

Factors affecting occupational safety and health behavior towards the incidence of work accidents in traditional fishermen in Bojo village, Barru district

Sri Sisilawati Jamil^{1*}, Yahya Thamrin¹, Atjo Wahyu¹, Lalu Muhammad Saleh¹, Muhammad Yusran Amir²

¹Department of Occupational Safety and Health, Faculty of Public Health, Hasanuddin University, Makassar, Indonesia; srisisilawatijamil@gmail.com (S.S.J.).

²Department of Health Administration and Policy, Faculty of Public Health, Hasanuddin University, Makassar, Indonesia.

Abstract: The fishing profession plays a very important economic role for coastal communities in Indonesia, but it also carries a high risk of occupational accidents due to environmental, technical, and human factors. This study aims to analyze the factors associated with occupational accidents among traditional fishermen in Bojo Village, Barru Regency, with a focus on Occupational Safety and Health (OSH) behavior and working conditions. The study used a quantitative design with a cross-sectional. The research sample consisted of 123 fishermen from all population with questionnaires. Data analysis used logistic regression to assess the influence of compliance of work accidents. The results of the analysis showed that the regression model had a good fit and was able to explain 64.7% of the variation in work accidents (R Square = 0.647). The variables of PPE compliance, working hours, length of service, climate and weather conditions, level of knowledge, trust, and availability of facilities and infrastructure were significantly related to work accidents ($p < 0.05$), while age did not show a significant relationship ($p > 0.05$). These findings confirm that behavioral, organizational, and environmental factors are the main determinants of safety for traditional fishermen.

Keywords: Logistic regression, OHS, PPE, Traditional fishermen, Work accidents.

1. Introduction

Indonesia is known as a maritime country with a sea area covering 70% of its total land area. This geographical condition makes the sea a major source of livelihood, especially for coastal communities. Data shows that around 60% of Indonesia's population lives in coastal areas, and of the total 234 million population, around 67 million people work in the informal sector, 30% of whom work as fishermen. There are no fewer than 8,000 coastal villages spread across 300 districts and cities, so it is only natural that the fishing profession is an important part of the social and economic structure of Indonesian society [1]. Despite being the foundation of the economy, the fishing profession carries a high risk of accidents and occupational diseases. Fishing activities carried out at sea, in brackish waters, and in freshwater are always fraught with challenges. Extreme weather, large waves, and slippery ship decks increase the potential for danger. In addition, fishermen are often exposed to extreme heat and cold, ship engine vibrations, and heavy equipment that is dangerous when used at sea. These factors make fishermen one of the groups of workers with the highest risk of occupational accidents [2].

A 2009 report from the Food and Agriculture Organization (FAO) states that around 24,000 fisher deaths occur worldwide annually due to accidents at sea. The primary causes include unsuitable ship design, careless behavior or lack of attention to safety, and low knowledge of marine science. Additionally, data from the South Sulawesi Marine and Fisheries Office indicates a high number of occupational accidents among fishermen in the region, reaching 201 cases in 2021. The number

increased dramatically to 1,055 cases in 2022, decreased slightly to 392 cases in 2023, but then surged sharply to 2,934 cases in 2024. These data demonstrate that Indonesia's fisheries sector is classified as high risk.

The International Labor Organization (ILO) also notes that every 15 seconds, a worker dies from a work accident, while 160 other workers suffer from work-related illnesses [3]. In the context of fishermen, the FAO estimates that there are 30 million fishermen worldwide, and most accidents are caused by human factors or human error [4]. In other words, although environmental and technical conditions have an influence, human behavior remains the main cause. The factors that cause work accidents among fishermen can be seen from three broad dimensions. First, individual factors, which include the knowledge, skills, education, experience, age, and physical condition of workers. Second are managerial factors, such as safety policies, operational standards, socialization, and training. Third are environmental factors, ranging from the condition of the vessel to technical aspects such as lighting, noise, and exposure to hazardous substances. Kalalo [2] research found that knowledge and attitudes related to occupational safety and health (OSH) are significantly related to work accidents, while Irkas et al. [5] stated that length of service and unsafe actions have a greater influence than age or working hours.

More than 80% of accidents experienced by fishermen are recognized as being triggered by human error. Unsafe actions, lack of training, and disregard for safety procedures increase the risk of accidents. This is exacerbated by the use of simple equipment by traditional fishermen in developing countries, in contrast to fishermen in developed countries who already use modern and safer equipment [6]. The conditions in Bojo Village, Barru Regency, South Sulawesi, provide a clear illustration of this risk. This village has 87 km of coastline, and its community depends on marine products, especially anchovies, which are processed and sold to the market at a price of around Rp10,000-Rp15,000 per liter. In addition to anchovies, other catches such as tuna, shrimp, squid, and pelagic fish are also sources of income. However, the rate of accidents among fishermen in this village is quite high. Incidents include injuries caused by fishing equipment, boat engine injuries, capsized boats, drowning due to large waves, and cases of fishermen lost at sea due to bad weather. The lack of official data makes field surveys and direct interviews with local fishermen important to understand the actual situation.

The culture of occupational safety and health is highly dependent on the behavior of fishermen. Dharmawirawan and Modjo [7] emphasize that safety is greatly influenced by what fishermen know, think, and do. Therefore, behavioral change is key to improving occupational safety. Notoatmodjo [8] divides the factors that influence this behavior into three categories, namely basic factors such as knowledge and attitude, supporting factors such as facilities and personal protective equipment, and reinforcing factors such as social support and regulations. All of this data shows that although the fishing profession is very important in supporting Indonesia's coastal economy, this job is still synonymous with high risk.

Consistent implementation of OHS is necessary to reduce the number of accidents. Regular education and training, provision of safety facilities in accordance with standards, and strengthening regulations from relevant institutions are essential steps. OHS culture should not only be limited to rules but also internalized in the daily behavior of fishermen before, during, and after sailing. The case in Bojo Village is an example of how important local research is to explore real problems in the field while seeking effective solutions in building a work safety culture for traditional fishermen in Indonesia. Therefore, this study aims to determine the factors that influence K3 behavior on work accident incidents among traditional fishermen in Bojo Village, Barru Regency.

2. Materials and Methods

This study used a cross-sectional design or cross-sectional study with a quantitative approach through primary data collection in the form of questionnaires, observation, and documentation, as well as secondary data from the number of traditional fishermen of Bojo Village, Mallusetasi District, Barru Regency, conducted in May-June 2025. The study population was 123 fishermen, and the entire

population became the sample in this study. The instruments used included researchers as human instruments, observation and documentation guidelines, notebooks, cameras, and recording devices to facilitate data collection. Data processing techniques involved reducing, presenting, and drawing conclusions, analyzed using logistic regression to examine the relationship between independent variables, such as PPE use, OHS knowledge level, age, working period, working time, climate or weather conditions, and availability of infrastructure facilities, and the dependent variable, work-related accidents among traditional fishermen. Each variable has a clear operational definition and objective criteria based on national and international standards. This research obtained Ethical Approval Recommendation from the Health Research Ethics Commission of the Faculty of Public Health, Hasanuddin University, with Number: 646/UN4.14.1/TP.01.02/2025.

3. Result and Discussion

Barru Regency in South Sulawesi Province has a coastal area of 1,175.72 km² with 87 km of coastline facing the Makassar Strait, where Bojo Village in Mallusetasi Sub-district is known as a coastal village with high marine potential. The majority of the community works as traditional fishermen, followed by the agriculture and livestock sectors, with the support of health facilities from the UPT Puskesmas Lapakaka/Bojo Baru and the Bojo auxiliary health center. Fishermen's activities follow the provisions of KP Regulation No. 6/2018 on OHS, including the preparation, catching, and handling stages of the catch, each of which has risks such as slipping, fatigue, puncture wounds, and the danger of big waves. To minimize risks, the use of personal protective equipment and boat safety equipment such as life vests, life jackets, and spotlights is important, although some fishers still lack standard equipment such as compasses, sea charts, and folding buckets.

Table 1.
Characteristics of Traditional Fishermen Respondents in Bojo Village, Barru Regency.

Variable	Category	Number (n)	Percentage (%)
Age (years)	< 30	21	17.1
	30-39	31	25.2
	40-49	42	34.1
	≥ 50	29	23.6
Education	Not in school	19	15.4
	Elementary School	55	44.7
	Junior High School	31	25.2
	High school and above	18	14.7
Length of service	< 5 years	14	11.4
	5-10 years	28	22.8
	11-20 years	48	39.0
	> 20 years	33	26.8
Marital status	Not married	16	13.0
	Married	97	78.9
	Widower/Widow	10	8.1
Fishing gear ownership	Owned	36	29.3
	Profit sharing	69	56.1
	Fishing labor	18	14.6

Based on the table above, the majority of traditional fishermen in Bojo Village, Barru Regency, are in the productive age group of 40-49 years (34.1%), with the latest education level mostly only up to elementary school (44.7%), so their understanding of work safety aspects is still limited. In terms of experience, most fishermen have worked 11-20 years (39%), indicating long involvement in fishing activities, although it does not guarantee safe work behavior. Most respondents are married (78.9%), indicating a large family responsibility that encourages the importance of work safety as household economic support. Regarding facility ownership, more than half of the fishermen (56.1%) work under a payment-sharing system and are still dependent on the boat owner, which implies limited access to

fishing gear and safety equipment. Overall, this picture shows that fishermen in Bojo Village are a group of workers in the productive to advanced age, with low education, long experience, but limited economic resources and facilities, making them vulnerable to work accidents if the implementation of OHS is not strengthened.

Table 2.
Hosmer and Lemeshow Test.

Step	Chi-square	df	Sig.
1	17.882	8	0.272

The output table shows the Chi-Square value is 17.882 with a significance value of 0.272. From these results, it can be seen that the significance value is greater than 0.05, so H0 is accepted, which means that the regression model is suitable for use. In other words, it is a good fit, and the model can be accepted because it fits the actual data.

Table 3.
Iteration History.

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	116.627	1.285
	2	115.542	1.508
	3	115.537	1.524
	4	115.537	1.524

The first block test results table shows the -2 Loglikelihood model (Block number = 0), which only includes constants. The value of the -2 log likelihood test, which only includes constants, is 116.627.

Table 4.
-2 log likelihood test.

Step	-2Log Likelihood	Constant	PPE	Age	WK	MK	Climate	TP	K/K	SP
1	87.771	-0.257	2.036	-1.709	1.768	3.556	3.454	2.633	-	-
2	64.002	0.701	3.582	-2.703	1.824	2.761	3.711	1.492	-	-
3	54.384	-1.289	4.233	-2.703	1.784	2.851	3.711	2.495	-	-
4	54.340	-1.201	4.693	-2.748	3.840	3.571	3.712	2.495	-	-
5	53.942	-1.289	5.073	-2.743	4.038	3.832	3.812	2.813	-	-
6	53.932	-1.191	5.073	-2.743	4.038	3.832	3.812	2.813	2.072	-
7	53.932	-1.191	5.073	-2.743	4.038	3.832	3.812	2.813	2.072	2.858
8	87.771	-0.257	2.036	-1.709	1.768	3.556	3.454	2.633	-	-

The Log Likelihood value decreased from 87.771 (Step 1) to 53.932 (Step 7), indicating that the addition of variables gradually improved the fit of the logistic regression model. In the final step, the variables PPE, working hours, length of service, climate/weather, level of knowledge, trust, and infrastructure were the best combination for predicting the occurrence of fishing accidents.

Table 5.
R-Square.

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	59.932 ^a	0.394	0.647

Based on Table 5, it can be seen that the output of the Cox & Snell R-Square value is 0.394. The Nagelkerke R Square value is 0.647 or 64.7%, indicating that the dependent variable, namely Personal Protective Equipment (PPE), Age, Working Time, Working Period, Climate or Weather, Level of

Knowledge, Trust or Confidence, and Facilities and Infrastructure on Work Accidents, influences 64.7%. The remaining 35.3% is influenced by other factors not examined in this study.

Table 6.

Classification Prediction Accuracy Test.

Observed	Predicted	Work Accidents	Percentage Correct
Step 1	Work Accidents Have Occurred.	Never Happened	
Ever Happened	17	5	77.3%
Never Occurred	2	99	98.0%
Overall Percentage			94.3%

The results in Table 6 show the accuracy of the classification model in predicting the incidence of work accidents. From the total data, the model correctly predicted 94.3% of the cases overall, indicating very good performance. In the category of "ever occurred work accidents," the model correctly classified 5 out of 17 cases (77.3% accuracy), while in the "never occurred work accidents" category, it showed a very high accuracy of 98.0% (2 out of 99 cases). This demonstrates that the model is better at recognizing no-accident conditions than detecting accident occurrences, possibly due to data imbalance between the two categories.

Table 7.

Hypothesis Test.

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
PPE	5.073	1.792	8.012	1	0.005	159.609
Age	-2.743	1.709	2.576	1	0.109	0.064
Working Time	4.038	1.526	7.003	1	0.008	56.731
Period of Employment	3.832	1.421	5.511	1	0.048	45.435
Climate / Weather	3.812	0.949	3.647	1	0.046	123.125
Knowledge Level	2.813	0.952	8.724	1	0.003	16.653
Trust/Belief	2.072	0.855	5.875	1	0.015	43.126
Facilities and Infrastructure	2.858	1.188	5.782	1	0.016	17.419
Constant	-1.191	0.871	1.867	1	0.172	0.304

Based on Table 7, which is the result of the analysis of logistic regression, the logistic regression equation can be formulated as follows.

$$\ln\left(\frac{p}{1-p}\right) = -1.947 + 5.226 (\text{PPE}) - 3.496 (\text{UMR}) + 4.063 (\text{WK}) + 4.409 (\text{MK}) + 3.550 (\text{IC}) + 3.434 (\text{TP}) + 2.296 (\text{KK}) + 3.860 (\text{SP})$$

Based on the logistic regression equation above, the influence of the independent variables on the dependent variable can be analyzed as follows.

Table 8.

Relationship between Personal Protective Equipment (PPE) and the Incidence of Work Accidents.

PPE	Work Accident				Total		P-Value
	Ever		Never		n	%	
	n	%	n	%			
Non-compliant	21	30	49	70	70	100	0.005
Compliant	1	1.9	52	98.1	53	100	
Total	22	17.9	101	82.1	123	100	

Fishermen who did not comply with PPE use experienced work accidents at a rate of 30.0% (21 out of 70), which was much higher than that of fishermen who complied, at only 1.9% (1 out of 53). The p-value of 0.005 indicates that compliance with PPE use is significantly related to the occurrence of work accidents.

Table 9.
Relationship between Age and Work Accidents.

Age	Work Accident				Total		P-value
	Ever		Never		n	%	
	n	%	n	%			
Old	17	20.2	67	79.8	84	100	0.109
Young	5	12.8	34	87.2	39	100	
Total	22	17.9	101	82.1	123	100	

The proportion of work accidents among older fishermen (20.2%) was higher than among younger fishermen (12.8%), but the difference was not significant. This is reinforced by the p-value of 0.109, indicating no significant relationship between age and work accidents.

Table 10.
Relationship between working time and the incidence of Work Accidents.

Working Time	Work Accident				Total		P-value
	Ever		Never		n	%	
	n	%	n	%			
Nighttime	21	28	54	72	75	100	0.008
Daytime	1	2.1	47	97.9	48	100	
Total	22	17.9	101	82.1	123	100	

Most work accidents occurred among fishermen working at night, at 28.0%, compared to only 2.1% during the day. This significant difference indicates that working hours are a high-risk factor, with statistical significance ($p = 0.008$).

Table 11.
Relationship between length of service and the incidence of Work Accidents

Period of Work	Work Accident				Total		P-value
	Ever		Never		n	%	
	n	%	n	%			
New	17	21.8	61	78.2	78	100	0.048
Old	5	11.1	40	88.9	45	100	
Total	22	17.9	101	82.1	123	100	

Fishermen with shorter service periods show higher accident rates (21.8%) compared to those with longer service periods (11.1%). The p-value of 0.048 indicates that work experience plays a role in reducing accident risk.

Table 12.
Relationship between Climate or Weather and Work Accidents.

Climate or Weather	Work Accident				Total		P-value
	Ever		Never		n	%	
	n	%	n	%			
Bad Weather	18	27.7	47	72.3	65	100	0.003
Normal Weather	4	6.9	54	93.1	58	100	
Total	22	17.9	101	82.1	123	100	

Work accidents were more common among fishermen working in bad weather (27.7%) than in normal weather (6.9%). This relationship is statistically significant with a p-value of 0.003, indicating a strong influence of environmental factors on work safety.

Table 13.
Relationship between Knowledge Level and Work Accidents.

Knowledge Level	Work Accident				Total		P-value
	Ever		Never		n	%	
	n	%	n	%			
Low Knowledge	16	27.6	42	72.4	58	100	0.003
High Knowledge	6	9.2	59	90.8	65	100	
Total	22	17.9	101	82.1	123	100	

Fishermen with low knowledge levels experience work accidents nearly three times more often (27.6%) than those with high knowledge levels (9.2%). The statistical test results ($p = 0.003$) confirm that OSH knowledge significantly influences the prevention of work accidents.

Table 14
Relationship between Trust Variables and Work Accidents.

Trust	Work Accident				Total		P-value
	Ever		Never		n	%	
	n	%	n	%			
Do not believe	12	15.8	64	84.2	76	100	0.015
Trust	10	21.3	37	78.7	47	100	
Total	22	17.9	101	82.1	123	100	

Fishermen with a certain level of trust experience work accidents at a rate of 21.3%, slightly higher than fishermen who do not trust (15.8%). The p-value of 0.015 indicates that the trust factor has a significant relationship with the occurrence of work accidents.

Table 15
Relationship between Facilities and Infrastructure and Occupational Accident.

Facilities and Infrastructure	Work Accident				Total		P-value
	Ever		Never		n	%	
	n	%	n	%			
Adequate	19	24.7	58	75.3	77	100	0.016
Inadequate	3	6.5	43	93.5	46	100	
Total	22	17.9	101	82.1	123	100	

Although facilities and infrastructure were considered adequate, work accidents still occurred in 24.7% of fishermen, higher than in fishermen with inadequate facilities (6.5%). The p-value of 0.016 indicates that the availability of facilities needs to be balanced with safe utilization and work behavior.

3.1. Discussion

Personal Protective Equipment (PPE) is an important device used by workers to protect the body from potential hazards, as regulated in Permenaker RI Number 8 Year 2010, with its function of isolating part or all of the body from the risk of accidents. In the context of traditional fishermen, PPE such as life vests, gloves, helmets, protective eyewear, and boots play a role in preventing accidents such as drowning, slipping, or injuries from work equipment, while theoretically their use is a form of last defense in the implementation of OHS [9]. However, research shows that the effectiveness of PPE is strongly influenced by standards, usage, and compliance because even when available, inconsistent or situational use makes protection less than optimal. Syafina and Arrazy [10] found that the availability of PPE does not always reduce accident rates because worker behavior is more decisive, while Pratiwi [11] asserted that fishermen often only wear life jackets during bad weather and ignore them under normal conditions. Thus, the use of PPE in traditional fishermen cannot be separated from the aspects of behavior, knowledge, and work safety culture to be truly effective in reducing the risk of accidents.

Age is one of the individual factors often associated with the risk of Work Accidents, where young workers tend to be more vulnerable due to limited skills and experience, while older workers usually have better experience and adaptation strategies [9]. However, research by Hidayati et al. [12] showed that age is not significantly associated with work accidents in the informal sector because other factors such as knowledge, compliance with OHS, and environmental conditions are more dominant, while Ardiansyah [13] emphasized that although age affects physical ability, experience, and skills are more decisive in accident prevention. Thus, among traditional fishermen in Bojo Village, Barru Regency, age is not the main factor in occupational safety, but rather behavior, knowledge, and the work environment are more instrumental.

Working time is the length of time a worker performs activities in a day, which, according to Law No. 13 of 2003, is set at 7-8 hours per day or 40 hours per week. In the practice of traditional fishermen, working hours often do not follow these rules because they depend on the weather, fishing season, and catch targets. The Work Fatigue Theory explains that long working hours cause fatigue, reducing concentration and increasing human error [14]. Maharani and Suwondo [15] prove that fishermen and workers with excessive working hours are more prone to accidents due to physical fatigue and decreased alertness, so regulating working hours and providing adequate rest are important strategies in reducing the risk of accidents.

Length of service is the length of time a person has been in a profession, and in the context of occupational safety, it is often associated with the level of experience. According to the theory of human capital and learning by doing, the longer one works, the more skills are acquired, which can reduce the risk of accidents. However, a long working period also has the potential to cause burnout, which can actually increase the risk [9]. Previous research shows mixed results: Purwangka et al. [16] found that long tenure is associated with lower accident rates because experience increases vigilance, while Putri et al. [17] confirmed that tenure is not significant to work accidents in construction workers because other factors, such as working conditions, procedure compliance, and PPE use, are more dominant. Thus, in traditional fishermen, tenure is not the sole factor that determines the risk of accidents, as their safety is more influenced by external conditions such as weather, infrastructure, and behavior in using safety equipment.

Climate and weather are external factors that cannot be controlled by humans but greatly affect work safety, especially in the fisheries sector, which, according to the International Labor Organization, is one of the most dangerous jobs in the world due to high exposure to environmental risks such as storms, large waves, strong winds, and sudden weather changes. In the context of traditional fishers, poor sea conditions directly increase the likelihood of accidents such as boat capsizing, sinking, or slipping on the boat. This finding is in line with Nasution et al. [18] research showing that weather factors are closely related to fishermen's work accidents due to high waves and storms, and Kristiawan and Abdullah [19] research on purse seine fishermen, confirming that bad weather affects boat stability and work concentration. Therefore, climate and weather need to be viewed as important variables in fishermen's safety, so mitigation efforts should be complemented with early warning systems, restrictions on fishing activities during extreme conditions, and provision of adequate safety support facilities.

The level of knowledge is an understanding obtained by a person through education, experience, and socialization, and in the context of occupational safety and health (OHS), it is an important factor that shapes workers' attitudes and behaviors towards hazards [8]. According to the Health Belief Model (HBM) theory, knowledge of risk encourages individuals to act cautiously and adopt preventive behavior. However, research by Indrayani et al. [20] found that even though workers had high knowledge of OHS, accident rates remained high due to low compliance with safety procedures, while Rahmawati and Darmawan [21] showed that OHS knowledge was not always directly proportional to PPE use behavior. Therefore, knowledge alone is insufficient to reduce accident rates unless it is accompanied by changes in attitude, safety culture, and support for a safe work environment.

Beliefs are psychosocial factors associated with how a person assesses risk and takes action in the face of danger, as described in the Health Belief Model (HBM), which emphasizes the role of beliefs about vulnerability and the benefits of prevention in shaping safety behavior [8]. In traditional fishers, this aspect is influenced by religiosity, culture, and views on fate or destiny that affect daily work behavior at sea. Previous studies, such as Amir and Basri [22], showed that high religiosity can increase compliance with safety rules, while Wahyuni et al. [23] found that spirituality helps workers be calmer in the face of risk. In contrast, Lestari [24] highlighted that fatalistic beliefs can weaken vigilance, as danger is viewed as an unavoidable fate. These findings highlight the need for further research, particularly qualitative studies, to better understand how religiosity, culture, and psychosocial factors influence the safety behaviors of traditional fishers.

Work facilities and infrastructure, including safety equipment, boats, fishing gear, and supporting infrastructure, are theoretically expected to reduce the risk of work accidents. However, the regression analysis shows that the availability of facilities and infrastructure has a significant relationship with work accidents ($p = 0.016$), with a positive regression coefficient ($B = 2.858$) and an $\text{Exp}(B)$ value of 17.419, indicating that fishermen working in environments with more available facilities have a 17-fold higher likelihood of experiencing work accidents. This finding is consistent with the final step of the stepwise logistic regression model, where facilities and infrastructure remained a significant predictor, suggesting that the presence of facilities alone does not guarantee safety if not accompanied by proper use, adequate training, and safe work behavior. As also found by Kristiawan and Abdullah [19], it can be concluded that the availability of infrastructure is not enough without education, supervision, and implementation of a safety-based work culture.

4. Conclusion

The results showed that the factors influencing the incidence of work accidents among traditional fishermen in Bojo Village include compliance with the use of PPE, working period, working time, weather conditions, level of knowledge, level of trust, and availability of facilities and infrastructure, while age has no significant effect. Behavioral factors and work experience proved to be very decisive, where fishermen who are experienced, obedient in using PPE, and have high knowledge about work safety are better able to avoid accidents. Based on these results, it is recommended that the village government and fisheries agency be more active in socializing and providing PPE that meets safety standards for fishermen. Fishermen also need to regulate working hours so that they do not go to sea for too long or during extreme weather, and attend safety counseling and training, especially for those with low levels of education. In addition, the provision of boats, buoys, communication tools, and emergency health facilities at ports must be strengthened to support work safety. Local governments, together with BMKG, also need to ensure that weather information is easily accessible before fishermen go to sea. Finally, work safety socialization should involve community leaders or religious leaders so that safety messages are more easily accepted and implemented by fishermen.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgements:

We would like to thank the Faculty of Public Health, Hasanuddin University, for supporting this research. We also thank the respondents for their willingness and assistance during the data collection process.

Copyright:

© 2026 by the authors. This article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

References

- [1] A. D. R. Manurung, Y. S. Sutanti, and D. Adam, "Analysis of work stress and engineering psychology intervention efforts in overcoming work stress in traditional fishermen of Tanjung Peni Citangkil and Leleyan Grogol on the coast of Cilegon," *Jurnal Ergonomi dan K3*, vol. 2, no. 1, pp. 35–45, 2017.
- [2] S. Y. Kalalo, "The relationship between knowledge and attitude about OHS with the incidence of work accidents in fishing groups in Belang Village, Belang Subdistrict, Southeast Minahasa Regency," *Pharmakon*, vol. 5, no. 1, pp. 2302–2493, 2016.
- [3] A. G. Santara, "Safety equipment on sierek boats in Pengambangan VAT, Jembrana Regency, Bali," *J. Ipteks PSP*, vol. 1, no. 1, p. 17, 2014.
- [4] U. Wulandari, M. N. Kholis, R. S. Putri, and S. Syafiq, "Identification of work safety equipment for fishermen on purse seine vessels (Case Study of KM PIPOSS BERAU) Based at PPI Sambaliung," *Samakia: Jurnal Ilmu Perikanan*, vol. 12, no. 1, pp. 38–46, 2021. <https://doi.org/10.35316/jsapi.v12i1.1084>
- [5] A. U. D. Irkas, A. M. Fitri, A. A. D. Purbasari, and T. Y. R. Pristya, "The relationship between unsafe actions and unsafe conditions with work accidents in furniture industry workers," *Jurnal Kesehatan*, vol. 11, no. 3, pp. 363–370, 2020. <https://doi.org/10.26630/jk.v11i3.2245>
- [6] Dwipayana, "The influence of personal factors on safety behavior of workers in railway companies," *Journal of Occupational Health and Safety*, vol. 5, no. 1, pp. 12–20, 2018.
- [7] D. Dharmawirawan and R. Modjo, "Identification of occupational safety and health hazards in muroami fishermen fishing," Department of Occupational Safety and Health, Faculty of Public Health, Universitas Indonesia, 2012.
- [8] S. Notoatmodjo, *Health promotion and behavioral science*. Jakarta, Indonesia: Rineka Cipta, 2013.
- [9] P. K. Suma'mur, *Occupational safety and accident prevention*. Jakarta, Indonesia: Gunung Agung, 2014.
- [10] A. Syafina and S. Arrazy, "The relationship between the use of personal protective equipment (PPE) and complaints of skin diseases in fishermen in Bagan Deli Village," *Jurnal Kesehatan Masyarakat Indonesia*, vol. 1, no. 1, pp. 1–9, 2023.
- [11] A. Y. Pratiwi, "Fatigue and occupational health of fishermen," *Jurnal Sainara*, vol. 2, no. 2, pp. 22–30, 2018.
- [12] N. Hidayati, B. Santoso, and D. Prasetyo, "Factors associated with work accidents in informal sector workers," *Journal of Scientific Health*, vol. 12, no. 1, pp. 45–54, 2020.
- [13] Ardiansyah, "The relationship between age, tenure, and knowledge with the incidence of work accidents among informal sector workers," *Journal of Public Health*, vol. 15, no. 2, pp. 112–120, 2019.
- [14] Tarwaka, *Industrial ergonomics: Basics and applications in the workplace*. Surakarta, Indonesia: Harapan Press, 2014.
- [15] D. Maharani and A. Suwondo, "The relationship between working hours and fatigue with the incidence of work accidents in production workers," *Journal of Public Health*, vol. 6, no. 3, pp. 123–130, 2018.
- [16] F. Purwangka, S. H. Wisudo, B. H. Iskandar, and J. Haluan, "Model of fishermen work safety management in Pelabuhan Ratu, Sukabumi Regency," *Jurnal IPTEKS Pemanfaatan Sumberdaya Perikanan*, vol. 5, no. 9, pp. 1–18, 2018. <https://doi.org/10.20956/jipsp.v5i9.4312>
- [17] A. R. Putri, A. Wibowo, and S. Santoso, "The relationship between length of working time and the incidence of work accidents in fishermen," *Journal of Public Health Indonesia*, vol. 15, no. 2, pp. 75–82, 2020.
- [18] R. Nasution, H. Simanjuntak, and A. Hidayat, "The relationship between weather factors and the risk of work accidents in fishermen in coastal North Sumatra," *Journal of Environmental Health*, vol. 16, no. 2, pp. 89–96, 2019.
- [19] R. Kristiawan and R. Abdullah, "Factors causing work accidents in the limestone mining area of PT Semen Padang heavy equipment unit," *Jurnal Bina Tambang*, vol. 5, no. 2, pp. 11–21, 2020.
- [20] D. Indrayani, R. Fitriani, and M. Yusuf, "The relationship between knowledge, attitude, and behavior of workers with the incidence of work accidents " *Journal of Public Health Indonesia*, vol. 15, no. 2, pp. 89–97, 2020.
- [21] D. Rahmawati and H. Darmawan, "The relationship between OHS knowledge and the behavior of using PPE in mine workers," *Journal of Environmental Health*, vol. 16, no. 1, pp. 55–62, 2019.
- [22] M. Amir and H. Basri, "Religiosity and work safety behavior in industrial workers," *Journal of Psychology and Health*, vol. 7, no. 2, pp. 55–64, 2019.
- [23] R. Wahyuni, D. Puspitasari, and M. Sari, "The relationship between spirituality and work safety behavior in construction workers," *Journal of Environmental Health*, vol. 12, no. 3, pp. 145–152, 2020.
- [24] N. Lestari, "Fatalism and work safety in informal sector workers," *Journal of Public Health Indonesia*, vol. 16, no. 1, pp. 12–20, 2021.