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The Level of Knowledge, Attitude, Practices, And Lived Experiences of Ship's Crew in Medication Management System: A Convergent Mixed Methods Study

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ABSTRACT

This study assessed the knowledge, attitude, practices, and lived experiences of the ship's crew regarding medication management systems utilizing a convergent mixed methods design. The author gathered both Quantitative and Qualitative data through structured surveys; the latter were obtained via in-depth interviews. The results showed that the respondents have demonstrated high levels of knowledge, positive attitudes, and good practices in medication management. Further, no significant differences were observed when grouped according to their age, rank, or years of service ($p > 0.05$). The author also uses thematic analysis and further reveals three major themes: accountability in medication handling, competence in emergency response, and the need for continuous training. Moreover, integration of findings confirms and states that experiential learning is reinforced and corroborates the quantitative outcomes. Lastly, the study highlights the importance of sustained training and regulatory compliance to ensure optimal medication safety on board.

Keywords: Pharmacy, medication management, seafarers, knowledge-attitude-practice, mixed methods, Philippines

INTRODUCTION

In the maritime industry, education management dispensing systems are very important hence, access to immediate healthcare is limited during a voyage. Increasing maritime accidents and onboard medical emergencies emphasize the need for efficient medication handling and trained personnel to facilitate the process onboard. There is a report that an increasing number of reports and global incidents of injuries and improper medication handling, stressing the gaps in compliance and training (WHO, 2018; EMSA, 2019).

Globally, frameworks such as the International Medical Guide for Ships provide strict compliance with medication protocols and guidelines. However, several of the studies shows lack in knowledge and practices among seafarers, leading to preventable risks. In the Philippines, an increasing repatriation rate occurred due to illness, further stressing the need for improved onboard medication dispensing systems. Department of Migrant Workers. (2023).

Based on the Health Belief Model, Social Cognitive Theory, and Observational Learning Theory, this study investigates how knowledge, attitudes, and practices influence medication management behaviors

among ship crews. (Bandura, 1986; Rosenstock, 1974)

MATERIALS AND METHODS

This study utilized the convergent mixed-methods research design that approved the dissemination and simultaneous collection and integration of both the quantitative and qualitative data, which provides a more comprehensive and detailed understanding of the use and the implementation of medication management on board as well as behaviors among ship crew members. The quantitative component of this research involved the use of a structured survey, while the qualitative component consisted of in-depth interviews by the different crew members depending on their rank, enabling the exploration of participants' lived experiences and perspectives.

The participants were composed of ship crew members from the different shipping lines and different type of cargo vessels, embarking and disembarking at the Port of Davao. The participants were selected through purposive sampling to ensure that participants with relevant experience in processing and handling the onboard medication management were included in the study. The Data collection for the quantitative research was conducted using a validated structured questionnaire designed for the purpose to assess the knowledge, attitudes, and practices of the ship's crew on medication management. Further, in the qualitative phase, has provided a semi-structured interview guides were utilized to facilitate detailed and in-depth discussion and sharing of experiences which allows the participants to express on their experiences and insights on board the shipping vessel.

The data analysis for the quantitative research utilized the use of descriptive statistics, including the determination of mean and standard deviation, to consolidate the respondents' levels of knowledge, attitudes, and practices. Moreover, the inferential statistical tests, specifically t-tests and analysis of variance (ANOVA), were applied to determine if there were any significant differences across demographic variables. Further, qualitative data were analyzed using Colaizzi's thematic analysis principle and approach, which involved systematic coding, extraction and identification of valuable themes, interpretation of meanings, and identification of emerging themes.

This study also follows the principle of ethics, and ethical considerations were strictly followed and observed throughout the study. The researcher obtained ethical clearance from the Research and Ethics Committee of the institution prior to data collection. Also, the respondents were informed about the purpose of the study and voluntarily signed and submitted their informed consent. Confidentiality and anonymity were maintained, and all data were handled in accordance with ethical research standards.

RESULTS AND DISCUSSION

1. Demographic Profile

Table 1. Demographic Characteristics of Respondents

Factor	Categories	Frequency	Percentage
Age	20-35	12	40.00%
	36-50	13	43.33%
	51-65	5	16.67%
Rank	Administrator and Officers	7	23.33%
	Ordinary Seaman	18	60.00%
	Ancillary Seaman	5	16.67%

Years of Service	Below 21 years	17	56.67%
	Above 20 years	13	43.33%

Discussion:

Table 1 shows that most respondents are within the 36–50 age group (43.33%), followed by those aged 20–35 (40.00%), while the others are in the 51–65 range (16.67%). These results suggest that the majority are in their active working years, with both physical capability and experience as a seafarer. In terms of rank, most are Ordinary Seamen (60.00%), with few Administrators and high-ranking Officers (23.33%) and Ancillary Seamen (16.67%). This reflects a typical maritime workforce where frontline personnel and the ordinary seamen make up the largest group and are directly involved in daily operations on board the vessel.

Further, regarding the years of service, more than half of the respondents (56.67%) have below 21 years of experience, while 43.33% have over 20 years. These results provide a balanced mix of less experienced and seasoned crew members, allowing for both skill development and knowledge sharing. Overall, the demographic profile shows a diverse group in terms of age, rank, and experience, which supports the reliability of the study findings.

2. Level of Knowledge, Attitude, and Practices

Table 2. Summary of KAP Levels

Variable	Mean	Interpretation
Knowledge	High	Adequate understanding
Attitude	High	Positive disposition
Practices	High	Proper compliance

Discussion:

The discussion presents the summary of Knowledge, Attitude and Practices of the ship's crew in medication management on board. The high level of knowledge implies that the crew is familiar with medication protocols and the regulation of the shipping vessel, also in relation to its consistency with the findings that training improves safety compliance (Kamis et al., 2020).

However, literature suggests that knowledge gaps may still be imminent in recognizing symptoms and risk factors (Ramos, 2016). Further, positive attitudes show and reflect strong behavioral intentions toward compliance. According to the Health Belief Model, a stronger belief in the benefits of a behavior is linked to a greater likelihood of adopting safe behaviors. This finding is further supported by research linking positive attitudes to improved workplace success and overall performance (Abdalkrim et al., 2016).

Moreover, good practices indicate full adherence to international guidelines and protocols, including proper storage, medication labeling, and documentation. However, previous studies state that improper record-keeping and medication errors remain

3. Test of Differences

Table 3. Differences in Attitude and Practices by Demographics

Variable	Test	p-value	Interpretation
Age	ANOVA	>0.05	Not significant
Rank	t-test	>0.05	Not significant
Experience	ANOVA	>0.05	Not significant

Discussion:

Table 3 shows that there are no significant differences in medication management experiences when participants are grouped by age, rank, or years of experience. The results suggest that the groups have similar skill levels. This implies that these abilities are not influenced by personal traits, but rather by shared external factors. In other words, a crew member's ability to manage medications is consistent, regardless of whether they are new or experienced, or whether they are an officer or not.

This uniformity further implies that shipping firms implemented standardized training across their workforce. This encompassed mandatory safety orientations, such as those mandated by the Safety of Life at Sea (SOLAS) convention, which incorporated competency-based evaluations and adherence to stringent regulations concerning procedural protocols, as corroborated by the World Health Organization (2019). Furthermore, the standardization of training and the shared exposure to identical systems among all crew members contribute to the reduction of discrepancies in operational procedures. Furthermore, the International Maritime Organization's (2018) international maritime guidelines and protocols emphasize the importance of uniformity in medication management practices, encompassing storage, administration, and documentation; this standardization contributes to enhanced safety and the reduction of errors.

Moreover, these findings can be explained by Social Cognitive Theory, which suggests that behavior is primarily influenced by the environment and its surroundings. (Bandura, 2001), rather than just individual traits. In this case, the shared environment training programs, rules, and supervision shape how crew members perform medication-related tasks. Through observing others, receiving feedback, and gaining confidence (self-efficacy), individuals develop similar skills and behaviors.

Overall, this shows that strong and consistent systems are more important than demographic differences in ensuring proper medication management.

4. Lived Experiences (Qualitative Findings)

Table 4. Emergent Themes

Theme	Description
Accountability Awareness	Responsibility in handling medicines
Emergency Competence	Ability to respond to medical emergencies
Need for Training	Demand for continuous learning

Discussion:

Table 4 shows the emergent themes transpired and extracted during the in-depth interviews; the participants highlighted the accountability, indicating a strong awareness of their responsibility in ensuring medication safety. This exhibits an understanding and knowledge that proper medication management and handling are not only a standard task but also an essential duty that directly affects patient outcomes. Further, such results align with international standards and regulations, including those set by the World Health Organization, truly highlighting the need for appointing designated and trained personnel responsible for the medication management system to ensure safe handling, administration, and monitoring of medications World Health Organization WHO, 2019. This sense of accountability increases compliance with protocols and reduces the likelihood of medication-related errors.

Moreover, the emergency competence, as highlighted by participants, points to the importance of hands-on experience and real-life exposure in developing critical skills. This supports principles from Observational Learning Theory, which is a component of Social Cognitive Theory that explains that individuals learn behaviors through monitoring and observing others and through repeated practice

(Bandura, 1986). In the shipping industry, such as maritime settings, crew members often acquire competence by observing experienced personnel who respond to emergencies and by actively participating in drills and training up to real situations. This experiential learning process enhances both skill retention and crew confidence, allowing individuals to respond effectively during actual medical emergencies.

Further, the expressed need for the crew for additional training suggests that while basic competencies are present, there are still higher gaps in advanced knowledge, training, and skills when it comes to the medication management system of ship's crew. This stresses the importance of continuous professional development, specific training on medication handling, and regular refresher training to maintain and improve competency levels. Also, current studies have shown that ongoing instruction, skills training, and program development are crucial in reducing medication errors and improving overall safety practices and procedures. (Yu-Xia et al., 2021). Also, continuous learning and program development ensure that personnel remain vigilant on current guidelines and regulations on the current medication management, and evolving best practices, ultimately strengthening the quality of the medication handling system.

5. Integration of Quantitative and Qualitative Findings

The results of the integration of quantitative and qualitative findings showed a clear convergent relationship, strengthening the overall interpretation of the study. The quantitative results showed that ship crew members possess high levels of knowledge, positive attitudes, and appropriate practices (KAP) in the medication management system. These findings indicate that, at some point, respondents are well-equipped to handle medications safely and effectively. Correlating this, the qualitative data offered a deeper understanding of the reasons behind these high KAP levels. The themes also provided inputs that continuous and sufficient training, a more intensive experience, and a convincing sense of accountability emerged as key factors influencing behavior.

Moreover, these lived experiences explain how and why respondents are able to maintain high competency levels in real-world settings. The convergence methods of this research extracted data that confirms that experiential learning and workplace exposure emphasize formal knowledge and behavioral aims. further, this alignment enhances the validity and credibility of the findings, as the qualitative data substantiate and contextualize the quantitative results, demonstrating that observed competencies are not only theoretical but are actively practiced and sustained in the maritime environment.

6. Methodological and Theoretical Limitations

This research created both methodological and theoretical limitations; despite the vigor of the findings, several limitations must be acknowledged to provide a balanced interpretation of the results. First, the study is subject to sampling bias, as participants were selected from a single port location which is Port of Davao, and there is a limit to the generalizability of the findings to other maritime settings, including outside Davao with different operational conditions, regulations, cultural contexts, or regulatory practices. Second, the confidence on self-reported data introduces the possibility of response bias, as respondents may have allowed that knowledge, attitudes, or practices due to social desirability or recall inaccuracies. This may result in an overrepresentation of positive behaviors that do not fully reflect actual practices onboard. Third, the study is limited by its theoretical framework, as Knowledge-Attitude-Practice (KAP) models often simulate a linear progression from knowledge to attitude to behavior.

Generally, any changes in behavior are more complicated and may be affected by things external of the model, like the culture of the organization and it's company policy people's attitudes, how they see things,

environmental constraints, and situational pressures. Given these challenges, a more comprehensive research should implement and follow a more rigorous multi-site sampling to improve representativeness and facilitate comparative analysis across various ports or regions in the Philippines. Additionally, longitudinal and alternative study designs are advocated to more effectively document temporal changes and to ascertain causal relationships among knowledge, attitudes, and practices, thus yielding a more thorough comprehension of medication management behaviors within ship crews.

CONCLUSION

Ship crews demonstrate high levels of knowledge, positive attitudes, and good practices in medication management systems when on board the shipping vessels. Further, no demographic differences were observed, indicating uniform competency of the ship's crew in the medication management system on board. Moreover, the lived experiences highlight accountability and the need for continuous training, especially in handling medicines, and the need for intensive training for the ship's crew when it comes to medication safety Also, the study confirms that training and experiential learning are key drivers of effective medication management on board ships.

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