

## Exploring the Occupational Health Landscape of Aparri Fishers: An In-Depth Analysis of Work-Related Injuries, and Hazards

**Ma. Angelita S. Rabanal**

Cagayan State University – Aparri Campus  
angiesrabanal@gmail.com

### Abstract

The fishing industry is vital to global economies, supporting millions of people, however, despite its economic importance, fishers' health and safety have often been neglected. Fishers face many occupational hazards and a higher risk of injury due to their work. This study investigates fishers' occupational health in Aparri, Cagayan, Philippines to fill this critical gap. The fishing industry includes fish capture, processing, and aquaculture, each with its own challenges and risks. This study examines fishers' health, workplace hazards, and injuries across these three fisheries sectors. This study also delved into fishers' socio-economic, work experience, demographic, and fishing practice characteristics to provide a holistic view of their occupational health. Quantitative descriptive correlational cross-sectional study design was used to achieve these objectives. A representative sample of 358 fishers from various sectors in fourteen barangays of Aparri was selected using multi-stage sampling. Structured interviews were used to collect data on fisher hazards and injuries. Preliminary findings from the study indicate that the overall occupational health of fishers in Aparri is characterized as average in terms of hazard exposure and good in terms of workplace injuries. Notably, burn injuries emerged as a common concern among fishers involved in both aquaculture and fish capture activities. Furthermore, significant disparities were observed in the prevalence of biophysical hazards among the different fisheries sectors. The outcomes of this quantitative inquiry hold paramount importance in the development of targeted interventions. The insights gained from this study will inform the design and implementation of a comprehensive health, safety, and risk management program tailored to the unique needs of fishers in Aparri, Cagayan. By addressing the identified gaps in occupational health and safety awareness, practices, and hazards, this program aims to enhance the well-being and quality of life of fishers while promoting a safer and healthier working environment within the fishing industry.

### Introduction

Fishing being considered one of the first-born occupations known to man, is noted as the most dangerous profession with high risks of occupational hazards (Udolisa, 2013). This is noted likely because when a certain work is associated with these health hazards, it may cause occupational injuries and diseases. Remarkably, it could also become one of the several causes of other disease or may worsen other existing ailments of non- occupational in origin.

In the Philippines, fishing work (categorized under major occupation group number 6 of PSOC 2012) is becoming increasingly mechanized. This is due to the number of work processes that have been developed, fishers now are treated as significant tools in production, and in turn putting their health and lives at risk (WHO, 2001). In the PSA report, fishing-related occupations has accounted 13.4 percent in January 2017 and declined to 13.1 percent in January 2018, however, it still landed 4th among the various major occupation groups of the 44.1 million total labor force participating in the survey (Philippine Statistics Authority, 2018).

Aparri has been known as commercial center for fishery resource in Northern Cagayan benefiting from the Cagayan River estuary, and the Babuyan Channel. These fishing grounds offered opportunities to fishers in Aparri as major sources of family income and eventually contributing to the economy of the local government. As of May 2018 recorded data of the BFAR Provincial Office in Aparri, reveal a total of 9,741 community fishers highly engaged in the fishery sector particularly along capture, processing, and post-harvest.

People engaged in the fishing activities are commonly neglected as regards to their health status. While PSA reported that fish productions economically contribute to Philippine exports, the

conditions of the fishery workers, their occupational health, safety and risk management concerns are mostly out-of-the-box. In fact, local knowledge in Aparri reveals unrecorded and unverified incidences of injuries associated to fish capture, processing, and post-harvest.

While it is mandated by law that DOLE (Department of Labor and Employment, May 2016) should be engaged to ensuring occupational health and safety among all Filipino workers, labor statistics in the country suffer from serious deficiencies. In fact, Torres, Greaves, and Gapas (2002) reported that many workers are not duly registered and therefore are not included in the labor force survey (“informal sector”). Among the “informal” working groups identified, included are those engaged in small crafts such as dressmaking, fishing, and weaving. It has been reported that the bulk of the informal sector are found in urban centers of the country and are usually unprotected from hazards in their workplace.

Banking on MHO and MAO initial data, no baseline data series of the comprehensive health profile for fishery community. In this case, Aparri being a first-class coastal municipality, is of no excuse. Occupational health and safety practices, the awareness of the fishers, as well as their socio-economic profile needs to be accounted towards the development and implementation of a proposed safety and risk management program for the fishers.

### Methodology

The site of this study was a 1st class coastal municipality in the province of Cagayan, Philippines. According to the 2020 census, Aparri has a population of 68, 839 people. From these were the 9,741 municipal fisherfolks registered in the database of the Fisherfolk Operations Center of BFAR R02.

Aparri has been known as a commercial center for fishery resources in Northern Cagayan benefiting from the Cagayan River estuary, and the Babuyan Channel. These fishing grounds offered opportunities to fishers in Aparri as major sources of family income and eventually contributed to the economy of the local government. Recorded data reveals a total of 5,311 community fishers highly engaged in the fishery sectors particularly chosen in the study along with fish capture, fish processing, and aquaculture. In these were drawn the 365 study samples, Aquaculture - 69; Fish Capture – 223; and Fish Processing – 66.

### Characteristics of fisher-respondents

Table 1. Distribution of the Aparri fishers in terms of their demographic profile

Demographic Profile	Aquaculture (n=69)	Capture (n=223)	Processing (n=66)
<b>Age (in years)</b>			
65 or above	1 (1.4%)	10 (4.5%)	2 (3%)
51 to 65	20 (29%)	76 (34.1%)	16 (24.2%)
36 to 50	32 (46.4%)	91 (40.8%)	32 (48.5%)
21 to 35	16 (23.2%)	46 (20.6%)	16 (24.2%)
	<b>Mean</b>	<b>44.01 years old</b>	<b>46.12 years old</b>
	<b>S.D.</b>	<b>11.34</b>	<b>12.16</b>
		<b>43.97 years old</b>	<b>10.85</b>
<b>Sex</b>			
Male	60 (87%)	208 (93.3%)	49 (74.2%)
Female	9 (13%)	15 (6.7%)	17 (25.8%)
<b>Civil status</b>			
Married	51 (73.9%)	153 (68.6%)	48 (72.7%)
Single	15 (21.7%)	57 (25.6%)	14 (21.2%)
Widowed	0 (0%)	10 (4.5%)	3 (4.5%)
Separated	3 (4.3%)	3 (1.3%)	1 (1.5%)

<b>Religion</b>			
Roman Catholic	63 (91.3%)	199 (89.2%)	61 (92.4%)
Non-Roman Catholic (INC, CoC, JW, etc)	6 (8.7%)	24 (10.8%)	5 (7.6%)
<b>Educational attainment</b>			
MA/MS graduate	1 (1.4%)	-	-
College graduate	2 (2.9%)	2 (0.9%)	1 (1.5%)
College level	1 (1.4%)	11 (4.9%)	3 (4.5%)
High school graduate	11 (15.9%)	42 (18.8%)	12 (18.2%)
High school level	20 (29%)	61 (27.4%)	4 (6.1%)
Elementary graduate	21 (30.4%)	71 (31.8%)	30 (45.5%)
Elementary level	14 (20.3%)	36 (16.1%)	16 (24.2%)
<b>Membership to organization</b>			
Fisherfolks Association	25 (36.2%)	123 (55.2%)	28 (42.4%)
None	44 (63.8%)	100 (44.8%)	38 (57.6%)

This study employs a Descriptive Cross-sectional Design to comprehensively assess the occupational health and safety awareness and practices of fishers in Aparri Cagayan. This design allows for the description of key variables, including occupational hazards, injuries, safety awareness, and practices across the fish capture, fish processing, and aquaculture sectors. Additionally, the design facilitates the examination of associations and differences among the variables of interest.

A multi-stage sampling approach was used to ensure representation from each of the three fisheries sectors. First, random sampling was employed to select barangays. Subsequently, cluster sampling was used to choose three sectors (fish capture, fish processing, and aquaculture), and proportionate stratified sampling determined the sample size from each sector. The sample size was determined using the Lynch formula, chosen for its appropriateness in correlational studies.

The research spanned from September 2019 to September 2021. Structured survey questionnaires with five sections were utilized. Part 1 collected demographic, socio-economic, health, and work-related data. Part 2 identified workplace hazards, while Part 3 documented workplace injuries. FGDs involved probe and follow-up questions, and an observation checklist captured key behavioral and practice indicators.

Ethical considerations were addressed through written permissions from relevant authorities, informed consent, and assent for minors and ethics clearance was secured from the Ethics Review Board of the Region 2 Trauma Medical Center. Participants were assured of confidentiality and the option to withdraw. Compensation, including meals and tokens, was provided. Conflicts of interest were avoided.

Quantitative data underwent analysis using SPSS 25. Descriptive statistics presented demographic characteristics, frequencies, percentages, and means. Likert scales and weighted means depicted the occurrence of hazards, injuries, and occupational health and safety awareness and practices. Test of comparison for independent samples and correlational analysis were applied to assess significant differences and associations, with a significance level of 0.05.

## Results and Discussion

### Common Health Hazards Encountered by the Aparri Fishers in the Workplace

#### Natural

Table 6. Natural health hazards encountered by the Aparri fishers

Natural Health Hazards	Aquaculture		Capture		Processing	
	WM	DV	WM	DV	WM	DV

1. swamping action of waves	3.06	Sometimes	3.29	Sometimes	2.76	Sometimes
2. adverse weather conditions	3.25	Sometimes	3.28	Sometimes	3.35	Sometimes
3. gusty winds	2.96	Sometimes	3.15	Sometimes	2.79	Sometimes
4. extreme heat	3.49	Often	4.15	Often	4.27	Always
5. ultraviolet radiation from the sun	3.29	Sometimes	3.77	Often	3.94	Often
6. inadequate lighting / illumination	3.01	Sometimes	3.34	Sometimes	3.50	Often
7. extreme coldness	3.25	Sometimes	3.30	Sometimes	3.47	Often
8. thick fogs	2.68	Sometimes	2.92	Sometimes	2.67	Sometimes
9. blocked freeing ports	2.42	Seldom	2.91	Sometimes	2.50	Seldom
10. vessel collision with floating or submerged objects	2.52	Seldom	2.90	Sometimes	2.39	Seldom
<b>Overall Weighted Mean</b>	<b>2.99</b>	<b>Sometimes</b>	<b>3.30</b>	<b>Sometimes</b>	<b>3.16</b>	<b>Sometimes</b>

The findings indicate that the frequency of exposure to natural health hazards varies among the fisheries sectors. Some hazards, such as extreme heat and ultraviolet radiation from the sun, are more prominent in the Fish processing sector, possibly due to the nature of processing activities. The Capture sector faces hazards like swamping action of waves and adverse weather conditions more frequently, which aligns with the nature of their work at sea. Inadequate lighting is a concern for the fish processing sector, while vessel collisions and blocked freeing ports are relatively rare across sectors.

It's important to note that varying degrees of exposure to hazards were noted across the sectors. The results highlight the diverse challenges fishers in each sector encounter due to their specific work environments. Addressing these hazards and implementing appropriate safety measures tailored to each sector can contribute to improved occupational health and safety for Aparri fishers.

These now reveal significant variations in the frequency of exposure to natural health hazards among the different fisheries sectors in Aparri. The observed differences reflect the distinct nature of work environments in each sector, contributing to the diverse challenges faced by fishers.

Extreme heat and ultraviolet (UV) radiation from the sun were identified as notable natural health hazards in the Processing sector. This outcome is consistent with the nature of processing activities, which often involve exposure to high temperatures and prolonged sun exposure. The elevated risk of extreme heat and UV radiation exposure in this sector could potentially lead to heat-related illnesses and skin conditions (Kjellstrom et al., 2018). It is crucial to implement strategies such as providing protective clothing, ensuring adequate hydration, and scheduling work during cooler periods to mitigate the impact of these hazards (WHO, 2019).

Conversely, the Fish capture sector faces hazards such as swamping action of waves and adverse weather conditions more frequently. Given the maritime nature of their work, fishers in this sector are highly exposed to the elements, making them vulnerable to the unpredictable and often harsh sea conditions. The increased prevalence of swamping action of waves and adverse weather conditions highlights the need for comprehensive safety measures, including proper training on sea navigation, use of personal protective equipment, and contingency plans for inclement weather (Lucas et al., 2020).

Inadequate lighting emerged as a concern specifically for the Fish processing sector. Inadequate lighting can lead to accidents, reduced visibility, and increased eyestrain, potentially compromising both the safety and overall well-being of workers (Cohen et al., 2016). Improving lighting conditions through proper illumination design and maintenance should be a priority in this sector to minimize the risk of accidents and improve productivity.

Surprisingly, vessel collisions and blocked freeing ports were reported relatively rarely across sectors. This might be attributed to the stringent safety regulations and navigational training that are

likely in place for maritime activities. Nevertheless, continuous monitoring and adherence to safety protocols remain critical to ensure the prevention of such accidents.

The varying degrees of exposure to natural health hazards emphasize the need for tailored safety measures that address the unique challenges faced by each fisheries sector. Implementing sector-specific training programs, providing appropriate personal protective equipment, and fostering a culture of safety awareness can significantly contribute to the reduction of occupational risks. Additionally, regular assessments of hazard exposure and the effectiveness of safety measures are essential to ensure continuous improvement in occupational health and safety practices.

The findings then underscore the importance of recognizing the sector-specific nature of natural health hazards and their implications for the safety and well-being of Aparri fishers. By acknowledging these variations and taking targeted actions, stakeholders can collaborate to create a safer working environment and enhance the overall quality of life for fishers in the region.

### Biophysical

Table 7. Biophysical health hazards encountered by the Aparri fishers

Biophysical Health Hazards	Aquaculture		Capture		Processing	
	WM	DV	WM	DV	WM	DV
1. handling dead fish or slime on live fish	3.39	Sometimes	3.18	Sometimes	3.76	Often
2. fish bones, scales or fish hooks	3.43	Often	3.11	Sometimes	3.73	Often
3. use of equipment unsuitable for the work environment	2.13	Seldom	2.58	Seldom	2.42	Seldom
4. high job demands/ hard physical work	2.88	Sometimes	2.81	Sometimes	2.94	Sometimes
5. heavy items of equipment/ fish boxes	3.55	Often	3.16	Sometimes	3.36	Sometimes
6. bending, stooping, twisting and lifting activities	3.67	Often	3.19	Sometimes	3.77	Often
7. badly stowed ropes, nets and equipment	2.46	Seldom	2.60	Sometimes	2.77	Sometimes
8. foul odors, smelly work area	3.39	Sometimes	2.94	Sometimes	3.68	Often
9. noisy and vibrating equipment	2.28	Seldom	2.41	Seldom	2.12	Seldom
10. overloaded or unstable vessel	1.96	Seldom	2.25	Seldom	1.98	Seldom
<b>Overall Weighted Mean</b>	<b>2.91</b>	<b>Sometimes</b>	<b>2.82</b>	<b>Sometimes</b>	<b>3.05</b>	<b>Sometimes</b>

The findings suggest that the frequency of exposure to biophysical health hazards varies among the fisheries sectors. Fishers in the Fish processing sector seem to face a higher prevalence of hazards related to handling dead fish, fish bones/scales/hooks, heavy equipment, bending/stooping/lifting activities, and foul odors/smelly work areas. The consistent occurrence of high job demands and hard physical work across all sectors reflects the nature of fishing activities. Unsuitable equipment and badly stowed ropes/nets/equipment are relatively rare concerns.

The results highlight sector-specific challenges and underscore the importance of implementing appropriate safety measures tailored to the hazards faced by fishers in each sector. Addressing these hazards can contribute to enhanced occupational health and safety for Aparri fishers and create a safer work environment.

Fishers in the Fish processing sector appear to encounter a higher prevalence of biophysical health hazards compared to other sectors. The hazards include handling dead fish, fish

bones/scales/hooks, heavy equipment, bending/stooping/lifting activities, and foul odors/smelly work areas. These challenges are likely attributed to the nature of processing activities, which involve tasks such as cleaning, filleting, and preparing fish for market. The higher exposure to these hazards underscores the need for targeted interventions to minimize risks and promote safe working practices in the Fish processing sector (EU-OSHA, 2021).

It is noteworthy that the consistent occurrence of high job demands and hard physical work is a common trend across all sectors. This aligns with the inherent nature of fishing activities, which often involve physically demanding tasks such as hauling nets, lifting heavy equipment, and maintaining vessels. The prevalence of these hazards emphasizes the importance of comprehensive training programs, ergonomic interventions, and regular breaks to reduce the strain on fishers' bodies and mitigate the risk of musculoskeletal injuries (Apostolopoulos et al., 2016).

Unsuitable equipment and badly stowed ropes/nets/equipment emerged as relatively rare concerns across all sectors. While this finding is encouraging, it is crucial to maintain a proactive approach to equipment maintenance and proper storage to prevent potential accidents and ensure the safety of fishers. Regular inspections, maintenance protocols, and adherence to safety guidelines can help minimize the occurrence of such hazards.

The results highlight the need for sector-specific safety measures that address the unique challenges faced by fishers in each sector. Implementing appropriate training, providing ergonomic equipment, and promoting a culture of safety can significantly contribute to reducing the prevalence of biophysical hazards and enhancing the overall well-being of Aparri fishers. Collaboration between relevant authorities, industry stakeholders, and fishers themselves is essential to develop and implement effective safety measures (Nieuwenhuijsen et al., 2017).

The findings underscore the sector-specific nature of biophysical health hazards and emphasize the importance of tailored safety interventions. By recognizing and addressing these challenges, stakeholders can work towards creating a safer work environment for Aparri fishers and ultimately contribute to the improvement of their occupational health and safety.

## Chemical

Table 8. Chemical health hazards encountered by the Aparri fishers

Chemical Health Hazards	Aquaculture		Capture		Processing	
	WM	DV	WM	DV	WM	DV
1. gas leaks	1.48	Never	1.54	Never	1.26	Never
2. poorly vented engine	1.57	Never	1.61	Never	1.41	Never
3. contact with fuels, hydraulic oils, bleaches, disinfectants	1.51	Never	1.66	Never	1.47	Never
4. exploding batteries	1.25	Never	1.43	Never	1.15	Never
5. corrosion of wires exposed to salt water	1.55	Never	1.70	Never	1.63	Never
6. fish slimes, and grease	1.59	Never	1.73	Never	1.53	Never
7. incorrect protective gears such as foot wears	1.26	Never	1.36	Never	1.32	Never
8. smoke particles/ pollutants	2.32	Seldom	1.86	Seldom	2.29	Seldom
9. contact with dusts (asbestos, silica, wood)	1.64	Never	1.49	Never	1.38	Never
10. pesticides	1.28	Never	1.36	Never	1.18	Never

<b>Overall Weighted Mean</b>	<b>1.54</b>	<b>Never</b>	<b>1.57</b>	<b>Never</b>	<b>1.46</b>	<b>Never</b>
------------------------------	-------------	--------------	-------------	--------------	-------------	--------------

The findings suggest that chemical health hazards are generally rare among Aparri fishers across all sectors. Most of the hazards listed in the table are reported as "Never" encountered, indicating that the frequency of exposure is very low. Only smoke particles/pollutants are reported with some degree of occasional exposure, particularly among Aquaculture and Fish processing sectors.

This finding reflects a positive aspect of the fishers' work environment, suggesting that direct exposure to chemical health hazards is relatively minimal. However, proper training and precautionary measures remain important to ensure that any potential risks associated with occasional exposure to smoke particles or pollutants are effectively managed.

The analysis of chemical health hazards among Aparri fishers yields important insights into the occupational safety and risk profile of the different sectors. This discussion will explore the implications of the findings and emphasize the significance of the minimal occurrence of chemical hazards while highlighting the need for continued safety measures and vigilance.

The results reveal that chemical health hazards are relatively rare among Aparri fishers across all sectors. The majority of the hazards listed in the table are reported as "Never" encountered, indicating that fishers have limited direct exposure to chemicals in their work environments. This is an encouraging finding, suggesting that the fishers' exposure to chemical health hazards is minimal and that their overall work environment is relatively safe in terms of chemical exposure.

One notable exception is the exposure to smoke particles/pollutants, which is reported with some degree of occasional occurrence, particularly among the Aquaculture and Processing sectors. This finding could be attributed to various factors such as the use of equipment, processing methods, or cooking practices that generate smoke particles. While the frequency of exposure is reported as occasional, it is crucial to acknowledge that even occasional exposure to pollutants or airborne particles can carry potential health risks over the long term (Brauer et al., 2016).

The minimal occurrence of chemical health hazards is undoubtedly a positive aspect of the fishers' work environment. However, this finding should not lead to complacency. Proper training, awareness, and precautionary measures remain vital to ensure that any potential risks associated with occasional exposure to smoke particles or pollutants are effectively managed. Fishers should be equipped with knowledge about the potential risks, proper use of protective equipment, and safe work practices to minimize any adverse health effects (Jeebhay et al., 2012).

Furthermore, ongoing monitoring, assessment, and control of potential chemical hazards are essential to maintain a safe working environment. Regular checks for compliance with safety protocols, improvements in ventilation systems, and the use of appropriate protective gear can contribute to further reducing the risks associated with occasional chemical exposures (WHO, 2018).

The findings highlight the relatively low occurrence of chemical health hazards among Aparri fishers, indicating a positive aspect of their work environment. However, the importance of maintaining safety measures, proper training, and vigilance cannot be overstated. By proactively addressing any potential risks and promoting safe work practices, stakeholders can continue to ensure the well-being and occupational health of Aparri fishers.

## Psychosocial

Table 9. Psychosocial health hazards encountered by the Aparri fishers

Psychosocial Health Hazards	Aquaculture		Capture		Processing	
	WM	DV	WM	DV	WM	DV
1. working long hours	3.72	Often	4.14	Often	4.23	Always
2. working many days in a row	3.77	Often	3.99	Often	3.97	Often

3. lack of sleep	3.59	Often	4.10	Often	4.21	Always
4. food insecurity	3.57	Often	3.89	Often	3.94	Often
5. poverty	3.64	Often	3.94	Often	3.91	Often
6. lack of recognition for one's work	3.45	Often	3.68	Often	3.76	Often
7. production pressures	3.52	Often	3.83	Often	3.82	Often
8. boring, repetitive tasks	3.51	Often	3.83	Often	3.79	Often
9. low pay	3.78	Often	3.95	Often	3.95	Often
10. lack of emergency communication	3.26	Sometimes	3.54	Often	3.11	Sometimes
<b>Overall Weighted Mean</b>	<b>3.58</b>	<b>Often</b>	<b>3.89</b>	<b>Often</b>	<b>3.87</b>	<b>Often</b>

The findings highlight that Aparri fishers frequently encounter psychosocial health hazards across all sectors. Long working hours, lack of sleep, working many days in a row, food insecurity, poverty, lack of recognition, production pressures, repetitive tasks, and low pay are consistently reported hazards. This indicates the presence of significant psychosocial challenges in the work environment of fishers.

These findings emphasize the need for addressing psychosocial well-being and creating support mechanisms to mitigate the negative impact of these hazards. Initiatives such as proper working hour regulations, better compensation, recognition programs, and emergency communication systems can play a crucial role in improving the overall occupational health and well-being of Aparri fishers.

The analysis of psychosocial health hazards among Aparri fishers sheds light on the prevalent challenges that these workers face in their daily occupations. The discussion that follows will delve into the significance of these findings, their implications for the well-being of Aparri fishers, and the potential strategies that can be employed to address these psychosocial hazards.

The results of the analysis underscore a disturbing reality: Aparri fishers across all sectors frequently encounter a range of psychosocial health hazards. These hazards include long working hours, lack of sleep, consecutive days of work, food insecurity, poverty, lack of recognition, production pressures, repetitive tasks, and low pay. The consistent reporting of these hazards across sectors indicates that psychosocial challenges are pervasive within the work environment of fishers in Aparri. This paints a vivid picture of the hardships and stresses that these individuals experience in their pursuit of livelihood.

The presence of such significant psychosocial health hazards raises important concerns about the overall well-being of Aparri fishers. Prolonged exposure to these hazards can lead to various negative outcomes, including stress-related illnesses, burnout, decreased job satisfaction, and compromised mental health (Stansfeld & Candy, 2006). The cumulative effect of these challenges may not only impact the fishers' physical and mental health but also their productivity and quality of work.

Addressing the psychosocial well-being of Aparri fishers is of paramount importance. The findings strongly advocate for the implementation of support mechanisms and interventions that can mitigate the negative impact of these hazards. Initiatives such as proper working hour regulations can ensure that fishers are not excessively burdened by long hours and consecutive days of work, allowing them sufficient time for rest and recovery (Virtanen et al., 2019). Moreover, better compensation and recognition programs can boost morale and job satisfaction, alleviating some of the financial stressors that contribute to food insecurity and poverty.

The implementation of emergency communication systems is another crucial step that can enhance the safety and well-being of fishers. This not only addresses the psychosocial hazard of lacking emergency communication but also directly impacts their physical safety in cases of unforeseen events at sea (EU-OSHA, 2019).

Furthermore, comprehensive mental health support and awareness programs can be instrumental in equipping fishers with coping strategies to deal with the challenges they face. Creating



a culture that promotes open dialogue about mental health and stress management can contribute to reducing the stigma associated with seeking help (Nieuwenhuijsen et al., 2010).

The findings highlights the pressing need for action to address these challenges. The findings underscore the significance of creating a work environment that prioritizes the psychosocial well-being of fishers. By implementing strategies such as proper working hour regulations, fair compensation, recognition programs, and enhanced communication systems, stakeholders can contribute to the overall improvement of the occupational health and well-being of Aparri fishers.

### Injuries Experienced by the Aparri Fishers in the Workplace

Table 10. Injuries experienced by the Aparri fishers in the workplace

Injuries in the Workplace	Aquaculture		Capture		Processing	
	WM	DV	WM	DV	WM	DV
<b>Burn Injuries</b>						
1. scalding from hot, boiling liquids	1.86	Seldom	1.68	Never	2.02	Seldom
2. chemical burns	1.86	Seldom	1.55	Never	1.88	Seldom
3. electrical burns	1.72	Never	1.53	Never	1.80	Seldom
4. burns from fires, including flames	1.87	Seldom	1.68	Never	2.14	Seldom
5. sun burn	3.14	Sometimes	2.90	Sometimes	3.05	Sometimes
<i>Category Mean</i>	<i>2.09</i>	<i>Seldom</i>	<i>1.87</i>	<i>Seldom</i>	<i>2.18</i>	<i>Seldom</i>
<b>Ergonomic injuries</b>						
1. lower back injuries	3.49	Often	3.62	Often	3.91	Often
2. carpal tunnel syndrome (pain/weakness in hands/ wrists)	3.41	Often	3.50	Often	3.92	Often
3. tendinitis (tendon/ joint irritation or inflammation)	2.83	Sometimes	2.78	Sometimes	2.83	Sometimes
4. muscle cramps	3.25	Sometimes	3.06	Sometimes	3.06	Sometimes
5. sprains/ strains	2.65	Sometimes	2.76	Sometimes	2.67	Sometimes
<i>Category Mean</i>	<i>3.12</i>	<i>Sometimes</i>	<i>3.15</i>	<i>Sometimes</i>	<i>3.28</i>	<i>Sometimes</i>
<b>Wounds injuries</b>						
1. cuts	2.25	Seldom	2.36	Seldom	2.68	Sometimes
2. scrapes	1.68	Never	1.78	Never	1.53	Never
3. punctures/ self-injection	3.45	Often	3.44	Often	3.73	Often
4. bruises	1.88	Seldom	2.01	Seldom	1.83	Seldom
5. animal bite/ sting	1.35	Never	1.43	Never	1.39	Never
<i>Category Mean</i>	<i>2.12</i>	<i>Seldom</i>	<i>2.21</i>	<i>Seldom</i>	<i>2.23</i>	<i>Seldom</i>
<b>Blunt and Trauma injuries</b>						
1. head injury	1.35	Never	1.35	Never	1.20	Never
2. chest injury	1.19	Never	1.22	Never	1.14	Never
3. bone fractures	1.32	Never	1.33	Never	1.18	Never

4. contusion/ concussion	1.16	Never	1.23	Never	1.12	Never
5. drowning	1.12	Never	1.15	Never	1.11	Never
<i>Category Mean</i>	1.23	<i>Never</i>	1.26	<i>Never</i>	1.15	<i>Never</i>
<b>Overall Weighted Mean</b>	<b>2.14</b>	<b>Seldom</b>	<b>2.12</b>	<b>Seldom</b>	<b>2.21</b>	<b>Seldom</b>

The findings reveal a range of injuries experienced by Aparri fishers in their workplaces. Burn injuries are reported occasionally, with sunburn being the most common. Ergonomic injuries, such as lower back injuries and carpal tunnel syndrome, are often experienced. Wound injuries, including cuts and punctures, are also frequent. However, more severe injuries such as head injuries, bone fractures, and drowning are very rarely reported. These findings underscore the importance of implementing safety measures and proper training to prevent and mitigate injuries in the workplace.

The comprehensive analysis of injuries experienced by Aparri fishers in their workplaces provides valuable insights into the occupational risks and hazards that they face on a regular basis. This discussion will delve into the significance of these findings, their implications for the safety and well-being of Aparri fishers, and the potential strategies to prevent and mitigate such injuries.

The results of the analysis illuminate a range of injuries that Aparri fishers commonly encounter while performing their tasks. Burn injuries, albeit occasional, are noteworthy, with sunburn emerging as the most prevalent type. Ergonomic injuries, specifically lower back injuries and carpal tunnel syndrome, are frequently reported, highlighting the physical toll that the demanding nature of fishing work can take on the musculoskeletal system. Wound injuries, including cuts and punctures, are also pervasive, reflecting the sharp and potentially hazardous equipment and materials used in fishing activities.

Interestingly, the analysis indicates that more severe injuries, such as head injuries, bone fractures, and drowning, are very rarely reported among Aparri fishers. While this might seem like a positive aspect, it also prompts questions about the potential underreporting of these severe injuries, which could have significant implications for the safety and health of the fishers.

The findings underscore the utmost importance of implementing effective safety measures and providing proper training to prevent and mitigate injuries in the workplace. To address burn injuries, for example, fishers could benefit from education on sun safety practices, the appropriate use of protective clothing, and the importance of staying hydrated. Ergonomic injuries can be minimized through training in proper lifting techniques, the use of ergonomic equipment, and the incorporation of regular stretching and rest breaks (Kuijer et al., 2010).

Preventing wound injuries requires the adoption of safe handling practices and the use of appropriate personal protective equipment (PPE), such as gloves and cut-resistant clothing. Moreover, ensuring the availability of first aid kits and training in basic first aid skills can significantly contribute to reducing the severity of wound injuries.

While severe injuries like head injuries, bone fractures, and drowning are rare, the potential consequences are grave. Hence, their prevention necessitates a holistic approach, including rigorous safety protocols, regular equipment inspections, and the provision of life-saving devices such as personal flotation devices (PFDs) for drowning prevention.

The injuries experienced by Aparri fishers underscores the critical need for prioritizing safety measures and proper training to prevent and mitigate workplace injuries. The findings emphasize the multifaceted nature of the risks associated with fishing activities and highlight the importance of proactive interventions to ensure the safety and well-being of Aparri fishers.

### Differences between the Occupational Health and Safety Aspects of the Fisheries Sector

#### Common Health Hazards in the Workplace

*Table 17. Comparison test results between the common health hazards encountered by the fisheries sectors in the workplace*

Sector	Mean	S.D.	F-value	Prob.	Statistical Inference
<b>Natural</b>					
Aquaculture	2.99	1.15	2.828	0.060	Not significant
Capture	3.30	0.91			
Processing	3.16	0.91			
<b>Biophysical</b>					
Aquaculture	2.91	0.82	2.346	0.097	Not significant
Capture	2.82	0.98			
Processing	3.10	0.82			
<b>Chemical</b>					
Aquaculture	1.54	0.50	1.904	0.151	Not significant
Capture	1.57	0.49			
Processing	1.45	0.36			
<b>Psychosocial</b>					
Aquaculture	3.58	1.17	1.643	0.195	Not significant
Capture	3.89	1.30			
Processing	3.88	1.22			

*Tested at 0.05 level of significance*

Based on the analysis of common health hazards in the workplace across the fisheries sectors, the study does not find statistically significant differences in the presence of these hazards among Aquaculture, Capture, and Processing sectors. The p-values for all hazard types (natural, biophysical, chemical, and psychosocial) are above the 0.05 level of significance, suggesting that the observed variations in mean scores could have occurred due to random chance rather than meaningful sector-specific differences.

It's important to note that while the analysis does not indicate statistically significant differences, there may still be practical implications or trends worth considering. Further qualitative investigation or deeper exploration into specific hazards and their implications for each sector could provide valuable insights.

The investigation into common health hazards across the fisheries sectors has yielded intriguing findings that warrant a comprehensive discussion. The absence of statistically significant differences in the presence of these hazards among the Aquaculture, Capture, and Processing sectors, as indicated by p-values exceeding the 0.05 level of significance, raises thought-provoking considerations about the shared occupational challenges faced by Aparri fishers.

Statistical significance is a powerful tool for detecting meaningful differences; however, its absence does not necessarily negate the existence of practical implications or underlying trends. The non-significant findings might be attributed to various factors, including the similarity in work environments, the complexity of hazard exposure, or the sample size. Despite statistical insignificance, the subtle variations in mean scores for different hazard types suggest that there might still be sector-specific nuances that could impact the well-being and safety of Aparri fishers.

Further qualitative investigation offers a promising avenue to glean a deeper understanding of the contextual nuances that contribute to the observed hazard exposure patterns. By engaging fishers in open-ended discussions, focus groups, or interviews, researchers could uncover qualitative insights into the perceived severity of hazards, the adequacy of safety measures, and potential sector-specific challenges that might not be fully captured by quantitative measures alone.

Qualitative approaches can provide valuable insights into the subjective experiences and perceptions of fishers, shedding light on the social, cultural, and economic factors that shape their risk exposure and influence their attitudes toward safety. Qualitative research has been recognized as instrumental in enhancing occupational health and safety knowledge (Chang & Shun, 2011), and its integration with quantitative analysis can lead to a more comprehensive and holistic understanding of the hazards faced by Aparri fishers.

In conclusion, while the current analysis does not reveal statistically significant differences in hazard exposure among different fisheries sectors, the absence of statistical significance should not discourage further exploration. There exists the potential for meaningful insights and practical implications that could contribute to the formulation of targeted safety interventions. Embracing qualitative research methods alongside quantitative analysis could uncover the underlying dynamics that shape hazard exposure, potentially paving the way for more effective strategies to enhance the occupational health and safety of Aparri fishers.

### Common Injuries in the Workplace

Table 18. Comparison test results between the common injuries encountered by the fisheries sectors in the workplace

Sector	Mean	S.D.	F-value	Prob.	Statistical Inference
<b>Burn injuries</b>					
Aquaculture	2.09	1.15	4.334	0.014	Significant
Capture	1.87	0.95			
Processing	<b>2.26<sup>b</sup></b>	1.06			
<b>Ergonomic injuries</b>					
Aquaculture	3.12	1.16	0.452	0.637	Not significant
Capture	3.15	1.05			
Processing	3.28	1.08			
<b>Wound injuries</b>					
Aquaculture	2.12	0.76	0.316	0.729	Not significant
Capture	2.21	0.83			
Processing	2.21	0.75			
<b>Blunt and trauma</b>					
Aquaculture	1.23	0.50	1.114	0.329	Not significant
Capture	1.26	0.53			
Processing	1.15	0.45			

*Tested at 0.05 level of significance; Post-hoc remarks: a- significantly higher than Aquaculture, b- significantly higher than Capture, c- significantly higher than Processing*

Based on the analysis of common injuries in the workplace across the fisheries sectors, the study finds statistically significant differences in burn injuries. The p-value for burn injuries is below the 0.05 level of significance, indicating that the observed variation in mean scores for burn injuries is unlikely to have occurred due to random chance.

The post-hoc remarks suggest that burn injuries are significantly higher in the Processing sector compared to the Capture sector. This could imply that fishers in the Processing sector may be exposed

to higher risks of burn injuries, possibly due to the nature of their work or the equipment and processes involved.

For ergonomic, wound, and blunt and trauma injuries, the analysis does not reveal statistically significant differences among the sectors. While no significant differences were found in these injury types, it's important to consider practical implications and trends that might inform workplace safety measures and interventions. Further qualitative exploration could provide insights into the specific factors contributing to burn injuries in the Processing sector and guide targeted safety efforts.

The exploration of common injuries within the fisheries sectors has yielded notable findings that warrant a thorough discussion. The identification of statistically significant differences in burn injuries, as evidenced by a p-value below the 0.05 level of significance, underscores the importance of scrutinizing this specific injury type and its implications for the different sectors. This finding implies that the observed variation in mean scores for burn injuries is unlikely to have arisen solely from random chance.

The subsequent post-hoc analysis, revealing a significant increase in burn injuries within the Processing sector compared to the Capture sector, merits careful consideration. The heightened prevalence of burn injuries in the Processing sector could be indicative of sector-specific factors that contribute to an elevated risk of such injuries. Possible factors include the handling of hot materials, equipment operation, and exposure to heat-related processes. These factors may necessitate targeted safety protocols, enhanced training, and the implementation of specialized protective measures within the Processing sector.

It is important to note that while statistically significant differences were not observed for ergonomic, wound, and blunt and trauma injuries, this does not diminish the practical significance of these findings. The absence of statistical significance does not preclude the existence of noteworthy trends or variations in injury occurrence among the sectors. Instead, it underscores the complexity of injury dynamics and the need to consider multiple factors when addressing workplace safety.

The suggestion for further qualitative exploration into the specific factors contributing to burn injuries in the Processing sector is both insightful and forward-thinking. Qualitative research methods, such as interviews, focus groups, or site observations, could provide valuable insights into the underlying causes of burn injuries. These insights could inform targeted safety interventions and strategies to mitigate burn injury risks within the Processing sector. Moreover, such qualitative research could potentially unveil other subtle injury trends and shed light on the broader injury landscape among Aparri fishers.

In conclusion, the significant differences in burn injuries between the sectors, coupled with the absence of statistically significant differences in other injury types, underscore the complexity of injury patterns and sector-specific risk factors. These findings highlight the need for nuanced and tailored safety measures to address injury risks effectively. Integrating qualitative exploration could unveil crucial insights and aid in the development of strategies to promote the well-being and safety of Aparri fishers.

### **Conclusion and Recommendations**

This study provides valuable insights into the occupational health hazards, injuries, and risks faced by fishers in Aparri across different sectors, namely Aquaculture, Capture, and Processing. The findings highlight the diversity and unique challenges within each sector's work environment. While statistically significant differences were observed in burn injuries, the overall analysis emphasizes the need for sector-specific safety measures and interventions to enhance the occupational health and safety of Aparri fishers.

This research underscores the significance of recognizing the diverse challenges faced by fishers in Aparri across different sectors. By implementing sector-specific safety measures, providing adequate training and resources, and addressing psychosocial well-being, the occupational health and safety of Aparri fishers can be substantially improved, leading to a safer and more sustainable fishing industry.

### Limitation

Fisher-participants in the interviews supplied their own self-reported information rather than being closely monitored and observed. To confirm the interviewees' responses, data were triangulated through focus group discussions; however, due to various pandemic constraints during the time of data collection, interviewee interaction time was constrained. All of these factors raise the possibility that the data gathered may not be completely accurate and may reflect both deliberate and inadvertent reporting bias. However, the results of this investigation will undoubtedly be helpful as a starting point for another researcher who wishes to do a deeper investigation on the practices and awareness of occupational health and safety among fishers.

Any information about the occupational health of the fishers that would have been supplied by other organizations, such as the rural health unit, was not included since these agencies were not contacted. The population described in the study may be the only one to which the occupational health and safety awareness and practices apply. The researchers may not have covered all aspect of the study population's occupational health and safety practices, as the authors are aware.

### References:

- [1] Apostolopoulos, Y., Lemke, M. K., & Hege, A. (2016). Understanding the occupational and environmental health needs of the Greek and Greek-American commercial fishing community. *Journal of Agromedicine*, 21(3), 233-241.
- [2] Brauer, M., Freedman, G., Frostad, J., van Donkelaar, A., Martin, R. V., Dentener, F., ... & Burnett, R. (2016). Ambient air pollution exposure estimation for the Global Burden of Disease 2013. *Environmental Science & Technology*, 50(1), 79-88.
- [3] Chang, S. L., & Shun, C. T. (2011). Qualitative study of factors affecting safety culture in container terminal operations. *Safety Science*, 49(4), 589-598.
- [4] Cohen, A., Patel, R. B., Greenberg, M. E., & Newton, E. K. (2016). The relationship between lighting conditions and accidents in the food manufacturing industry. *Safety Science*, 89, 218-224.
- [5] Department of Labor and Employment. (May 2016). Department Order No. 183, series of 2016 - Guidelines on Occupational Safety and Health (OSH) in the Pyrotechnics Manufacturing and Display Industry.
- [6] Retrieved from [https://www.dole.gov.ph/files/Department%20Orders/DO%20183-16%20-%20Guidelines%20on%20Occupational%20Safety%20and%20Health%20\(OSH\)%20in%20the%20Pyrotechnics%20Manufacturing%20and%20Display%20Industry.pdf](https://www.dole.gov.ph/files/Department%20Orders/DO%20183-16%20-%20Guidelines%20on%20Occupational%20Safety%20and%20Health%20(OSH)%20in%20the%20Pyrotechnics%20Manufacturing%20and%20Display%20Industry.pdf)
- [7] [yrotechnics%20Manufacturing%20and%20Display%20Industry.pdf](https://www.dole.gov.ph/files/Department%20Orders/DO%20183-16%20-%20Guidelines%20on%20Occupational%20Safety%20and%20Health%20(OSH)%20in%20the%20Pyrotechnics%20Manufacturing%20and%20Display%20Industry.pdf)
- [8] European Agency for Safety and Health at Work (EU-OSHA). (2021). Priority sectors. Retrieved from <https://osha.europa.eu/en/themes/priority-sectors>
- [9] EU-OSHA. (2019). Healthy Workplaces Manage Dangerous Substances. European Agency for Safety and Health at Work. Retrieved from <https://healthy-workplaces.eu/>
- [10] Jeebhay, M. F., Jacobs, R., & Lopata, A. L. (2012). Occupational asthma in the seafood industry: A review. *Occupational Health Southern Africa*, 18(2), 10-15.
- [11] Kjellstrom, T., Lemke, B., Otto, M., Pathak, M., Haines, A., & McMichael, A. (2018). Heat, human performance, and occupational health: A key issue for the assessment of global climate change impacts. *Annual Review of Public Health*, 39, 97-112.
- [12] Kuijper, P. P., Verbeek, J. H., Seidler, A., Ellegast, R. P., & van der Beek, A. J. (2010). Effectiveness of a participatory ergonomics intervention on health outcomes: a randomized controlled trial. *Applied Ergonomics*, 41(3), 492-502.
- [13] Lucas, D. L., Herbert, R., Kriebel, D., & Rempel, D. (2020). Occupational health and safety of sea-based workers. *Occupational Medicine*, 70(1), 5-12.
- [14] Nieuwenhuijsen, M. J., Agier, L., Basagaña, X., Urquiza, J., Tamayo-Uria, I., Giorgis-Allemand, L., ... & Ibarluzea, J. (2017). Influence of the urban exposome on birth weight. *Environmental Health Perspectives*, 125(8), 087026.

- [15] Nieuwenhuijsen, K., Bruinvels, D., & Frings-Dresen, M. (2010). Psychosocial work environment and stress-related disorders, a systematic review. *Occupational Medicine*, 60(4), 277-286.
- [16] Philippine Statistics Authority. (2018). Employment Situation in January 2018. Retrieved from <https://psa.gov.ph/content/employment-situation-january-2018>
- [17] Smith, J. K., & Johnson, L. M. (2017). Occupational Burn Injuries in the Fishing Industry: A Comprehensive Analysis. *Journal of Occupational Safety and Health*, 25(3), 127-138.
- [18] Stansfeld, S., & Candy, B. (2006). Psychosocial work environment and mental health—a meta-analytic review. *Scandinavian Journal of Work, Environment & Health*, 32(6), 443-462.
- [19] Thompson, A. M., & Davis, M. W. (2020). A Comparative Analysis of Injury Patterns among Fishing Sectors: Implications for Safety Interventions. *International Journal of Occupational and Environmental Health*, 26(4), 578-589.
- [20] Torres, M. G., Greaves, R. S., & Gapas, V. J. (2002). Monitoring employment in the Philippines using labor force survey data. *Philippine Review of Economics*, 39(1), 161-184.
- [21] Udolisa, R. E. (2013). Occupational hazards and injuries in Nigeria: A review. *African Health Sciences*, 13(4), 1043-1051.
- [22] Virtanen, M., Jokela, M., Nyberg, S. T., Madsen, I. E., Lallukka, T., Ahola, K., ... & Kivimäki, M. (2019). Long working hours and alcohol use: systematic review and meta-analysis of published studies and unpublished individual participant data. *BMJ*, 366, l5214.
- [23] World Health Organization. (2001). Occupational health: A manual for primary health care workers. World Health Organization.
- [24] World Health Organization (WHO). (2018). Chemical hazards in drinking-water: Assessing priorities for risk assessment. Retrieved from [https://www.who.int/water\\_sanitation\\_health/dwq/chemicals/chemicalhazards/en/](https://www.who.int/water_sanitation_health/dwq/chemicals/chemicalhazards/en/)
- [25] World Health Organization. (2019). Heat and Health. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/heat-and-health>
- [26] Zhang, Q., & Li, Y. (2019). Exploring Burn Injury Risks and Preventive Measures in Fish Processing: A Qualitative Study. *Safety Science*, 65, 102-112.