

Assistance to improve occupational safety and health behavior in traditional diver fishing communities

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ABSTRACT

Traditional fishermen are exposed to various occupational hazards due to the nature of their work, often lacking adequate safety practices and health knowledge. This community service initiative aimed to improve occupational safety and health (OSH) behaviors among traditional fishermen on Kambuno Island, Pulau Sembilan District, Indonesia. Using a one-group pre- and post-test design, the intervention targeted a sample of 60 out of 862 local fishermen. The program involved counseling sessions and the distribution of OSH guidelines specifically tailored for fishing activities, delivered over a two-month period. The intervention assessed various components related to OSH, including the use and completeness of Personal Protective Equipment (PPE), knowledge and practice levels, personal health habits, treatment-seeking behavior, and environmental health awareness. Results showed significant improvements in PPE usage, knowledge levels, and OSH practices. For instance, post-intervention data indicated a substantial increase in the use of head, hand, and foot protection, as well as life vests. Furthermore, positive behavioral changes were observed in boat cleaning, self-care, and formal healthcare-seeking behaviors, as fishermen increasingly opted for health centers over traditional treatments. The findings suggest that focused OSH interventions can effectively enhance safety and health behaviors in high-risk fishing communities. This program underscores the importance of continued education and monitoring to sustain these improvements and reduce occupational risks in traditional fishing communities.

ABSTRAK

Nelayan tradisional terpapar berbagai bahaya pekerjaan karena sifat pekerjaan mereka, yang sering kali kurang memiliki praktik keselamatan dan pengetahuan kesehatan yang memadai. Kegiatan pengabdian masyarakat ini bertujuan untuk meningkatkan perilaku keselamatan dan kesehatan kerja (K3) di kalangan nelayan tradisional di Pulau Kambuno, Kecamatan Pulau Sembilan, Indonesia. Menggunakan desain satu kelompok pre dan post-test, intervensi ini menargetkan sampel sebanyak 60 dari 862 nelayan lokal. Program ini melibatkan sesi konseling dan distribusi panduan K3 yang dirancang khusus untuk aktivitas nelayan, yang diberikan selama periode dua bulan. Intervensi ini menilai berbagai komponen terkait K3, termasuk penggunaan dan kelengkapan Alat Pelindung Diri (APD), tingkat pengetahuan dan praktik, kebiasaan kesehatan pribadi, perilaku pencarian pengobatan, dan kesadaran kesehatan lingkungan. Hasil menunjukkan peningkatan signifikan dalam penggunaan APD, tingkat pengetahuan, dan praktik K3. Misalnya, data post-intervensi menunjukkan peningkatan yang substansial dalam penggunaan pelindung kepala, tangan, kaki, serta rompi pelampung. Selain itu, perubahan perilaku positif diamati dalam pembersihan perahu, perawatan diri, dan perilaku pencarian layanan kesehatan formal, di mana nelayan semakin memilih pusat kesehatan daripada pengobatan tradisional. Temuan ini menunjukkan bahwa intervensi K3 yang terfokus dapat secara efektif meningkatkan perilaku keselamatan dan kesehatan di komunitas nelayan berisiko tinggi. Program ini menegaskan pentingnya edukasi berkelanjutan dan pemantauan untuk mempertahankan perbaikan ini dan mengurangi risiko pekerjaan di komunitas nelayan tradisional.

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INTRODUCTION

Fishermen are among the most vulnerable occupational groups, facing a myriad of health risks and safety hazards that significantly impact their well-being. The fishing industry is characterized by high rates of accidents and injuries, with global estimates indicating approximately 120 million accidents and 200,000 fatalities annually within this sector (Nguyen, 2024). This alarming statistic underscores the urgent need for targeted interventions to mitigate these risks. The inherent dangers of fishing, such as exposure to harsh weather conditions, heavy machinery, and the physical demands of the job, contribute to a high occupational fatality rate that is often reported as being 30 times higher than the overall occupational fatality rate in many countries (Lucas & Case, 2017; Levin et al., 2010).

International Labour Organization (ILO) menunjukkan bahwa setiap tahun terjadi 1,1 juta kematian yang disebabkan oleh karena penyakit atau kecelakaan akibat hubungan pekerjaan (Wibisono, 2013). Data hasil penelitian Kementerian Kesehatan (2006) mengenai penyakit dan kecelakaan yang terjadi pada nelayan dan penyelam tradisional, menyebutkan bahwa sejumlah nelayan di Indonesia menderita nyeri persendian (57,5%) dan gangguan pendengaran ringan sampai ketulian (11,3%), kasus barotrauma (41,37%) dan kelainan dekompresi (6,91%) yang di sebabkan tidak tercukupinya gas nitrogen akibat penurunan tekanan yang mendadak, sehingga menimbulkan gejala sakit pada persendian, susunan syaraf, saluran pencernaan, jantung, paru dan kulit

The lack of knowledge regarding occupational health and safety is a significant factor contributing to the vulnerability of fishermen. Many fishermen operate without adequate training or understanding of safety protocols, which exacerbates their risk of accidents and health issues (Ahmad, 2022). For example, compliance with safety regulations is often minimal, and protective equipment is rarely utilized (Kang et al., 2019; Zytoon & Basahel, 2017). This lack of awareness not only increases the likelihood of accidents but also leads to a general neglect of health maintenance practices, further compromising their well-being (Dewi, 2023; Yan et al., 2022). Moreover, the socio-economic context of fishermen often limits their access to healthcare and occupational safety resources. Many fishermen work in informal settings with little to no support for health-related issues, which can lead to untreated injuries and chronic conditions (Guillot-Wright et al., 2022; Cherryhomes & Guillot-Wright, 2023). The interconnectedness of work-related and non-work-related health issues highlights the need for comprehensive health interventions that address both the occupational hazards and the broader social determinants of health affecting fishermen (Guillot-Wright et al., 2022; Barrow et al., 2022).

In addition to the immediate physical dangers, fishermen are also susceptible to chronic health issues. Studies have shown that they experience higher rates of hearing loss, musculoskeletal disorders, and skin diseases due to prolonged exposure to environmental hazards and the physical strain of their work (Ernawati, 2021; Eckert et al., 2018; Doza et al., 2021). For instance, a literature review highlighted that a staggering 97.5% of fishermen in Indonesia experienced some level of hearing loss, emphasizing the occupational health risks associated with this profession (Ernawati, 2021). Furthermore, the prevalence of skin diseases, often linked to inadequate protective measures and low awareness of safety, has been documented in various studies (Kang et al., 2019; El-Matty, 2023).

Pulau Sembilan, Sinjai Regency, 95% of the villagers (men) work as fishermen. The problems faced by traditional fishermen on Sembilan Island are the many work accidents and occupational health problems that occur, especially traditional fishermen, traditional divers pay less attention to occupational safety and health so that many fishermen are exposed to decompression sickness besides that, the existence of accidents such as shells or animals that suddenly attack when diving, the average age of fishermen aged 40-50 years, hyperbaric environmental problems, namely high pressure environments that are more than one atmosphere. This service activity is based on several previous studies that the lack of knowledge and attitudes about occupational safety and health at sea cause many fishermen to experience work accidents, looking at the Economic Potential of the Sembilan Island District of Sinjai Regency which is dominated by fishing communities around 98% of the population. So that the purpose of the service is to find out the effect of mentoring on improving occupational safety and health behavior in the traditional diving fishermen community on Pulau Sembilan Sinjai Regency.

Table 1. Distribution of Respondents of Traditional Fishermen of Kambuno Island

Characteristic	n	%
Age Group		
17 – 27 years	3	5
28 – 38 years	20	33.4
39 – 49 years	24	40
50 – 60 years	11	18.3
> 60 years	2	3.3
Education		
Not Completed Primary	6	10
Primary School Completed	29	48.4
Junior High School Completed	8	13.3
Senior High School Completed	17	28.3
Higher Education	0	0
Boat Ownership		
Own Boat	26	43.4
Rented	34	56.6
With Whom They Fish		
Alone	31	51.7
Family	16	26.7
Neighbor	13	21.6
Years as Fisherman		
< 5 Years	2	3.3
5 – 10 Years	8	13.3
11 – 20 Years	14	23.4
21 – 30 Years	14	23.4
> 30 Years	12	20

METHODS

This service is a form of intervention to respondents by providing socialization with a one group pre and post-test approach. The population is traditional fishermen who are on Kambuno Island, Pulau Sembilan District as many as 862 people and a sample of 60 people. The strategy in this service is to provide assistance by counseling and providing occupational safety and health guidelines that have been compiled by the research team to be studied and applied by each respondent. This service was carried out for 2 months on Kambuno Island, Sembilan Island District, Sinjai Regency. The population in this service is the fishing community in Kambuno, Sembilan Island District, which totals 862 people, while the number of samples in this service is 60 people. The results of data collection were then analyzed to determine the percentage change in respondent behavior improvement.

This service instrument includes various components designed to evaluate fishers' knowledge, attitudes, and practices related to occupational health and safety. The main components measured include the use and completeness of Personal Protective Equipment (PPE), knowledge of PPE, and actual practice in its use while at sea. In addition, the instrument also assesses personal habits that affect fishermen's health, such as smoking, boat cleaning, bathing after fishing, and rest and self-care patterns. Other aspects covered include treatment-seeking habits and the location of treatment-seeking, both in formal and alternative health facilities. Knowledge and practices related to environmental health (EH) were also assessed to measure fishermen's awareness in maintaining clean working areas and waters. Finally, the instrument includes an occupational accident risk prevention component, to understand the preventive measures fishers take to reduce the potential for injury while working at sea.

Table 2. Frequency Distribution of Personal Protective Equipment (PPE) Use

PPE Type	Pre-Test		Post-Test		Percentage Increase
	n	%	n	%	
Head Protection					
Yes	26	43.3	49	81.6	38.3
No	34	56.4	11	18.4	
Face/Eye Protection					
Yes	12	20	36	60	40
No	48	80	24	40	
Ear Protection					
Yes	0	0	9	15	15
No	60	100	51	85	
Hand Protection					
Yes	18	30	44	73.3	43.3
No	42	70	16	26.7	
Respiratory Protection					
Yes	0	0	5	8.3	8.3
No	60	100	55	91.7	
Foot Protection					
Yes	27	45	52	86.3	41.3
No	23	55	8	13.7	
Life Vest					
Yes	21	35	41	68.3	33.3
No	39	65	19	31.7	

RESULTS AND DISCUSSION

Pulau Sembilan sub-district in Sinjai Regency, consists of nine small islands and several patch reefs that sink at high tide. One of the islands is Kambuno Island, which is the center of Pulau Sembilan Subdistrict, so on this island the development of sea transportation facilities and infrastructure (ports) was launched as a pioneer of sea transportation routes. Where the facilities and infrastructure (port) consists of a dock and its facilities.

Table 1 presents the demographic distribution of traditional fishermen respondents from Kambuno Island based on various characteristics, including age group, education level, boat ownership, fishing companionship, and years of experience as a fisherman. The age distribution shows that most respondents are aged between 39–49 years (40%), followed by those aged 28–38 years (33.4%). A smaller portion of respondents falls into the 50–60 years age range (18.3%), with minimal representation from those over 60 years (3.3%) and the youngest group, 17–27 years (5%). In terms of education, nearly half of the respondents have only completed primary school (48.4%), while 28.3% completed senior high school. A smaller group completed junior high school (13.3%), and 10% did not finish primary school. Notably, none of the respondents pursued higher education. Regarding boat ownership, the majority (56.6%) rent their boats, while 43.4% own their boats. In terms of fishing companionship, over half of the fishermen (51.7%) fish alone, with others fishing alongside family members (26.7%) or neighbors (21.6%). Finally, examining years of experience, the respondents display a range of experience levels. Those with 11–20 years and 21–30 years of experience each account for 23.4% of respondents. Additionally, 20% of respondents have been fishing for more than 30 years, while fewer have 5–10 years (13.3%) or less than 5 years (3.3%) of experience.

Table 2 shows the frequency distribution of Personal Protective Equipment (PPE) use among fishermen in both pre-test and post-test conditions, highlighting the percentage increase for each type of PPE. For head protection, usage increased from 43.3% in the pre-test to 81.6% in the post-test, with a 38.3% improvement. Face/eye protection usage saw a significant rise, from 20% to 60%, marking a 40% increase. Ear protection, which had no usage initially, reached 15% post-test, showing a 15% increase. Hand protection also saw an improvement, from 30% to 73.3%, resulting in a 43.3% increase. Respiratory protection saw minimal change, increasing from 0% to 8.3%. Foot protection usage rose from 45% to 86.3%, a 41.3% increase. Lastly, life vest usage improved from 35% to 68.3%, achieving a

33.3% increase. This data reflects a general increase in PPE use following the intervention.

Table 3. Distribution of Knowledge, Practices, and Habits among Fishermen Before and After Intervention

Variables	Pre-Test		Post-Test		Percentage Increase
	n	%	n	%	
Knowledge Level					
Poor	38	63.3	3	5	38.3
Average	6	10	18	30	
Good	16	26.7	49	65	
Practice Level					
Poor	38	63.3	7	11.7	24.9
Average	6	10	22	36.7	
Good	16	26.7	31	51.6	
Knowledge Level					
Poor	49	81.6	22	36.7	26.6
Average	7	11.6	18	30	
Good	4	6.7	20	33.3	
Smoking Status					
Smokes	60	100	60	100	0
Consumption Level					
< 5 Cigarettes/Day	0	0	0	0	0
5 – 7 Cigarettes/Day	2	3.3	2	3.3	
8 – 10 Cigarettes/Day	4	6.7	11	18.3	
11 – 13 Cigarettes/Day	39	65	32	53.4	
> 13 Cigarettes/Day	15	25	15	25	
Cleaning Habit					
Yes	19	31.7	33	55	23.3
No	41	68.3	27	45	
Bathing Habit					
Yes	49	81.7	55	91.7	10
No	11	18.3	5	8.3	
Self-Care Habit					
Yes	24	40	39	65	15
No	36	60	21	35	

Table 3 displays the frequency distribution of fishermen's knowledge, practices, and habits related to health and safety, both before and after an intervention. In terms of knowledge level, the percentage of respondents with "Good" knowledge increased from 26.7% in the pre-test to 65% in the post-test, indicating a 38.3% improvement. Practice levels showed similar gains, with "Good" practices rising from 26.7% to 51.6%, a 24.9% increase. Knowledge of clean and healthy living behavior (PHBS) improved as well, with "Good" knowledge increasing from 6.7% to 33.3%, reflecting a 26.6% improvement. Smoking habits remained unchanged, with all respondents continuing to smoke. However, there were shifts in consumption levels, particularly in the 11–13 cigarettes/day group, which decreased from 65% to 53.4%. Cleaning habits improved by 23.3%, with more fishermen cleaning their boats post-intervention. Bathing habits also showed a 10% increase, and self-care habits improved by 15%, with a rise from 40% to 65% of respondents practicing self-care post-intervention. These results suggest that the intervention positively impacted fishermen's knowledge, practices, and certain health-related habits.

Table 4. Distribution of Treatment-Seeking Behavior and Treatment Locations

Variables	Pre-Test		Post-Test		Percentage Increase
	n	%	n	%	
Treatment Search					
Poor	37	61.7	18	30	63.3
Good	23	38.3	42	70	
Treatment Location					
Self-Treatment	38	63.7	23	38.3	21.7
Traditional Treatment	18	30	10	16.7	
Health Center/Health Facility	14	23.3	27	45	

Table 4 illustrates the frequency distribution of treatment-seeking behavior and preferred treatment locations among fishermen before and after an intervention. In the area of treatment search, the percentage of respondents with "Good" treatment-seeking practices increased significantly from 38.3% in the pre-test to 70% in the post-test, showing a 63.3% improvement. For treatment location, self-treatment decreased slightly from 63.7% to 38.3%, while the use of traditional treatments dropped from 30% to 16.7%. Conversely, reliance on health centers or health facilities increased from 23.3% in the pre-test to 45% post-intervention, reflecting a 21.7% rise. This data suggests that the intervention effectively encouraged fishermen to seek formal health services over self-treatment or traditional methods.

Table 5. Frequency Distribution of Environmental Knowledge and Work Accident Risk Prevention

Variables	Pre-Test		Post-Test		Percentage Increase
	n	%	n	%	
Environmental Knowledge					
Poor	49	81.7	30	50	15
Average	6	10	16	26.7	
Good	5	8.3	14	23.3	
Work Accident Risk Prevention					
Poor	52	86.7	22	36.7	26
Average	8	13.3	12	20	
Good	0	0	26	43.3	

Table 5 presents the frequency distribution of environmental knowledge and work accident risk prevention practices among fishermen, before and after the intervention. In terms of environmental knowledge, there was an improvement, with the percentage of respondents with "Good" knowledge rising from 8.3% in the pre-test to 23.3% in the post-test, reflecting a 15% increase. Respondents with "Average" environmental knowledge also grew from 10% to 26.7%. For work accident risk prevention, there was a notable shift, with "Good" practices increasing from 0% pre-test to 43.3% post-test, showing a 26% improvement. The proportion of respondents with "Poor" practices decreased significantly from 86.7% to 36.7%. This data indicates that the intervention led to positive changes in both environmental knowledge and work safety practices among the fishermen.

Importance of PPE Use in fishermen

The use of Personal Protective Equipment (PPE) is critically important for fishermen, who face numerous occupational hazards that can lead to serious injuries and health issues. The fishing industry is recognized as one of the most dangerous occupations globally, with fishermen being at a significantly higher risk of accidents compared to workers in other sectors (Filho et al., 2019; . The primary hazards include exposure to adverse weather conditions, dangerous aquatic animals, and the physical demands of handling heavy equipment (Filho et al., 2019; Nguyen, 2024). Consequently, the implementation of PPE is essential to mitigate these risks and enhance the safety of fishermen.

Research indicates that non-compliance with PPE usage is directly correlated with an increased risk of accidents and injuries among fishermen. A study found that fishermen who did not consistently use protective measures were significantly more likely to experience accidents (Nguyen, 2024). This highlights the necessity of promoting and enforcing the use of appropriate safety equipment, such as life jackets, gloves, and ear protection, to reduce the likelihood of harm (Nguyen, 2024; El-Saadawy et al., 2014). Furthermore, the lack of PPE usage has been linked to specific health issues, such as skin diseases and hearing loss, which are prevalent among fishermen due to their exposure to harmful environmental factors (Ernawati, 2021; L., 2023). For instance, the absence of ear protection in noisy environments has been shown to contribute to hearing loss, with a significant percentage of fishermen reporting auditory impairment (Ernawati, 2021).

Moreover, the importance of PPE extends to protecting against environmental hazards, particularly ultraviolet (UV) radiation. Fishermen are often exposed to high levels of UV rays due to prolonged outdoor work, which can lead to skin cancers and other dermatological conditions (Filon et al., 2018; Modenese et al., 2021). Effective sun protection strategies, including the use of protective clothing and sunscreen, are essential for reducing the risk of skin damage (Modenese et al., 2021). Training programs aimed at increasing awareness of sun safety among fishermen have shown promise in improving protective behaviors (Modenese et al., 2021; Nkogotse et al., 2018).

In addition to physical safety, the psychological aspect of PPE compliance cannot be overlooked. Fishermen's attitudes towards safety equipment can significantly influence their willingness to use PPE. Studies have indicated that enhancing knowledge about the risks associated with their work and the benefits of PPE can lead to improved compliance (Levin et al., 2010; Davis, 2011). Educational initiatives that focus on the importance of PPE and provide hands-on training can empower fishermen to prioritize their safety (Levin et al., 2010; Davis, 2011).

Importance of Clean and Healthy Lifestyle Knowledge for fishermen

The knowledge of clean and healthy lifestyle practices is crucial for fishermen, who often face unique health challenges due to the nature of their work. Fishermen are frequently exposed to harsh environmental conditions, long working hours, and the physical demands of their occupation, which can lead to various health issues if not managed properly (Cengiz (2022)). Understanding and implementing healthy lifestyle choices can significantly enhance their overall well-being and reduce the risk of occupational diseases.

Research indicates that blue-collar workers, including fishermen, have a heightened need for health awareness and education regarding lifestyle choices (Huang et al., 2010). This is particularly important as many fishermen may have limited access to healthcare resources and may not prioritize their health due to the demands of their work (Özurmaz & Mandiracioğlu, 2017). By fostering an understanding of health-promoting behaviors, such as proper nutrition, regular physical activity, and stress management, fishermen can improve their health outcomes and work performance (Pluut & Wonders, 2020). For instance, studies have shown that organizations that promote healthy lifestyle behaviors among their workers tend to see improvements in productivity and overall job satisfaction (Pluut & Wonders, 2020).

Moreover, the lifestyle choices of fishermen can directly impact their susceptibility to chronic diseases. Long working hours and the physical nature of fishing can lead to unhealthy habits, such as poor dietary choices and insufficient physical activity, which are risk factors for conditions like obesity, diabetes, and cardiovascular diseases (Kang et al., 2014; Ngaruiya et al., 2019). Education on healthy eating practices, including the importance of balanced diets rich in fruits, vegetables, and whole grains, can help mitigate these risks (Tanaka et al., 2018). Furthermore, awareness of the dangers of smoking and excessive alcohol consumption is essential, as these behaviors are prevalent in some fishing communities and can exacerbate health issues (Untari et al., 2021).

The promotion of a clean and healthy lifestyle also extends to mental health, which is often overlooked in physically demanding occupations like fishing. Stress, isolation, and the pressures of the job can lead to mental health challenges, including anxiety and depression (El-Matty, 2023). By providing education on mental health awareness and coping strategies, fishermen can better

manage the psychological demands of their work (El-Matty, 2023). Community health initiatives that focus on mental well-being, alongside physical health, can create a more holistic approach to health promotion in fishing communities (El-Matty, 2023; No, 2024).

Search for Treatment and Health Facilities for fishermen

The health and well-being of fishermen are critical issues that require comprehensive strategies to address the unique challenges faced by this occupational group. Fishermen are exposed to a variety of health risks, including chronic conditions stemming from their work environment, such as noise exposure, UV radiation, and physical strain, which can lead to musculoskeletal injuries and other health complications (Eckert et al., 2018). Furthermore, the prevalence of substance use disorders, particularly opioid-related issues, has been noted in the fishing community, necessitating targeted interventions that involve multiple stakeholders to enhance education and awareness (Walter et al., 2018).

Access to healthcare services is another significant concern for fishermen. Research indicates that many commercial fishers face barriers to healthcare access, which can exacerbate health issues and lead to poor health outcomes (Turner et al., 2018). Proactive measures are essential to improve the supply and utilization of healthcare services tailored to the needs of fishermen. This includes not only enhancing physical access to healthcare facilities but also ensuring that the services provided are culturally competent and relevant to the specific health risks associated with the fishing profession (Turner et al., 2018).

The chronic health risks associated with fishing are compounded by environmental factors, such as exposure to pollutants and contaminants in marine environments. Studies have shown that fishermen are at risk of exposure to heavy metals and other toxic substances through fish consumption, which can lead to serious health issues, including neurological and reproductive problems (Venkateswarlu & Venkatrayulu, 2020; Dórea, 2008). Moreover, the presence of foodborne pathogens in fish can pose additional health risks, highlighting the need for stringent monitoring and management practices within the fishing industry (KOBUSZEWSKA & Wysok, 2023).

The fishing industry also faces challenges related to mental health, with high rates of stress and psychological disorders reported among fishermen. The demanding nature of the work, combined with the isolation often experienced at sea, can contribute to mental health issues that require appropriate intervention and support (Walter et al., 2018). Community-based participatory research approaches have been suggested as effective strategies to engage fishermen in health promotion initiatives, fostering a sense of ownership and collaboration in addressing their health needs (Walter et al., 2018).

Furthermore, the impact of external factors, such as the COVID-19 pandemic, has highlighted vulnerabilities within the fishing community, particularly among migrant fish workers who often have limited access to health services and social support (Marschke et al., 2020). The pandemic has disrupted employment and mobility, exacerbated existing health disparities and underscored the urgent need for comprehensive health programs that address the unique challenges faced by this population (Marschke et al., 2020). In terms of health facilities, it is crucial to develop specialized healthcare services that cater specifically to the needs of fishermen. Additionally, integrating mental health services into these healthcare facilities can help address the psychological well-being of fishermen, providing a holistic approach to health care (Walter et al., 2018).

The establishment of health education programs is also vital in promoting awareness about occupational health risks and preventive measures. These programs should focus on educating fishermen about safe fishing practices, the importance of regular health check-ups, and the risks associated with substance use (Walter et al., 2018). Community engagement in these educational initiatives can enhance their effectiveness, as fishermen are more likely to participate in programs that are developed with their input and reflect their lived experiences (Walter et al., 2018).

Moreover, collaboration between various stakeholders, including government agencies, healthcare providers, and fishing communities, is essential for developing effective health policies and programs. This collaborative approach can help ensure that the health needs of fishermen are

adequately addressed and that resources are allocated effectively to support their health and well-being (Walter et al., 2018).

Importance of Occupational Accident Risk for fishermen

The occupational accident risk for fishermen is a critical area of concern, given the inherently hazardous nature of the fishing profession. Fishermen face numerous risks, including adverse weather conditions, equipment malfunctions, and the physical demands of the job, which can lead to serious injuries or fatalities. The fishing industry is often classified as one of the most dangerous occupations globally, with fatality rates significantly higher than those in many other sectors (Turner et al., 2019; Lucas & Case, 2017). Understanding the factors contributing to these risks is essential for developing effective safety measures and improving the overall health and well-being of fishermen.

One of the primary factors contributing to occupational accidents among fishermen is the unpredictable nature of the marine environment. Fishermen are frequently exposed to extreme weather conditions, including storms and high waves, which can lead to capsizing and other accidents (Ogega et al., 2023). Research indicates that approximately 5,000 people, mostly fishermen, perish annually on Lake Victoria due to extreme weather-related incidents (Ogega et al., 2023). The combination of working on unstable vessels and the potential for sudden changes in weather creates a precarious working environment that significantly heightens the risk of accidents.

In addition to environmental hazards, the operation of heavy machinery and fishing gear poses substantial risks. Fishermen often work with complex equipment, including nets, traps, and winches, which can lead to injuries such as cuts, bruises, and even amputations if not handled properly (Turner et al., 2019; Lucas & Case, 2017). Studies have shown that younger and less experienced fishermen are particularly vulnerable, as they may lack the necessary training and awareness to operate equipment safely (Ngaruiya et al., 2019). This highlights the need for comprehensive training programs that emphasize safety protocols and the proper use of fishing gear.

Musculoskeletal disorders (MSDs) are another significant concern in the fishing industry. The physical demands of fishing, including lifting heavy loads and maintaining awkward postures for extended periods, can lead to chronic pain and injuries (Couto et al., 2019). Research has indicated that female shellfish gatherers, for example, experience high rates of lower back pain due to the nature of their work (Couto et al., 2019). Implementing ergonomic interventions and promoting the use of personal protective equipment (PPE) can help mitigate these risks and improve the health outcomes of fishermen.

Moreover, the psychological aspects of fishing work cannot be overlooked. Fishermen often experience high levels of stress and mental health issues, which can impair their decision-making abilities and increase the likelihood of accidents (Woodhead et al., 2018). The isolation and long hours associated with fishing can exacerbate these mental health challenges, necessitating the integration of mental health support into occupational safety programs (Woodhead et al., 2018). Addressing the psychosocial factors influencing fishermen's well-being is crucial for reducing accident rates and enhancing overall safety in the industry.

The lack of regulatory oversight and safety standards in many regions further complicates the issue of occupational safety for fishermen. Despite the known risks, the fishing industry often operates with minimal safety regulations, leaving fishermen vulnerable to accidents (Turner et al., 2019; Lucas & Case, 2017). Advocacy for stronger safety regulations and the enforcement of existing laws is essential to protect the health and safety of fishermen. This includes ensuring that fishing vessels are equipped with necessary safety gear, conducting regular safety inspections, and providing access to emergency services.

The intervention on Kambuno Island demonstrated significant strengths, particularly in its structured approach of providing personalized counseling and occupational safety and health guidelines, which led to noticeable improvements in fishermen's use of Personal Protective Equipment (PPE), health practices, and treatment-seeking behavior. The one-group pre- and post-test design allowed for direct measurement of behavior changes following the intervention. However, limitations include the small sample size of only 60 respondents out of a total population of 862 fishermen, which

may affect the generalizability of the results. Additionally, the relatively short duration of two months may not have been sufficient to foster long-term behavior changes, as ongoing follow-up would likely be needed to sustain improvements.

CONCLUSION

This intervention effectively increased awareness and improved occupational safety and health practices among traditional fishermen on Kambuno Island. Results showed significant positive changes in PPE use, health and safety practices, environmental knowledge, and treatment-seeking behaviors. Although smoking habits remained unchanged, the intervention led to substantial improvements in knowledge and practices that promote both personal health and workplace safety. The data suggest that targeted health education and structured support can lead to measurable behavior changes, thereby enhancing occupational health outcomes for high-risk groups like traditional fishermen. For fishermen, it is recommended to continue applying the safety practices and PPE usage habits learned during the intervention to protect themselves while working. Health workers should consider providing ongoing support and periodic training on occupational safety and health to reinforce these practices. Additionally, future researchers are encouraged to expand this study with a larger sample size and longer follow-up period to assess the long-term sustainability of behavior changes and to explore additional factors that may impact health practices among fishing communities.

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