



THE RELATIONSHIP BETWEEN THE LEVEL OF LABOR FATIGUE AND THE QUALITY OF SLEEP IN FISHERMEN

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ABSTRACT

Work fatigue is a condition that can cause a decrease in efficiency as well as reduced strength or physical endurance of a worker's body and can affect the quality of sleep in workers. Fishermen have a high workload, irregular work schedules, which can affect fatigue and sleep quality. This study aims to determine the relationship between the level of work fatigue and the sleep quality of fishermen. The research method used is descriptive-correlative, using a cross sectional approach. The population in this study were all fishermen who actively worked in Karangjaladri Village, Parigi District, Pangandaran Regency, with a sample size of 131 fishermen. Data was obtained through the Job Fatigue Measuring Tool Questionnaire (KAUPK2) to measure the level of work fatigue and the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality in fishermen. The data analysis used to connect the two variables used the Spearman rank test. The results of the study showed that the level of work fatigue among fishermen in the less tired category was 19 fishermen (14.5%), 42 fishermen (32.1%) were tired, and 70 fishermen (53.4%) were very tired. The research results also showed that 21 fishermen (16%) had good sleep quality and 110 (84%) had poor sleep quality. The results of statistical tests show that there is a relationship between the level of work fatigue and the quality of sleep in fishermen, with a p value of 0.000. It can be concluded that fishermen have a level of work fatigue in the very tired category and have poor sleep quality.

Keywords: fishermen; sleep quality; work fatigue

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INTRODUCTION

Indonesia is a maritime country, consist of total land area with more than 3.25 million km² and an Exclusive Economic Zone (EEZ) covering 2.55 million km² (Kementrian Kelautan dan Perikanan, 2022). It encourages the residents who living in coastlines to use the marine resources for their livelihoods. As well as the main job of the families at coastal areas is fisherman. Fishermen are a group of people who rely on marine products for their livelihood, either through fishing or mariculture (Denny et al., 2016). According to the Census of Fatal Occupational Injuries (CFOI) report released by the Bureau of Labor Statistics (BLS), the risk of accidents in fishing work is much higher, around 20 to 30 times compared to other professions (Alayyannur et al., 2023). Fishermen have sleep and rest patterns that are adapted to working at night to go to sea and catch fish. This is a lifestyle that is not good for fishermen because it can disrupt the circadian rhythm, causing various kinds of health problems (Kiki et al., 2021). According to Habel et al., (2019), the fishermen occupational group often experiences difficulty sleeping as a result of work activities carried out at night, being in the open ocean for long periods of time, weather fluctuations, and unstable changes in body

temperature. This makes it difficult for them to sleep. Apart from that, fatigue due to waiting and attracting the catch with high alertness is also a major factor that disrupts sleep patterns and affects the quality of sleep for fishermen. There are factors that influence a person's sleep quality, namely gender, health status, psychology, and fatigue (Shim & Kang, 2017). Research by Abrahamsen et al., (2023) shows that fishermen in the Danish Faroe Islands generally have poor sleep quality, with an average score of 9.4 which is much higher than the limit for poor sleep (> 5).

Most of the causes of shipping disasters or ship accidents in Indonesia can be attributed to human error at 43.67%, natural factors at 32.37%, and technical factors at 23.94% (Dirjen Perhubungan Laut, 2013). One of the factors in work accidents is human error, which is caused by fatigue and lack of sleep, which can create work situations that are potentially dangerous (Handari & Qolbi, 2021). Feelings of fatigue at work are the most common symptom, ranking seventh according to epidemiological studies in the United States. Complaints of feeling tired while working are the most frequently reported by workers who visit health facilities (Wijanarti & Anisyah, 2022). Fatigue in a person is usually characterized by symptoms such as decreased morale, which is often caused by monotonous work, workload that is too heavy, pressure to complete tasks quickly, unergonomic work postures, inadequate nutritional intake, psychological conditions of workers, other factors such as age, and the length of time a person has been working (Timur Wicaksono et al., 2022). The impact of work fatigue can cause a decrease in performance, a willingness to take risks, and increased involvement of fishermen in organizations that prioritize safety in the event of accidents. According to the results of the research, fishermen in Kelurahan Posokan City of Belitung experienced light labor fatigue of 22.9%, moderate labor fatigue of 42.9%, and heavy labor fatigue of 33.43% (Masengi et al., 2018). Factors affecting fishermen's health and safety at work are fatigue associated with very high job demands, as well as stressful working conditions such as irregular work schedules, long working hours, high work density, and workplace safety problems (Hidayat & Febriyanto, 2021). If this situation persists over a long period of time, it can lead to high levels of work fatigue and increase the risk of work accidents (Lubis & Mu'minah, 2022).

This research was carried out in Karangjaladri Village, Parigi District, Pangandaran Regency. Pangandaran has a coastline length of 91 km and a sea area of 67,340 ha. The fisheries and marine sector is indeed one of the main pillars of the community's economy in Pangandaran Regency, both now and in the future. This district has great potential in the fisheries and marine sectors, which can make a significant contribution to the local economy. This research aims to identify the relationship between the level of work fatigue and the quality of sleep among fishermen in Karangjaladri Village, Parigi District, Pangandaran Regency. It is hoped that this research can help improve occupational safety and health for fishermen and can become the basis for developing policies and health programs aimed specifically at fishermen, such as replicating the UKK Post for the region.

METHOD

The research method used is a correlative descriptive method with a cross-sectional approach. The population in this study was 195 fishermen who were actively working in the Karangjaladri village of Parigi district of Pangandaran, who then took a sample of 131 respondents with a 5% error rate using the Slovenian formula. Samples are taken using probability sampling with the Simple Random Sampling method. The research has been licensed by the Padjadjaran University Ethics Commission under letter number 176/UN6.KEP/EC/2024. The data collection was done door-to-door and consisted of

demographic data (age, gender, recent education, marital status, and working time), a KAUPK2 questionnaire to measure the level of work fatigue, and the Pittsburgh Sleep Quality Index (PSQI) for measuring the quality of sleep of respondents. Data collection was carried out from February 24–30, 2024. The researchers performed validity and reliability tests with $n = 20$ on the instruments used. KAUPK2 is declared valid and reliable, with count r values ranging from 0.467 to 0.853 and Cronbach Alpha values of 0.885. PSQI is declared valid and trustworthy, with a table size r value ranging between 0.477 and 1 and a Cranbach Alpha value of 0.911. The data obtained was analyzed univariately and bivariately with the Spearman rank test. The research was conducted for 10 days after permission for research and research ethics were obtained.

RESULTS

The results of this study were obtained using a questionnaire consisting of a work fatigue questionnaire and a sleep quality questionnaire. The result of the data that has been collected is then analyzed with univariate and bivariate analyses. Bivariat analysis in this study uses the Spearman Rank test to find out the relationship between the level of labor fatigue and the quality of sleep among fishermen in the village of Karangjaladri Parigi, district of Pangandaran.

Table 1.
Respondent characteristics (n= 131)

Respondent characteristics	f	%
Age		
Early Adults : 26-35 Years	12	9,2
End Adult : 36-45 Years	35	26,7
Midle Age : 45-59 Years	76	58
Late Age : >60 Years	8	6,1
Gender		
Men	131	100
Women	0	0
Last Education		
SD	76	58
SMP	34	26
SMA	21	16
Marriage Status		
Married	131	100
Not Married	0	0
Working Time		
New : <5 Years	9	6,9
Long Time : >5 Years	122	93,1

Table 1. shows the distribution of the respondents, mostly aged 45–59 (middle age) with 76 respondents (58%) and the minimum age of > 60 years (lansy) with 8 respondents (6.1%). The last education of respondents is mostly SD level, with a total of 76 respondents (58%), and the least is high school level, with 21 respondents (16%). All respondents were male and had marital status (100%). Later, the results also showed that as many as 122 fishermen (93.1%) had a working time >5 years.

Table 2.
Distribution of Work Fatigue Level (n=131)

Work Fatigue Rate	Score range	f	%
Less tired	<23	19	14,5
Tired	23-31	42	32,1
Very tired	>31	70	53,4

Table 2. It was found that the work fatigue rate among respondents mostly experienced fatigue in the highly tired category, with a total of 70 respondents (53.4%), followed by the

respondents who experienced fatigue in the fatigue category as 42 respondents (32.1%) and the less tired category as 19 respondents (14.5%).

Table 3.
Distribution of Sleep Quality (n=131)

Sleep Quality	Score range	f	%
Good Sleep Quality	<5	21	16
Poor Sleep Quality	>5-21	110	84

Table 3. shows that the shows that the frequency distribution shows that respondents have problems with sleep quality. Respondents experienced poor sleep quality in the poor category, with a total of 110 respondents (84%).

Table 4.
Crosstab of Work Fatigue Levels with Sleep Quality (n=131)

Work Fatigue Rate	Sleep Quality				Total	P Value	Correlation coefficient	
	Good		Poor					
	f	%	f	%				
Less tired	15	78,9	4	21,1	19	100	0,000	0,504
Tired	3	7,1	39	92,9	42	100		
Very tired	3	4,3	67	95,7	70	100		
Total	21	16	110	84	131	100		

Table 4 shows that the relationship between the level of work fatigue and the quality of sleep among respondents obtained the highest results, namely the level of fatigue, very tired with poor sleep quality, 67 respondents (95.7%). Based on the results of the Spearman Rank correlation analysis, it was found that the r value was positive, namely 0.504 with a significance value of 0.000 or p value ≤ 0.05 , so that the null hypothesis (H0) was rejected and the alternative hypothesis (Ha) was accepted, which means there is a significant relationship between the level of work fatigue and quality. Sleep. The results also show a moderate level of correlation because they have an r value between 0.40 and 0.599 (Sugiyono, 2018).

DISCUSSION

Work fatigue is a response of a person's body to the activity performed during work. Based on the results of the study, most fishermen in the Karangjaladri Village and Parigi district of Pangandaran experienced extreme fatigue at work (53.4%). This indicates that more than half of the sample experienced extreme fatigue in their work as fishermen. This condition can be caused by a variety of factors, including excessive workload, time stress, and a lack of adequate rest. It shows that labor exhaustion is a pretty serious problem for fishermen. High labor fatigue in fishermen can lead to health problems, increase the risk of accidents at work, and decrease productivity. A total of 42 respondents (32.1%) experienced work fatigue rates in the tired category. This shows that almost a third of respondents felt tired, but not at a very disturbing rate. However, this condition still needs attention, as it can develop into more severe fatigue if not handled properly. The results also showed that a small percentage, or only 19 respondents (14.5 percent), experienced a degree of work fatigue in the less tired category. It shows that only a small fraction of the fishermen feel their workload is still within the limits of tolerance and does not cause significant exhaustion.

This study differs from the results of Masengi et al. (2018), who found that fishermen experience mild labor fatigue of 22.9%, moderate labor fatigue of 42.9%, and heavy labor fatigue of 33.43%. This difference can be due to the health conditions of each worker and also the different working environment conditions in each area of the waters, such as fairly high wave conditions and different types of gear used by the fishermen. Fishermen in the district of

Pangandaran still use traditional tools such as fishing nets and panning tools. This is supported by research carried out by Prayitno et al. (2023), which mentions that fishing catches in the district are included in small-scale fishing. It is marked with tools used by fishermen, such as small boats, and the number of fishermen is 1-3 people in a boat. The catch is then sold for local consumption. In addition, fishermen in the village of Karangjaladri, Parigi district of Pangandaran, have side jobs such as selling and farming. So the fisherman will have an extra burden of work in addition to his work as a fisherman.

This study uses the KAUPK2 questionnaire as a measure of work fatigue, with 17 question items. The result is that most fishermen feel anxious about something, with a percentage of 40.9%. The results of this study are in line with the study conducted by Fitriani and Kurniati (2022), which found that fishermen in Brebes district often experience anxiety at work. This anxiety is caused by several factors, such as a lack of social and emotional support due to fishermen working in environments far from family and friends. Physical and mental health problems also affect anxiety. Fishermen often experience physical and mental problems as a result of their work, such as fatigue, injuries, and illness. In addition, the uncertainty of income being a fisherman also affects the anxiety felt by fishermen because, as an eye to their daily livelihoods, they depend on the catch.

Working fatigue can also be influenced by several factors, such as age and working hours. Based on the results of the study, the age of the majority of fishermen is 45–59 years (middle age), or as much as 76 fisherman (58%). As you age, the BMR tends to decrease, and the body needs less basic energy to undergo the metabolic processes needed to sustain everyday life. (Ramdan, 2018). Thus, with increasing age, workers will experience decreased energy, lower physical endurance, and increased fatigue, resulting in reduced speed and response to work. In addition, labor exhaustion is also caused by the employment factor, one of which is working time. Based on the results of research, fishermen have a long working time of >5 years, as many as 122 fishermen (93.1%) and a new working time of <5 years, as many as 9 fishing people (6.9%). A person's degree of work experience has an impact on the level of fatigue that may occur during work. In this study, fishermen who have long working hours tend to have fatigue rates in the highly tired category. This is in line with a study conducted by Cahyawati et al. (2024) that states that workers with long working hours experience high rates of fatigue. Thus, working hours can have a positive or negative impact on workers. The positive impact of workers becoming more experienced in their work is positive, but on the contrary, longer working hours also have a negative impact caused by monotonous or repeated work, leading to fatigue and boredom in the work.

Sleep is an essential human need for physical and mental health. The study used the PSQI instrument to measure the quality of sleep in respondents with 19 questions consisting of 7 sleep components. According to the results of the study, most fishermen in the village of Karangjaladri Parigi in the in the district of Pangandaran have poor sleep quality (84%), compared to good sleep quality (16%). The results of this study are in line with the study conducted by Abrahamsen et al. (2023), which showed that the fisherman has poor quality of sleep with a slope of >5. Based on the results of seven components in the questionnaire used, most fishers rated their sleep quality quite badly (52.7%). In the sleep latency component, respondents averaged 16–30 minutes to sleep with a relatively short sleep duration of <5 hours (63.4%), rather intense sleep disturbances of 2 times a week (86.3%), and daily dysfunction with minor problems and drowsiness (49.6%).

The quality of a person's sleep is influenced by several factors, such as age, irregular work schedules, and environmental factors. (Potter & Perry, 2015). In this study, it was found that the majority of fishermen aged 45–59 (middle age) were 58%. According to Oktaviani (2018), it was noted that the age of a person has an impact on the quality of sleep associated with the health conditions experienced and the symptoms of aging. Working with irregular schedules can challenge individuals to adjust to changes in their sleep schedules, which can pose a high risk of worker sleep problems. Fishermen in this study had an average of sleep hours <5 hours (63.4%), where they should be sleeping 7 hours a day by middle age, so this is one of the reasons fishermen have poor sleep quality. There are several factors that affect the quality of sleep of fishermen in this study, including uncertain working hours that can interfere with sleep patterns, heavy physical work, uncomfortable work environments, work stress, and irregular or insufficient sleep habits that worsen their sleep quality. This is in line with a study conducted by Hidayat and Febriyanto (2021), noting that very high job demands as well as stressful working conditions such as irregular work schedules, long working hours, high work density, and workplace safety issues are factors that interfere with worker sleep quality.

Based on the results of the data analysis with statistical tests, the result was a value of significance of 0.000 or $p \text{ value} \leq 0.05$, so the zero hypothesis (H_0) was rejected and the alternative hypotheses (H_a) were accepted, which means that the results showed a significant relationship between the rate of work fatigue and the quality of sleep. It proves that work exhaustion can affect the quality of sleep for fishermen. This study is in line with the study carried out by January et al. (2024) that found a relationship between labor fatigue and sleep quality in fishermen with a $p \text{ value}$ of 0.000 (< 0.05). The results obtained also show that the correlation coefficient value, or $r \text{ value}$, of 0.504, which means the rate of work fatigue with the quality of sleep in fishers in the village Karangjaladri Parigi district of Pangandaran has a similar relationship. When the exhaustion rate gets higher, the quality of sleep tends to be poor. The results showed that the majority of fishermen with fatigue levels in the highly tired category also had poor sleep quality (95.7%), and the fishermen with fatigue rates in the less tired categories tended to have good sleep quality (78.9%). This study is in line with the results of a study conducted by Wijanarti and Anisyah (2022) that found that as a person's fatigue rates increased, the quality of sleep was more likely to deteriorate. On the contrary, if the exhaustion rate is lower, then the quality of sleep will improve.

According to a study carried out by Putri (2018), fatigue caused by a workload can create stress and cause poor sleep quality in a person. In addition, fatigue can also cause sleep disorders such as waking up in the middle of the night, insufficient sleep, or even insomnia because the body cannot switch to optimal sleep conditions, which can worsen the quality of a person's sleep. (Nunn et al., 2016). As a result, nurses need to conduct a thorough assessment of the health of fishermen, including factors that can affect the quality of their sleep, such as work fatigue, stress, and lifestyle. Nurses can develop and implement effective interventions to reduce labor fatigue and improve fishermen's sleep quality. Nurses can also collaborate with various parties, such as entrepreneurs, associated organizations, and other stakeholders, to create a work environment that is conducive to and supportive of the health and well-being of fishermen. Amar et al. (2023) noted that UKK posts on improving health and safety at work in fishermen can improve fisherman's knowledge and skills about health and security at work.

CONCLUSION

Based on the findings of this study, it can be concluded that the fishermen in the village of Karangjaladri in Parigi district of Pangandaran mostly have a level of work fatigue in the

category of very tired and have poor quality of sleep. It has nursing implications that nurses need to raise awareness of the problem, conduct a thorough assessment of fishermen's health, develop effective interventions, and collaborate with various stakeholders to create a conducive working environment and support the health and well-being of fishers.

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