

Perceived Occupational Hazard Preparation among Third Year Marine Transportation Students of AIMS

Article History:

Received: 16 October 2024

Accepted: 18 October 2024

Published: 28 December 2024

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Abstract

The study aimed to assess the preparedness of third-year Bachelor of Science in Marine Transportation (BSMT) students of Asian Institute of Maritime Studies (AIMS) for occupational hazards through competency-based training programs. A quantitative descriptive-correlational research design was utilized to collect data from 39 purposively sampled students regarding their demographic profiles, perceptions of skills acquisition, and self-reported preparedness levels. Questionnaires were developed based on the Standards of Training, Certification and Watchkeeping for Seafarers (STCW) guidelines to measure students' mastery of skills relating to elementary first aid, survival techniques, and safety responsibilities. Descriptive statistics provided a summary of the skills acquisition and self-reported preparedness while Pearson's R analyzed the relationship between the skills acquired in preparation for occupational hazards and preparedness when onboard the vessel. Results indicated that most respondents were male, aged 21-23. The students strongly agree that the training effectively developed their abilities adhering to international standards. Moderate to high positive correlation between skill acquisition and preparedness suggested that the training enhanced the self-assessed hazard response capabilities of the students. Accordingly, maritime education adequately equipped graduates as regulated. Significant associations validated the competency-focused pedagogies of the BSMT program. The study rejected the null hypothesis, finding a significant relationship between acquired skills and preparedness for actual occupational hazards. This underscores the value of interactive, application-focused teaching methods, such as those implemented by AIMS, in building the confidence of maritime students to respond effectively to onboard dangers.

Keywords: occupational hazard, competency-based training, skills acquisition, self-preparedness, Standards of Training, Certification and Watchkeeping for Seafarers (STCW)



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INTRODUCTION

Seafarers faced daily occupational risks. This study also collected additional data to determine the type of training that seafarers received to prepare for their daily lives. The rate of disasters and accidents in the maritime industry has significantly decreased over the past few decades. A study by Roberts (2008) on fatal work-related accidents onboard UK merchant ships between 1919 and 2005 found that mortality rates in fatal disasters and personnel accidents decreased significantly over time. Other studies confirmed this trend. Explosions in the cargo hold, collisions caused by poor visibility, and ship foundering in typhoons, storms, and strong gales were the primary causes of death in shipping disasters. When ship types were taken into consideration, fishermen had the highest mortality rates—up

to 400 per 100,000 seafarer years. Rough weather, lack of safety awareness, lack of use of personal protective equipment, and lack of experience were the primary causes of workplace fatalities. Deck ratings and deck officers were responsible for most occupational fatalities, and there was a recurrence of similar accident types, such as falling into or inside cargo holds, falling overboard, or being struck by heavy seas on deck. Injuries that resulted in death during off-duty hours were frequently linked to alcohol consumption.

Maritime accidents remain a significant concern in the shipping industry, with studies showing a consistent increase in accident rates over recent years (Napoleone, 2016; Gasparotti, 2024). Between 2014 and 2022, EU member states reported 23,814 maritime accidents and incidents, ranging from very serious to less

severe (Gasparotti, 2024). Common injuries include contusions, wounds, burns, and eye injuries, with multiple and head injuries being the leading causes of accident-related deaths on board (Napoleone, 2016). Factors contributing to accidents include physical, ergonomic, environmental, psychological, and cultural elements (Ramírez-Marengo et al., 2021). A comprehensive analysis of 213 marine accidents from 1990 to 2020 revealed significant correlations between various parameters, such as ship type, damage location, visibility, and vessel age in collision accidents (Pilatis et al., 2024).

A Danish mortality study found that seafarers had an 11.5-fold higher accident rate than the Danish male ashore workforce. In addition, the likelihood of maritime catastrophes, in which the workplace itself vanished or was severely damaged, was an explanation.

With the above background, this study aimed to explore the relationship between skills acquired during maritime training and levels of preparedness for occupational hazards aboard vessels. It sampled 39 third-year Bachelor of Science in Marine Transportation (BSMT) students to quantify this correlation. The independent variables included first aid, survival techniques, and safety/social responsibility training. The dependent variables were self-reported preparedness concerning environmental, physical safety, and physical hazards.

LITERATURES

Occupational Health and Safety Challenges in Maritime Work. Maritime work presents significant occupational health and safety (OHS) challenges. Seafarers face hazards related to employment-related geographical mobility, including restricted rights on board and discouragement from raising safety concerns (Shan & Lippel, 2019). The COVID-19 pandemic has exacerbated these issues, with travel restrictions leading to an OHS crisis at sea (Shan, 2022). Canadian seafarers specifically confront challenges due to increasing Arctic shipping activities, intensified work-related

mobility, and insufficient legal protection (Shan, 2020). The implementation of environmental regulations like SECA and NECA in the Baltic Sea Region introduces new occupational risks related to emerging technologies and processes (Prause et al., 2018). Maritime workers are often exposed to demanding working conditions, isolation, psychological stress, and physical fatigue, which can lead to occupational diseases and accidents (Prause et al., 2018). These challenges are compounded by gaps in current maritime OHS laws and the need for improved regulatory protections for seafarers (Shan, 2020; Shan & Lippel, 2019).

Human Factors and Risk Management. Human factors play a crucial role in maritime safety and risk management. Research highlights the importance of incorporating human elements into risk assessment models for ship collisions (Sotiralis et al., 2016). The human factor is recognized as the primary cause of accidents at sea, necessitating its inclusion in risk assessment matrices (Loginovsky & Inland Shipping, 2018). Factors such as human error, fatigue, stress, and non-technical skills significantly impact safety performance in shipping (Lorenzi et al., 2018). A comprehensive approach to risk management in modern shipping involves integrating technical, organizational, and human aspects of maritime safety (Torskyi et al., 2024). This includes considering psychophysiological aspects of seafarers' activities, intercultural communication in multinational crews, and the development of a proactive safety culture. The use of innovative technologies like decision support systems and predictive analytics is also emphasized in enhancing risk management practices in the maritime industry (Torskyi et al., 2024).

Physical and Mental Well-Being of Filipino Seafarers. Social interaction onboard is crucial for their overall wellness, with higher levels of social engagement positively impacting physical well-being (Balido, 2024). Stress, fatigue, and separation from family are major contributors to mental health issues, with seafarers employing strategies like maintaining a positive outlook and socializing with

crewmates to cope (Sarinas et al., 2022). The COVID-19 pandemic has further impacted seafarers' mental health, emphasizing the need for improved mental health education in seafarer training programs (Abila & Acejo, 2021). Despite the Philippines being the largest source of global seafarers, the POEA-Standard Employment Contract falls short in addressing occupational health and safety issues, failing to adequately protect seafarers from excessive working hours, fatigue, stress, and anxiety (Pia et al., 2024).

METHODOLOGY

Population, Sample Size, and Sampling Technique. The study used purposive sampling, a non-probability sampling method that relies on the researchers' judgment in selecting participants. The sample is comprised of 39 third-year Bachelor of Science in Maritime Transportation (BSMT) students from the Asian Institute of Maritime Studies (AIMS). This group was specifically chosen for their relevance to the study's focus on maritime education and occupational hazard preparedness. Table 1 below presents the distribution of the respondents based on their demographic characteristics.

Table 1
Frequency Distribution of the Participants' Age and Gender

Profile	Frequency	Percentage
Gender	Female	2
	Male	37
Age	18-20 years old	5
	21-23 years old	33
	24-26 years old	1

Research Instrument. The instrument was a survey questionnaire designed to align with the study's objectives. It underwent a rigorous validation process involving maritime experts and a statistician to ensure reliability and content validity. The questionnaire consisted of three sections: 1) Questions on age and gender to establish respondent profiles; 2) Close-ended questions assessing the training and skills respondents gained in preparation for seafaring; and, 3) Close-ended questions

addressing environmental factors, physical safety risks, and other potential hazards onboard ships.

The instrument was evaluated for reliability using Cronbach's alpha, achieving an internal consistency value above 0.9, hence, indicating an excellent reliability. A five-point Likert scale was used to measure respondents' levels of preparedness.

Data Collection Procedure. Data were collected using Google Forms, aligning with the HyFlex Delivery of Classroom Instructional Standards (H-DCIS) adopted in the post-pandemic era. This method enabled real-time response aggregation and streamlined data compilation. The use of Google Forms ensured the integrity and reliability of the process while accommodating remote participation. This approach facilitated the collection of insights into the skills and preparedness of the maritime students in addressing seafaring occupational hazards.

Statistical Treatment. Quantitative methods were applied to analyze the collected data. IBM SPSS Version 26 was used to conduct both descriptive and inferential statistical analyses.

Means and standard deviations described central tendencies and variability in responses.

Pearson's product-moment correlation was used to examine the relationship between skill acquisition and preparedness levels. The correlation coefficient (r) indicated the strength and direction of the association.

RESULTS

Skills Acquired in Managing Occupational Hazards. The results of the descriptive analysis (Table 2) show that the participants strongly agree with having acquired elementary first aid skills in their preparation for seafaring occupational hazards ($M = 4.24$, $SD = 0.67$). They strongly agree that the training in elementary first aid has effectively prepared them for seafaring occupational hazards ($M = 4.33$, $SD = 0.81$), that the skills they acquired in elementary

first aid would contribute significantly to their safety while onboard a vessel ($M= 4.31$, $SD= 0.80$), and that it will be valuable in mitigating risks and providing immediate assistance to others while onboard a vessel ($M= 4.28$, $SD= 0.69$).

Table 2

Participants' Skills Acquired in Preparation for Seafaring Occupational Hazards in terms of Elementary First Aid

Elementary First Aid	M	SD	Interpretation
1. I have been trained well in elementary first aid.	4.13	0.80	Agree
2. The training in elementary first aid has effectively prepared me for seafaring occupational hazards.	4.33	0.81	Strongly Agree
3. The skills I acquired in elementary first aid will contribute significantly to my safety while onboard a vessel.	4.31	0.80	Strongly Agree
4. I am confident in my ability to apply the skills in elementary first aid during actual occupational hazards while onboard a vessel.	4.13	0.80	Agree
5. The skills I acquired in elementary first aid will be valuable in mitigating risks and providing immediate assistance to others while onboard a vessel.	4.28	0.69	Strongly Agree
Elementary First Aid	4.24	0.67	Strongly Agree

While they also agree that they have been trained well in elementary first aid ($M= 4.13$, $SD= 0.80$) and that they are confident in their ability to apply the skills learned on actual occupational hazards while onboard a vessel ($M= 4.13$, $SD= 0.80$), their overall responses indicate that the training satisfactorily achieved its goal of preparing seafarers for occupational hazards. Additionally, participants agreed that the skills would meaningfully assist survival in sea emergencies. This aligns with research showing hands-on training strengthens the retention of survival procedures (IMO, 2020). Being able to practice with actual appliances fosters competence and mastery of techniques, as their responses underscored the value of practical experience in boosting confidence to perform under pressure. Administering first aid is one such critical lifesaving technique that research has found can significantly impact survivability (Apostol-Mates, 2021). The results demonstrate the training program's effectiveness in imparting first aid and other skills that prior literature establishes are crucial for safely responding to accidents or disasters at sea.

Skills Acquired in Preparation for Seafaring Occupational Hazards in terms Personal Survival Techniques. In Table 3, results have shown that most participants strongly agree for having acquired personal survival techniques in

their preparation for seafaring occupational hazards ($M= 4.27$, $SD= 0.70$). These findings indicate that the participants believe that the training in Personal Survival Techniques has been effective in equipping them with the necessary skills and knowledge to ensure their safety during emergencies at sea.

Table 3

Participants' Skills Acquired in Preparation for Seafaring Occupational Hazards in terms Personal Survival Techniques

Personal Survival Techniques	M	SD	Interpretation
1. The training in Personal Survival Techniques has equipped me with the necessary skills to ensure my personal safety during emergency situations at sea.	4.28	0.83	Strongly Agree
2. I feel confident in my ability to effectively use survival equipment and techniques taught in Personal Survival Techniques training.	4.28	0.76	Strongly Agree
3. The training in Personal Survival Techniques has increased my awareness of potential risks and hazards at sea.	4.33	0.84	Strongly Agree
4. The skills I acquired in Personal Survival Techniques training will significantly contribute to my ability to survive in emergency situations at sea.	4.15	0.81	Agree
5. I believe that the Personal Survival Techniques training has adequately prepared me to handle emergency situations and ensure the safety of myself and others on board a vessel.	4.31	0.77	Strongly Agree
Personal Survival Techniques	4.27	0.70	Strongly Agree

Furthermore, the participants strongly agree that the training in Personal Survival Techniques: has increased their awareness of potential risks and hazards at sea ($M= 4.33$, $SD= 0.84$) and that it has adequately prepared them to handle emergencies and ensure their safety and that others on board a vessel ($M= 4.31$, $SD= 0.77$). Moreover, they were equipped with the necessary skills to ensure personal safety during emergency situations at sea ($M= 4.28$, $SD= 0.83$), and they were confident in their ability to effectively use survival equipment and techniques ($M= 4.28$, $SD= 0.76$). They also agree that the skills they acquired in personal survival techniques training will significantly contribute to their ability to survive in emergencies at sea ($M= 4.15$, $SD= 0.81$). These results are significant, as they indicate the effectiveness of personal survival technique training in enhancing third-year maritime students' preparedness for occupational hazards.

Additionally, this shows that training plays a significant role in mitigating potential hazards and reducing the risk of human error onboard during equipment operation and maintenance.

Skills Acquired in Preparation for Seafaring Occupational Hazards in terms Personal Safety and Social Responsibilities. Results in Table 4 revealed that the participants strongly agree for having acquired personal safety and social responsibilities in their preparation for seafaring occupational hazards (M= 4.29, SD= 0.63).

Table 4
Participants' Skills Acquired in Preparation for Seafaring Occupational Hazards in terms Personal Safety and Social Responsibilities

Personal Safety and Social Responsibilities	M	SD	Interpretation
1. The training in Personal Safety and Social Responsibilities has increased my understanding of the importance of safety measures and regulations in the maritime industry.	4.28	0.76	Strongly Agree
2. I feel confident in my ability to implement safety procedures and protocols taught in Personal Safety and Social Responsibilities training.	4.21	0.77	Agree
3. The training in Personal Safety and Social Responsibilities has enhanced my awareness of my responsibilities towards the safety of myself, fellow crew members, and the environment.	4.26	0.82	Strongly Agree
4. The skills and knowledge gained in Personal Safety and Social Responsibilities training will contribute significantly to maintaining a safe and secure working environment on board a vessel.	4.33	0.84	Strongly Agree
5. I believe that the Personal Safety and Social Responsibilities training has adequately prepared me to fulfill my responsibilities and obligations in maintaining a safe and secure maritime workplace.	4.38	0.67	Strongly Agree
Personal Safety and Social Responsibilities	4.29	0.63	Strongly Agree

The participants have strongly agreed that the Personal Safety and Social Responsibilities training has adequately prepared them to fulfill their responsibilities and obligations in maintaining a safe and secure maritime workplace (M= 4.38, SD= 0.67), This standard was created to fulfill the criteria outlined in Section A-VI/4, Table A-VI/1- 4, Chapter VI of the STCW Code regarding Personal Safety and Social Responsibility (Maritime Safety Training and Development) that the skills and knowledge gained in the training will contribute significantly to maintaining a safe and secure working environment on board a vessel (M= 4.33, SD= 0.84), that the training has increased their understanding of the importance of safety measures and regulations in the maritime industry (M= 4.28, SD= 0.76), and that the training has enhanced their awareness of their responsibilities towards the safety of self, fellow crew members, and the environment (M= 4.26, SD= 0.82). They also agree that they feel confident in their ability to implement safety procedures and protocols as learned in Personal Safety and Social Responsibilities training (M=4.21, SD=0.77). Participants strongly agreed that the Personal Safety and Social

Responsibilities training has equipped them with the necessary skills and knowledge to fulfill their obligations in maintaining a safe and secure maritime workplace (Marquardt et al., 2020).

Preparedness in Seafaring Occupational Hazards when Onboard the Vessel in terms of Environmental Factors. This study also examined the agreement of the participants on the preparedness in seafaring occupational hazards when onboard the vessel in terms of environmental factors. As reflected in Table 5, results revealed that the participants have strongly agreed (M= 4.23, SD= 0.60) that they are prepared for occupational hazards when they go onboard. They strongly agreed that the knowledge and training received regarding environmental factors have prepared them for any challenges that may arise during seafaring duties (M= 4.41, SD= 0.68) and that it has equipped them with skills to handle emergency situations and ensure the safety of the crew and the vessel (M= 4.31, SD= 0.69).

Table 5
Participants' Preparedness in Seafaring Occupational Hazards when Onboard the Vessel in terms of Environmental Factors

Environmental Factors	M	SD	Interpretation
1. I am adequately trained and prepared to handle environmental factors such as extreme weather conditions, rough seas, and natural disasters.	4.10	0.82	Agree
2. I possess the knowledge and skills to mitigate the risks associated with environmental factors and ensure the safety of myself and others on board the vessel.	4.18	0.72	Agree
3. The training and preparation I have received regarding environmental factors have adequately equipped me to handle emergency situations and ensure the safety of the crew and the vessel.	4.31	0.69	Strongly Agree
4. I am confident in my ability to adapt to different environmental conditions and take necessary precautions to minimize risks while onboard the vessel.	4.15	0.81	Agree
5. I believe that the knowledge and training I have received regarding environmental factors have prepared me well for any challenges that may arise during my seafaring duties.	4.41	0.68	Strongly Agree
Environmental Factors	4.23	0.60	Strongly Agree

Also, they agree that they possess the knowledge and skills to mitigate the risks associated with environmental factors and ensure the safety of themselves and others on board the vessel (M= 4.18, SD=0.752), are confident in their ability to adapt to different environmental conditions and take necessary precautions to minimize risks while onboard the vessel (M= 4.15, SD= 0.81), and are adequately trained and prepared to handle environmental factors such as extreme

weather conditions, rough seas, and natural disasters ($M= 4.10$, $SD= 0.82$). The results of our survey showed that the respondents of Maritime Transportation students at the Asian Institute of Maritime Studies were well trained and possessed knowledge to mitigate the risks of environmental hazards on board vessels, as it concluded with a mean score of 4.23. These environmental factors include extreme weather conditions, rough seas, and natural disasters. With these results, the researchers were able to determine how ready they were when facing environmental hazards, which gathered a positive result as the interpretation of the data ranges from agree to strongly agree. Thus, giving reliable data in the study as the researchers dwell deeper in this study. Moreover, the gathered data states that the respondents were confident to take on challenges when facing environmental hazards and the skills they acquired in their training were effective as they go along on board the vessel.

Moreover, occupational safety and health is broadly defined by the ILO as anticipating, recognizing, evaluating, and controlling workplace conditions that could cause workers injury or illness. This involves promoting and maintaining the highest degree of physical, mental, and social well-being of workers through preventative and protective measures. The primary goal of occupational safety and health is to foster a safe and healthy working environment through risk identification and mitigation.

Preparedness in Seafaring Occupational Hazards when Onboard the Vessel in terms of Physical Safety Hazards. Results also showed (Table 6) that the participants strongly agree on the level of preparedness in seafaring occupational hazards when onboard the vessel in terms of physical safety hazards ($M= 4.27$, $SD= 0.66$). They strongly agreed that the training received regarding physical safety hazards had adequately prepared them to maintain a safe working environment on board the vessel and prevent accidents ($M= 4.38$, $SD= 0.71$), that they have the necessary skills and knowledge to use safety equipment and follow safety protocols to

prevent accidents and injuries on board the vessel ($M= 4.36$, $SD= 0.78$), and that the training has adequately equipped them to handle any safety related challenges that may arise during seafaring duties ($M= 4.26$, $SD= 0.68$). To avert human injury, loss of life, and environmental damage, ensuring personal safety and safety at sea is paramount.

Table 6
Participants' Preparedness in Seafaring Occupational Hazards when Onboard the Vessel in terms of Physical Safety Hazards

Physical Safety Hazards	M	SD	Interpretation
1. I am well-prepared to identify and mitigate physical safety hazards such as slips, trips, falls, and machinery related risks on board the vessel.	4.18	0.79	Agree
2. I have the necessary skills and knowledge to use safety equipment and follow safety protocols to prevent accidents and injuries on board the vessel.	4.36	0.78	Strongly Agree
3. The training I have received regarding physical safety hazards has adequately prepared me to maintain a safe working environment on board the vessel and prevent accidents.	4.38	0.71	Strongly Agree
4. I am confident in my ability to identify potential physical safety hazards and take appropriate measures to ensure the safety of myself and others on board the vessel.	4.15	0.84	Agree
5. I believe that the training I have received regarding physical safety hazards has adequately equipped me to handle any safety-related challenges that may arise during my seafaring duties.	4.26	0.68	Strongly Agree
Physical Safety Hazards	4.27	0.66	Strongly Agree

They also agreed that they are well-prepared to identify and mitigate physical safety hazards such as slips, trips, falls, and machinery related risks on board the vessel ($M= 4.18$, $SD= 0.79$) and are confident in their ability to identify potential physical safety hazards and take appropriate measures to ensure the safety of themselves and others on board the vessel ($M= 4.15$, $SD= 0.84$). The findings suggest that participants feel well-prepared and confident in their ability to address physical safety hazards while onboard the vessel, attributing their preparedness to effective training programs and the acquisition of necessary skills and knowledge in safety protocols. However, there may be some variability in individual confidence levels regarding hazard identification and mitigation, highlighting areas where additional training or support could be beneficial.

Preparedness in Seafaring Occupational Hazards when Onboard the Vessel in terms of Physical Hazards. Moreover, the results in Table 7 revealed that the participants agreed to being prepared in seafaring occupational hazards when onboard the vessel in terms of physical hazards ($M= 4.15$, $SD= 0.65$). The participating

students have agreed that they: are confident in their ability to respond quickly and effectively to physical hazards and implement appropriate safety measures to protect themselves and others on board the vessel (M= 4.15, SD= 0.81); possess the necessary knowledge and skills to respond effectively to physical hazards and minimize their impact on the safety of the crew and the vessel (M = 4.13, SD= 0.83); equipped to handle emergency situations and to ensure the safety of the crew and the vessel in the event of physical hazards (M= 4.10, SD= 0.72); and, trained and prepared to handle physical hazards such as fire, explosions, and chemical spills on board the vessel (M= 4.03, SD= 0.81).

Table 7
Participants' Preparedness in Seafaring Occupational Hazards when Onboard the Vessel in terms of Physical Hazards

Physical Hazards	M	SD	Interpretation
1. I am sufficiently trained and prepared to handle physical hazards such as fire, explosions, and chemical spills on board the vessel.	4.03	0.81	Agree
2. I possess the necessary knowledge and skills to respond effectively to physical hazards and minimize their impact on the safety of the crew and the vessel.	4.13	0.83	Agree
3. The training and preparation I have received regarding physical hazards have adequately equipped me to handle emergency situations and ensure the safety of the crew and the vessel in the event of physical hazards.	4.10	0.72	Agree
4. I am confident in my ability to respond quickly and effectively to physical hazards and implement appropriate safety measures to protect myself and others on board the vessel.	4.15	0.81	Agree
5. I believe that the knowledge and training I have received regarding physical hazards have prepared me well for any emergency situations that may arise during my seafaring duties.	4.33	0.74	Strongly Agree
Physical Hazards	4.15	0.65	Agree

They also strongly agreed that the knowledge and training received about physical hazards have prepared them well for any emergency situations that may arise during my seafaring duties (M= 4.33, SD= 0.74). As shown in Table 3.3, respondents agreed their training adequately equipped them to effectively handle fires, explosions, chemical leaks, and other physical dangers (M=4.15, SD=0.65). This perception of preparedness aligns with the objectives of competency-based maritime education established in the STCW Convention (IMO, 2010). This affirms the utility of cadet training programs in developing necessary hazard mitigation skills. Nuhu and Frank (2020) found the training to be effective in improving hazard perception and risk response competencies expected in the industry. Similarly, Abdullah et

al. (2018) and Yaacob et al. (2020) identified positive correlations between hands-on hazard training and confidence levels dealing with real emergencies. Henceforth, the demand for individuals who can navigate the ever-expanding landscape of technology is on the rise, and the ability to harness these skills can make all the difference in one's academic journey and future career prospects (Eng, 2023).

Relationship Between the Skills Acquired by the Respondents in Preparation for Occupational Hazards and Preparedness for Occupational Hazards Aboard Vessels. Results in Table 8 found that there are significant associations at a 0.05 p-value, such as skills acquired in preparation for seafaring occupational hazards in terms of Elementary First Aid are significantly and positively correlated to the level of preparedness to Environmental Factors ($r = .663$, $p = <.01$), Physical Safety Hazards ($r = .744$, $p = <.01$), and Physical Hazards ($r = .671$, $p = <.01$). These suggest that the skills acquired from the training related to seafaring occupational hazards can predict the level of preparedness they have about various hazards like environmental factors, physical safety hazards, and physical hazards.

Table 8
Pearson Correlation (r) Analysis of the Relationship between the Skills Acquired in Preparation for Seafaring Occupational Hazards and Preparedness when Onboard the Vessel (N= 39)

Skills Acquired in Preparation for Seafaring Occupational Hazards	Preparedness when Onboard the Vessel		
	Environmental Factors	Physical Safety Hazards	Physical Hazards
Elementary First Aid	0.663** (p= .000)	.744** (p= .000)	.671** (p= .000)
Personal Survival Techniques	0.688** (p= .000)	.680** (p= .000)	.786** (p= .000)
Personal Safety and Social Responsibilities	.812** (p= .000)	.765** (p= .000)	.868** (p= .000)

****Correlation is significant at the 0.01 level (2-tailed).**

Similarly, the results reveal that the skills acquired in preparation for seafaring occupational hazards in terms Personal Survival Techniques are significantly and positively correlated to Environmental Factors ($r = .688$, $p = <.01$), Physical Safety Hazards ($r = .680$, $p = <.01$), and Physical Hazards ($r = .786$, $p = <.01$), which indicate that the learned and

acquired skills from seafaring occupational hazards training can predict how prepared the students can be in facing environmental factors, physical safety hazards, and physical hazards.

Lastly, the statistical results also show that the skills acquired in preparation for seafaring occupational hazards in terms of Personal Safety and Social Responsibilities are significantly and positively correlated to Environmental Factors ($r = .812$, $p < .01$), Physical Safety Hazards ($r = .765$, $p < .01$), and Physical Hazards ($r = .868$, $p < .01$). These mean that as their skills acquired from training increase, their preparedness to face hazards such as environmental factors, physical safety hazards, and physical hazards may also increase. Evaluating this relationship provides insight into the effectiveness of competency-based maritime education pedagogies in developing seafarers' competencies as required by the STCW Convention (IMO, 2010).

DISCUSSION

The strong agreement among respondents indicates that their expectations were met or exceeded, demonstrating that the training effectively prepared students for seafaring occupational hazards as required by the STCW Convention. The programs provided essential safety and emergency response training that aligned with industry standards and student expectations. These findings highlight the importance of regularly updating and enhancing maritime education to ensure it remains relevant and effective in promoting onboard safety and competence.

Although respondents expressed confidence in the skills and knowledge they acquired, the study found that routine training, drills, and updates to procedures are necessary to maintain preparedness for hazards. While strong agreement was reported overall, there was some variability in preparedness for physical hazards, indicating a need for continuous improvement in this area.

The study's findings also revealed significant positive correlations between skill acquisition

and self-assessed preparedness for onboard hazards. These results effectively refute the null hypothesis, which suggested no significant relationship between the two variables. The data provides solid evidence that the competencies gained through the maritime education program contributed to the enhanced preparedness for occupational hazards. This underscores the value of interactive, application-focused teaching methods, such as those implemented by AIMS, in building the confidence of maritime students to respond effectively to onboard dangers. The statistical analysis supports the alternative hypothesis, confirming a significant correlation between skill acquisition and perceived preparedness, and demonstrates the effectiveness of the maritime education program in equipping future seafarers with essential skills.

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