

Analysis of Occupational Health and Safety Practices in the Malang Rapat Village Fishermen Group

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ABSTRACT

Small-scale fisheries remain among the most hazardous occupations worldwide, yet occupational health and safety (OHS) practices in this sector are rarely studied at the community level in Indonesia. This study examines OHS conditions among fishermen in Malang Rapat Village, Bintan Regency, using a qualitative-descriptive approach. Data were collected through semi-structured interviews with 15 respondents, participatory observation, and documentation review, and analyzed thematically. Findings reveal five systemic vulnerabilities: (1) low safety awareness shaped by cultural and structural factors, (2) minimal use of personal protective equipment (PPE), (3) chronic fatigue and long-term health issues, (4) lack of emergency preparedness, and (5) weak institutional engagement and policy disconnect. Despite the high level of occupational risks, OHS implementation remains absent due to socioeconomic constraints, cultural perceptions, and inadequate institutional support. This study highlights the need for decentralized, culturally embedded OHS governance at village level, integration of artisanal fishers into national labor protection schemes, and alignment with international frameworks such as FAO SSF Guidelines and ILO-OSH standards. The findings contribute to a more contextualized understanding of OHS vulnerabilities in small-scale fisheries and offer evidence-based recommendations for both local policy and sustainable coastal development.

Keywords: occupational health and safety, small-scale fisheries, fishermen, Malang Rapat Village

INTRODUCTION

Occupational health and safety (OHS) is a fundamental pillar of labor protection that ensures not only the physical well-being of workers but also enhances productivity, economic security, and social welfare. While significant strides have been made in implementing OHS standards in industrial and formal sectors, small-scale and informal work environments particularly in fisheries remain largely under-regulated and underserved. Globally, the fishing industry is recognized as one of the most dangerous occupations due to exposure to unpredictable environmental conditions, physical exhaustion, and limited access to health resources (Turner, 2025; Rasolofoson et al., 2024).

In Indonesia, small-scale fisheries represent a vital economic sector for coastal communities, including Malang Rapat Village in Bintan Regency. Here, fishing is not only a primary livelihood but also a cultural identity. Despite its socioeconomic importance, the daily work of local fishermen involves a range of occupational hazards such as storm exposure, musculoskeletal injuries, and

inadequate onboard safety infrastructure. These risks are exacerbated by low levels of formal education, poor access to safety training, and the absence of enforceable regulatory mechanisms at the village level (Purnomo et al., 2025; Nishanthan et al., 2025).

Recent studies in Southeast Asia and other developing maritime regions have emphasized the growing urgency of integrating OHS into fisheries governance. For instance, research by Acevedo Rodriguez et al. (2025) and Sentillet et al. (2025) highlights that OHS interventions such as first responder training, vessel certification, and protective gear distribution can significantly reduce occupational incidents in small-scale fishing communities. However, these studies are often concentrated in specific ecological or policy contexts, and very few focus on community-based fisheries in Indonesia's outer island regions. Moreover, Rasolofoson et al. (2024) identify a concerning rise in fisher drowning deaths linked to both climate change and inadequate safety preparedness.

This forms the state of the art: while global research is advancing in integrating OHS frameworks into small-scale fisheries management, localized studies in Indonesian fishing villages particularly at the micro level involving fisher groups are scarce. Most existing studies take a top-down policy analysis approach or remain quantitative in nature, leaving a significant gap in understanding how OHS is actually perceived, practiced, and neglected at the grassroots level.

The novelty of this research lies in its community-specific, qualitative exploration of OHS practices within the Malang Rapat Village Fishermen Group. Unlike prior studies that focus on broad policy or national frameworks, this study investigates lived experiences, cultural beliefs, and informal coping mechanisms related to occupational risks. It also offers a bottom-up perspective rooted in fieldwork that can be used to inform more contextualized, sustainable safety interventions.

Based on these gaps, the central research question of this study is: *“How are occupational health and safety practices perceived, implemented, and challenged within the Malang Rapat Village Fishermen Group?”*

Accordingly, this study aims to provide a comprehensive analysis of the occupational health and safety conditions among small-scale fishermen in Malang Rapat. By employing qualitative methods including in-depth interviews, participatory observation, and thematic analysis the study seeks to uncover the latent factors contributing to safety neglect and to propose actionable recommendations grounded in local realities. This is intended to serve not only as an academic contribution but also as a practical framework for OHS integration in similar coastal communities throughout Indonesia.

Occupational Health and Safety Challenges in Small-Scale Fisheries: Global and Local Context

Small-scale fisheries (SSFs) are among the most perilous occupations globally due to exposure to extreme weather, long working hours, and limited access to healthcare. Despite their economic significance particularly in countries like Indonesia small-scale fishers often face chronic neglect in terms of safety regulation and healthcare access (Turner, 2025; Ferrer et al., 2021). The Food and Agriculture Organization (FAO) emphasizes that fishing requires extended hours at sea, frequently at night and in rough weather, involving dangerous equipment and physically demanding work, which can have severe health consequences. In many

developing countries, this risk is compounded by the lack of safety equipment, training, and emergency response systems. Case studies from Lake Baringo, Kenya, and Turkey’s fisheries sector show that inadequate safety measures result in high rates of physical exhaustion, drowning, and musculoskeletal injuries (Rasolofoson et al., 2024; Dewi & Kusnoputranto, 2023).

Socioeconomic constraints further exacerbate the problem. Limited income, low levels of formal education, and cultural perceptions often hinder the adoption of safety practices such as the use of personal protective equipment (PPE) or participation in OHS training (Indrayani et al., 2023; Hyde, 2022). The informal nature of many SSFs means that fishers are frequently excluded from labor protections or national safety frameworks (Zakaria et al., 2022; Nakamura, 2022). In Indonesia, although small-scale fisheries are the backbone of local fish production, policies and funding still prioritize environmental conservation and food security over human safety (Sari et al., 2021; Jaya et al., 2022).

While international frameworks like the FAO’s Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries advocate for fisher safety, local implementation remains inconsistent. Even in countries with established safety policies, such as Canada, enforcement challenges persist. In Indonesia, integrated coastal management plans rarely include community-based OHS schemes (Stacey et al., 2021; Halim et al., 2019), leaving many fishing communities—particularly in outer island regions without structured safety protocols.

Recent literature also highlights emerging threats from climate change, which increases storm-related accidents, disrupts fish stocks, and amplifies health risks for fishers (Bygvraa et al., 2022; Dewi et al., 2022). The COVID-19 pandemic further exposed vulnerabilities, especially for those lacking health insurance or safe working environments (Ferrer et al., 2021; Cavalli et al., 2019). Rights-based approaches are gaining traction, but there remains a gap in translating these global principles into actionable, localized safety measures (Nakamura, 2022; Franz et al., 2023).

However, despite a growing body of research on OHS in fisheries, few studies focus on micro-level, community-specific contexts in Indonesia’s outer islands—such as Malang Rapat Village in Bintan Regency—where fishing is both an economic lifeline and a cultural identity. Existing studies largely adopt broad policy analyses or national-scale assessments, overlooking how OHS is understood, practiced, and constrained within specific fisher

groups. This gap is particularly critical because community-level factors—such as traditional fishing methods, local perceptions of risk, and informal safety norms—directly influence the effectiveness of any safety intervention.

This study addresses that gap by investigating: *How are occupational health and safety practices perceived, implemented, and challenged within the Malang Rapat Village Fishermen Group?* By situating the research in this specific location, the study not only documents local realities but also provides a grounded understanding that can inform more targeted and culturally appropriate safety strategies for small-scale fisheries in Indonesia.

This study employs a qualitative descriptive design using a case study approach, which is appropriate for exploring in-depth, real-life occupational experiences of fishermen in localized contexts. This approach aligns with recommendations from Garrido Campos (2020) and Stacey et al. (2018), who emphasize that community-specific research provides rich insights for safety interventions in small-scale fisheries.

The research was conducted in Malang Rapat Village, Bintan Regency, Riau Islands, Indonesia, from May to June 2025. This village was selected due to its strong dependence on small-scale fisheries and the observable absence of formal OHS systems. The geographical remoteness and cultural uniqueness of the community make it an ideal site to explore context-specific OHS risks (Halim et al., 2019).

To obtain comprehensive insights, the study used triangulated data collection methods:

1. In-depth Interviews were conducted with 15 purposively selected informants, consisting of: 8 active fishermen, 3 local fishing group leaders, 2 health workers, 2 village officials. The semi-structured protocol, adapted from Bygvraa et al. (2022), focused on perceptions of risk, past accidents, health behaviors, and preventive knowledge.
2. Participant Observation was carried out for a 2-week period, during which the researcher shadowed daily fishing activities and dockside operations. Observations noted the use (or absence) of protective equipment, work posture and exposure risks, and emergency response behavior.
3. Documentation Review included photographs, safety-related signage, personal protective equipment (PPE) records, and local government regulations to contextualize the findings.

Data were analyzed using Thematic Analysis, following Braun & Clarke's (2006) six-phase framework: (1) Familiarization with data, (2) Generating initial codes, (3) Searching for themes, (4) Reviewing themes, (5) Defining and naming themes, and (6) Producing the report.

This study involved 15 purposively selected informants, consisting of 8 active fishermen, 3 local fishing group leaders, 2 health workers, and 2 village officials. Data from in-depth interviews, participant observation, and documentation were analyzed using Braun & Clarke's (2006) thematic analysis framework. During coding, 37 initial codes were identified, which were then grouped into 12 sub-themes. Through iterative review and cross-checking with field notes, these sub-themes were consolidated into five interrelated themes that capture the systemic vulnerabilities in occupational health and safety (OHS) among small-scale fishermen in Malang Rapat Village. The term "informal fishers" in this context refers to individuals engaged in small-scale, non-industrial fishing activities who are not formally registered as workers, are outside formal labor regulations, and often operate without standardized safety protocols or contractual protections.

Theme 1 – Limited Safety Awareness as a Cultural and Structural Barrier

Interview data show that 11 out of 15 informants (73%) reported no formal safety training experience, and 9 fishermen (60%) admitted they had never discussed safety procedures within their groups. One of the informants, Pak Amir (54 years old), stated: *"We have been like this for a long time, if the weather is bad, we wait for it to subside, but regarding safety training or SOPs, we have never been able to do so."* This reflects a work culture where risk is normalized and accidents are often attributed to fate (*takdir*). Both cultural beliefs and the absence of institutionalized training contribute to this low awareness. This aligns with Indrayani et al. (2023), who found that informal fishers in Indonesia often perceive safety as secondary unless enforced by external actors.

Theme 2 – Lack of Personal Protective Equipment (PPE) and Its Consequences

Observation showed that only 3 out of 8 active fishermen (37.5%) owned a life jacket, and none wore gloves or protective footwear during fishing. One informant, Mr. Ridwan (39 years old), explained: *"Buoy? There are those who have been given*

when there was a government program in the past, but it was hard, hot, and interfered with the time of pulling the net. So it's not used." Many cited discomfort, high cost, or perceived irrelevance as reasons for not using PPE. This behavioral pattern is consistent with Acevedo-Rodriguez et al. (2025), who identified economic constraints and informal norms as major obstacles to PPE adoption among artisanal fishers.

Theme 3 – Work-Related Fatigue and Long-Term Health Issues

A majority of active fishermen (6 out of 8, or 75%) reported working 12–16 hours per day during peak fishing season, with some trips lasting up to three consecutive days at sea. Prolonged exposure to sun, heavy lifting, and hauling nets were common, leading to chronic pain in shoulders, knees, and backs. As Mr. Rahmat (45 years old) stated: *"If it's the season, we can go to sea for three days in a row, just rest for a while on the ship. Going home crushed."* This workload increases the risk of accidents due to fatigue, consistent with Kim & Lee's (2022) findings.

Theme 4 – Absence of Emergency Preparedness

Of the 15 respondents, none had ever participated in marine accident handling training, and no fishing vessels observed carried complete first aid kits, emergency radios, or flares. Emergency responses relied entirely on ad-hoc help from nearby boats or mobile phones, which often lacked signal. One incident described by Mr. Yusuf (51 years old) illustrated this risk: *"There was one who fell into the sea, but because we couldn't swim, we all panicked. Fortunately, there was a boat passing by."* Such unpreparedness is consistent with Rasolofoson et al. (2024), who note rising drowning rates among artisanal fishers due to poor risk readiness.

Theme 5 – Weak Institutional Engagement and Policy Disconnect

All 15 informants (100%) stated that they had never received routine OHS training or safety equipment assistance from government agencies or NGOs. While some had heard of safety programs in other districts, none were implemented in Malang Rapat. According to Ibu Sari, head of a women's fishermen's group: *"We have often proposed training or buoy assistance to the village, but it has always been promised."* This reflects a gap between central government policy—often generic and top-down—and the specific needs of local fishing communities (Halim et al., 2019).

Five key themes emerged: low safety awareness, lack of PPE, chronic fatigue, poor emergency preparedness, and weak institutional engagement. Table 1 summarizes these findings.

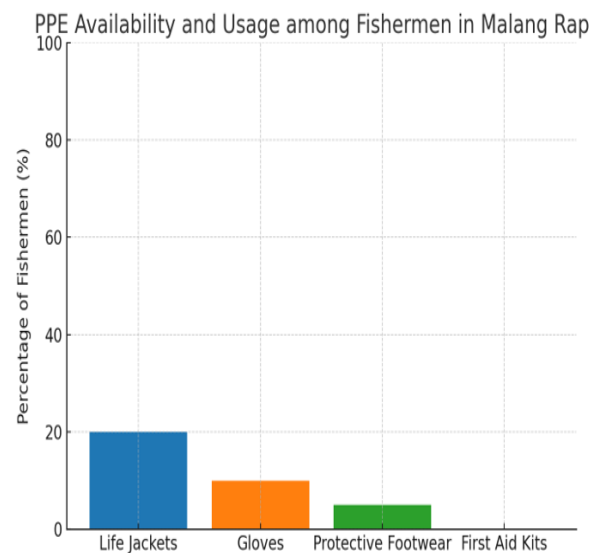


Figure 1. PPE Availability and Usage among Fishermen in Malang Rapat.

Table 1. Key OHS Findings in Malang Rapat Village.

Theme	Evidence	Consequences	Literature Alignment
Low safety awareness	Risks seen as "fate"; no SOPs	Fatalism, neglect of preventive measures	Indrayani et al., 2023; Turner, 2024
Lack of PPE	Rarely used due to cost & discomfort	Higher fatality risk	Acevedo-Rodriguez et al., 2025; OSHA, 2023
Work fatigue	12–16 hrs shifts, untreated injuries	Chronic pain, accidents	Cavalli et al., 2019; Kim & Lee, 2022
Emergency unpreparedness	No training, no SOPs, poor equipment	Panic during accidents	Rasolofoson et al., 2024; OSHA, 2023
Weak institutional support	No training, no safety programs	Policy–practice disconnect	Halim et al., 2019; Bennett et al., 2021

Source: Procced Data, 2025

Fewer than 20% of fishermen reported owning or using life jackets, while the usage of gloves and protective footwear was below 10%. Alarmingly, none of the observed boats carried a functional first aid kit. This lack of PPE is consistent with global artisanal fisheries research, where safety equipment is often unavailable, uncomfortable, or perceived as unnecessary unless mandated.

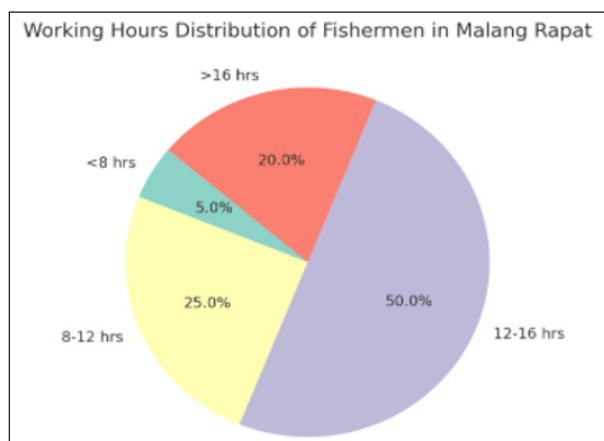


Figure 2. Working Hours Distribution of Fishermen in Malang Rapat.

Nearly half (50%) reported working 12–16 hours daily, while 20% admitted working more than 16 hours continuously. This prolonged workload contributes to chronic fatigue, musculoskeletal pain, and accidents. The normalization of fatigue reflects the absence of labor regulations governing rest in small-scale fisheries.

In summary, these five themes limited safety awareness, lack of PPE, work-related fatigue, absence of emergency preparedness, and weak institutional engagement are interconnected and collectively shape the high-risk work environment of Malang Rapat's small-scale fishermen. The combination of cultural attitudes, economic constraints, lack of structural support, and policy neglect creates systemic vulnerabilities that require locally tailored, community-based OHS interventions.

POLICY IMPLICATIONS

The findings of this study have critical implications for occupational health and safety (OHS) policymaking in Indonesia's small-scale fisheries sector.

First, the need for Decentralized Safety Governance. The absence of localized safety infrastructure and institutional support in Malang Rapat underscores the urgency of decentralizing OHS responsibilities. Village-level regulations and

safety budgets (*alokasi dana desa*) can be designed to include: Mandatory PPE procurement, Community-based first responder training, Appointment of local OHS coordinators within fishing cooperatives. This approach echoes the recommendations by Stacey et al. (2021) and Halim et al. (2019), who argue for embedding OHS into coastal zone governance structures.

Second, Inclusion of Informal and Seasonal Fishers in National OHS Frameworks. In this study, *seasonal fishers* refer to fishermen who only work during certain fishing seasons due to weather conditions, migratory fish patterns, or economic constraints, and who often supplement their income with other jobs during off-seasons. Current Indonesian labor law often excludes informal workers like artisanal and seasonal fishers. These gaps lead to inadequate coverage under BPJS Ketenagakerjaan (National Workers Insurance) and limit access to occupational clinics. Based on the risk exposure observed in this study, policymakers should prioritize expanding flexible and mobile OHS services to remote coastal zones and redesign regulations to explicitly protect self-employed or seasonal fishers.

Third, Cultural Integration into OHS Communication. Findings suggest that safety is culturally perceived as secondary or optional. Therefore, OHS communication strategies should incorporate local values and beliefs to improve acceptance. Instead of assigning “education and outreach” roles to traditional leaders or religious figures who do not have a formal mandate these actors can serve as cultural influencers by endorsing safety practices in community forums or ceremonies. Such culturally embedded approaches, when combined with technical training delivered by relevant agencies, have been effective in other developing regions (Franz et al., 2023).

Community-Based OHS Framework in Informal Maritime Sectors. Most OHS frameworks are developed for industrial or formal sectors. This study introduces a grassroots model of OHS vulnerability, where informal labor, environmental hazards, and cultural norms interact, advancing Garrido Campos' (2020) work on community-centric safety governance in fisheries. Expanding Risk Perception Theory. Findings enrich risk perception theory by illustrating how occupational risks are framed within cultural-religious narratives (*“takdir”* or fate), especially in under-regulated coastal communities, opening new avenues for interdisciplinary exploration across safety science and anthropology. Linking OHS and Sustainable Development in Coastal Economies. By

embedding OHS discourse into coastal livelihood sustainability, the research supports a more holistic approach to SDG 8 (*Decent Work*) and SDG 14 (*Life Below Water*), aligning health, environment, and economics in one policy-relevant model.

Conclusions

Based on the findings and analysis, it can be concluded that:

1. Occupational safety for fishermen in Malang Rapat Village is still very low both in terms of awareness, training, and supporting facilities such as PPE.
2. A work culture that does not prioritize safety, coupled with economic and structural conditions, is the main obstacle to the implementation of OHS practices.
3. High working hours and lack of fatigue management have long-term health impacts that can reduce fishermen's productivity.
4. The absence of emergency training and weak local policies increase vulnerability to work accidents at sea.
5. The gap between central policies and implementation on the ground indicates the need for a more responsive, locally tailored approach.

Recommendations

To address these issues, it is recommended to develop a participatory, locally based occupational safety strategy for the Malang Rapat fishing community. The local government, together with relevant agencies, should:

1. Organize regular OHS training adapted to the realities of fishing work and cultural characteristics of the community,
2. Systematically procure PPE suited for sea conditions, accompanied by practical training on its proper use,
3. Implement work rotation systems and provide mobile healthcare services to mitigate fatigue and long-term health problems,
4. Establish clear and universally understood emergency SOPs, along with regular first aid and evacuation simulations,
5. Involve fishermen in the planning and monitoring of OHS programs, ensuring that occupational safety is an integral part of the coastal development agenda.

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AUTHORS CONTRIBUTION STATEMENT

We hereby state that regarding the contribution of each author in the creation of the paper, the contributing authors are Satriadi as the main contributor and Muhammad Ihsan Ridho, Umi Habibi, Julaika Fira Usada, and Diana Martin as contributor members.

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