home. So our body also adjusts. As for treatment, there is nothing special. But sometimes mothers at home also have lots of herbal medicines made from these plants. Like drinking turmeric juice, there are also leaves. He said to be fit for work, healthy, not easy to get sick.

MM. Male. 29 years

"The pattern is normal, drink coffee in the morning, fried bananas, work that can be done. Food is also ordinary, rice and side dishes. Afternoon too. Just normal. If you are sick, sometimes you just rest, watch your meals, rarely have a fever for up to 3 days. Thank God, he recovers quickly if he gets sick, so even if he doesn't go to the doctor, he will recover on his own.

ND. Male. 32 years

"If you have aches and pains due to the effects of work, you rarely access health facilities. Most just sort it at home. Most if you go to the Puskesmas, if you are sick, such as the effects of hypertension, or the effects of uric acid, or cholesterol, which limit people's movements. If it's just sore, it can go away with rest, right?"

AR. Female. 35 years old

"If you have pain, ask your child to massage it using massage oil. Sometimes sorted to sleep. If you wake up, it's usually better, you can take it to work again. Sometimes if you have a fever, at most you take paracetamol, I always have it ready at home. Just that. Let's not go to the Puskesmas"

DL. Female. 45 Years

From interviews with several informants, it is known that massage oil is a treatment for muscle pain commonly used by the community. In addition, consuming beverages in the form of brewed tea or coffee drunk in warm conditions is believed to have a relaxing effect, thereby reducing the fatigue felt after work.

Based on the interviews, it was found that the community's awareness regarding the use of drugs with chemicals was very good. Because they tend to avoid taking chemical drugs and prefer relaxation in traditional ways such as consuming coffee or tea in warm conditions or by massage methods using massage oil.

The use of massage oil is a treatment for relieving muscle pain that is commonly used by the community. In addition, the consumption of beverages in the form of hot tea or hot coffee is believed to have a relaxing effect (Rodak et al., 2021), which can minimize the fatigue felt after work so that people do not feel the need to access health facilities if it is only related to MSDs complaints, except if the health problem is very disturbing or causes extreme pain.

4. CONCLUSION

In Takalar Regency's Sanrobone District, many individuals make their living as seaweed farmers. This is supported by the geographical location of the region, which is in the coastal area. This job forces workers to be in work postures that are not ergonomic, therefore it can cause workers to experience fatigue more quickly and cause musculoskeletal complaints (MSDs). Based on the results of this study, 328 seaweed farmers experienced complaints of MSDs (46.5%), with a working period of > 1 year. The most common MSDs complaints were back pain (33.1%), low back pain (36%), and pain

in the lower body (thighs to feet) as much as 19.5%. The most risky work positions experienced were bending (50.3%), sitting for a long time (54.8%), and lifting (55.2%). Moreover, it is known that seaweed farmers prefer not to access health facilities in handling MSDs complaints and tend to relax in the traditional way through massage methods using massage oil, rest and consuming coffee or tea in warm conditions.

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