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ORIGINAL ARTICLE

Noise Causes Work Stress in Traditional Boat Workers

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ABSTRACT

Introduction: Noise is an unwelcome sound that disrupts workers. Noise is present in every workplace, including ship engine noise. Continuous noise exposure can result in health issues, including hearing loss. Noise can cause stress on traditional boat workers because being continuously exposed to noise causes an uncomfortable feeling in the work environment. This uncomfortable feeling can trigger stress on ferry boat workers. This study aims to determine the relationship between noise and work stress on ferry boat workers at the Pier of Kampung Baru Tengah, Balikpapan. **Methods:** This study used a quantitative approach with a cross-sectional research design with 44 respondents. The instruments used a Sound Level Meter to measure Noise Level and Dass 21 Questionnaire with an interview method to measure Job Stress. **Results:** As many as 35 respondents were exposed to noise caused by traditional boat engines, and more than 50% of workers did not experience work stress (normal). The results of this study indicated a relationship between noise and work stress in traditional boat workers. **Conclusion:** The direction of the association between noise and work stress was positive but low, meaning that, as noise levels rise, so does the risk of workplace stress.

Keywords: noise, traditional boat workers, work stress

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INTRODUCTION

Indonesia is a country that has a wide sea with a long coastline and consists of thousands of islands. Indonesia's maritime and maritime sector plays an important role in the economic, environmental, social, cultural, legal, and security aspects of Indonesia. The port is a facility at the end of the ocean, river, or lake used for sustainable water transportation, such as cargo ships, passenger ships, klotok, speedboats, and other water transportation (Tinimbang, 2019).

There are many hazards in sea transportation that can interfere with transportation activities, caused by several factors, such as weather, ship conditions, worker skills, amount of cargo, track conditions, and ship terrain. The risks and hazards in sea transportation are related to occupational health and safety, affecting work accidents, occupational diseases, and environmental pollution (Yusmardiansyah and Zhara, 2019). Five hazards in the workplace have the potential to cause work accidents and occupational diseases, namely, biological hazard factors (fungus, viruses, bacteria), chemical hazard factors (gas, dust, toxic materials), physical/mechanical hazard factors (machinery, pressure) hazard factors biomechanics/ergonomics (work position, movement) and psychological social hazard factors (stress, violence, leadership style, conflict in the organization or workplace) (Pinilih, Kamasturyani and Fauzi, 2022).

Each place has potential to affect the health conditions of workers, making it a potential hazard to the safety of the worker. These harmful influences can be physical and mental disturbances (Alfian and Putri, 2019). Within the scope of employment, work stress is a problem for workforce health, potentially increasing the risk of work accidents which will raise considerable material loss and can reduce productivity as a whole (Waluyo, 2013). Psychological disorder is a neglected potential hazard, even though it is potentially dangerous.

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Psychological status is also an important factor that needs attention related to health worker mentality (Putri, Sukyati and Febriyanti, 2021).

Job stress is a condition that arises in the interaction between humans and their work. It can be concluded that work stress is a condition of individual subjective appreciation, which can be in the form of interactions between individuals and the work environment that can threaten and put pressure on psychological, physiological, and individual attitudes (Marisha and Herawati, 2020). Uncomfortable working environment conditions trigger work stress, and workers' safety and health are directly influenced by work stress (Ratnaningtyas *et al*., 2021).

Different studies have shown job stress as a relevant predictor of worker discomfort, morbidity, and even death (Alonso *et al*., 2020). Job stress is caused by two factors: internal and external factors. Internal factors come from the workers themselves, such as their self-confidence, abilities, and skills. External factors include the work environment, including the physical and social environment (work community). Human environmental factors (social) that often cause stress are authoritarian leadership and unhealthy work competition. Physical environmental factors often cause work stress, including an unclean workplace, high vibration, and noise.

Noise is a physical environmental component that impacts the health of employees and is one of the factors that might contribute to the burdens of workers (Yusmardiansyah and Zhara, 2019). Noise may cause temporary or permanent hearing loss, and is also a source of stress that causes an increase in alertness and psychological imbalance (Ali and Mulyati, 2020). Noise is one of the most common environmental pollutants worldwide, especially at work. As a stressor, it affects the ear and the whole body (Kacem *et al*., 2021).

High work noise levels are a global problem. More than 30 million employees in the United States are exposed to damaging noise, but in South Korea, an estimated 2 million workers are exposed (Park *et al*., 2022). Generally, prolonged exposure and high noise levels gradually cause permanent damage. It is possible for transient hearing loss to evolve into permanent hearing loss (Febriyanto *et al*., 2019). Germany's Environmental Expert Council (EEC) states that noise is the main source of severe stress (Fooladi, 2012). According to the Health and Safety Environment (HSE) report, there were 595,000 cases of work-related stress and depression in 2017/2018, with a prevalence rate of 1,800 cases per 100,000 workers. Work-related stress and depression accounted for 44% of all occupational health problems and 57% of illness-related absenteeism (Reppi, Sumampouw and Lestari, 2020).

Deafness due to factory noise, commonly called noise trauma or Noise Induced Hearing Loss (NILH), occurs spontaneously, slowly, and is not felt by workers. When workers feel something is wrong I s generally hearing loss already exists in a more permanent irreversible state. Other effects can cause someone to experience hearing loss (threshold change), temporary limits due to noise and threshold changes due to noise), physiological consequences (discomfort and stress increases, blood pressure increases, pain, headaches, and fatigue), emotional disturbances (irritability and confusion), distraction lifestyle (sleep or rest disturbances and loss of concentration at work), and distraction hearing (reduced ability to listen to TV, radio, communication, and telephone). All of this will affect work productivity (Saefudin and Devianita, 2021).

Work stress is a serious problem in Indonesia, as evidenced by the Basic Health Research (Riskesdas) results by the Ministry of Health, with a mental-emotional disorder rate of 9.8%. As much as 35% of work-related stress can be fatal, and an estimated 43% lost workdays (Aulia, Kawatu and Langi, 2019). On board ships, further loads are often the result of irregular and often extended working hours, which is especially true for small vessels used near the coast with frequent port calls. Twenty-four hours of continuous physical stress from noise, vibration, and ship motion is a hardship for workers (Oldenburg and Jensen, 2019). Previous research conducted by Sinamude, Nugroho, and Alfanan (2022) it found a relationship between noise and work stress as indicated by a p value of 0.038 (p value <0.05).

The Kampung Baru crossing pier in Balikpapan is a functional pier connecting Balikpapan City and Penajam Regency. On active crossing vessels, noise measurements have never been conducted at the precise location. Referring to the noise research on ships conducted by Alfarizi *et al*. (2022), the noise level of 66.4 dB to 73.6 dB indicates a strong category, according to Suma'mur's (2009) analysis, but does not cause deafness and hearing damage (Alfarizi *et al*., 2022). When conducting a preliminary study, the authors uncovered several

stress-related complaints from workers, such as trouble sleeping, balance disorders, and difficulty concentrating. From the results of exposure to facts and existing data, the authors are interested in making a study which links noise and work stress on ferry boat workers at Kampung Baru Pier, Balikpapan.

METHODS

This research was quantitative research with a cross-sectional approach. The population in this study were workers on the traditional boat at the Kampung Baru Middle Pier, Balikpapan City. The sample in this study was taken using the total sampling technique totalling 44 respondents. The dependent variable in this study was work stress, and the dependent variable is noise. The instruments used in this research are Sound Level Meter to measure Noise and Dass 21 Questionnaire with an interview method was used to measure job stress. The data obtained were processed using the SPSS 22.0 statistical tool with the Spearman's rho test. This test was used to see the relationship and strength between variables. This research has received an ethics certificate from the Commission of Ethical Research for Health, Medical Faculty of Mulawarman University Samarinda, with certificate number: 91/KEPK-FK/VII/2022.

RESULTS

Table 1 shows that out of 44 respondents, nine received noise exposure that did not exceed the TLV of 20.5%, and 35 received noise exposure that exceeded the TLV of 79.5%. From the work stress frequency test results, it was found that many workers did not experience work stress.

Based on Table 2, the results of statistical tests using Spearman's rho obtained the results of a p-value of 0.019 or p-value <0.05, which means that there was a relationship between noise and work stress; the correlation coefficient was 0.351. The value indicated a low correlation relationship or weak relationship. Furthermore, the direction of the relationship between noise and work stress showed a positive relationship but low, which means that the higher the noise level the higher the risk of work stress.

DISCUSSION

Based on the findings of a research study on the frequency of work stress from the questionnaire sheets distributed to respondents, the average respondent had experienced symptoms of lack of concentration, such as being unconscious when experiencing delays and experiencing feelings of

Table 1. Frequency Distribution Based on Characteristics of Respondents

Variable	Frequency	Percentage
Age		
17-25 Years	9	20.5
26-35 Years	12	27.3
36-45 Years	10	22.7
46-55 Years	9	20.5
56-65 Years	4	9.1
Level of Education		
Primary School	24	54.6
Junior High School	10	22.7
Senior High School	10	22.7
Work Experience		
≤ 5 years	13	29.5
> 5 years	31	70.5
Exposed to Noise Level		
Not Exceeding Threshold Limit Value (TLV) (< 85dB)	9	20.5
Exceeding Threshold Limit Value (TLV) (>85dB)	35	79.5
Work Stress		
Normal	24	54.6
Mild Stress	14	31.8
Moderate Stress	6	13.6
Heavy Stress	0	0
Very Heavy	0	0

Table 2. Distribution of Spearman's Rho Noise Test with Work Stress

Noise	Work Stress					Total	R Value	p value
	Normal	Mild	Moderate	Heavy	Very Heavy			
< TLV (85 dB)	8 (88.9%)	1 (11.1%)	0 (0%)	0 (0%)	0 (0%)	9 (100%)	0.351	0.019
> TLV (85 dB)	16 (45.7%)	13 (37.1%)	6 (17.1%)	0 (0%)	0 (0%)	35 (100%)		
Total	24 (54.5%)	14 (31.8%)	6 (13.6%)	0 (0%)	0 (0%)	44 (100%)		

restlessness. They experienced restlessness and sleep disturbances. This continued to be felt repeatedly by workers. As a result, they had less sleep time and rushed to work because they wanted to complete the work as quickly as possible so they could rest. It is exceptionally hazardous for the workers and passengers, and there is a risk of an accident on the ship.

Work stress is tension or emotional pressure experienced by a person who is confronted with overwhelming expectations (Zelviana and Febriyanto, 2019). Stress is a condition induced by a person's ideas, emotions, and spiritual experiences (Kurniasari, Mustikarani and Ghozali, 2021). According to Ratnaningtyas *et al*. (2021), tension leads to uncomfortable conditions, difficulty concentrating, anxiety, and restlessness, which impact a person's cognitive, spiritual, and physical aspects, such as shaking, weakness, and others.

The results of the noise measurement measured using the Sound Level Meter on a traditional boat that operated during working hours showed that 35 boats (79.5%) had noise that exceeded the noise threshold value; meanwhile, there were only nine workers (20.5%) having noise below the threshold value. According to Ratnaningtyas *et al*. (2021), noise is a physical aspect that is the cause of occupational diseases. Noise exceeding the threshold value can harm the worker's health and cause discomfort in the work environment.

Based on the bivariate analysis results using the Spearman's rho test, the p-value of 0.019 or $p < 0.05$ was rejected, which means there is a relationship between noise and work stress. This relationship between noise and work stress can occur because the noise in the work environment can trigger work stress in individuals. After all, noise is disturbing, causing discomfort to the worker's environment (Ratnaningtyas *et al*., 2021). The correlation coefficient obtained a value of 0.351, indicating that the relationship between variables was weak.

Although there was a relationship in this study, the strength of the relationship between noise and work stress was weak. It can be seen that, from 44 respondents, there were 16 respondents with noise values exceeding TLV who did not experience work stress. It happened because the noise that workers were exposed to every day made them accustomed even though the noise value exceeded the predetermined TLV so that some workers did not feel disturbed by the noise caused by the ship's engine (Oldenburg and Jensen, 2019).

In addition, the pattern of the association between noise and work stress was positive, meaning that the greater the noise level, the greater the risk of work stress. Research from Barus (2021) found an association between noise and job stress in the production area of PT. Siantar Ice Factory which yielded Chi Square test values of 0.0001 (p-value 0.065), indicating a significant relationship between noise and work stress. Another study was also conducted by Ratnaningtyas *et al*. (2021) which explained that noise intensity affects work stress levels. Noise, changes in air temperature, and many other obstacles have unavoidable likelihoods as causes of work stress.

Furthermore, this research is in line with research that has been conducted by Nasution (2019) said in a study of iron workers that most workers who were exposed to noise experienced mild stress symptoms so that it was concluded that there was a significant relationship between noise and work stress. In addition, the results of this study are in contrast to research that has been conducted by Kenwa *et al*. (2019) on the Relationship of Noise Intensity with Work Stress Levels in Motor Workshop Workers and Dwijati Motor Dealers Denpasar. This study found there was no significant relationship between noise and work stress, which was shown with a p-value of 0.464 (p-value> 0.05).

CONCLUSION

Finally, the direction of the association between noise and work stress was positive but low, meaning that as noise levels rise, so does the risk of workplace stress. Various noise reduction efforts based on risk management principles. Among them were engineering controls (the installation of noise barriers), administrative controls (the regulation of working hours, routine hearing tests and noise measurements, as well as the enactment of noise-prevention regulations), also the use of personal protective equipment (hearing protection devices).

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