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Occupational Safety and Health Compliance in Hospitality Laboratory Classes: Towards Developing an Enhanced Safety Program at Iloilo State University

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Abstract

This study assessed the extent of Occupational Safety and Health (OSH) implementation in hospitality laboratory classes at Iloilo State University of Fisheries Science and Technology – San Enrique Campus. Specifically, it examined students' adherence to Personal Protective Equipment (PPE) utilization, equipment and tools safety procedures, fire safety and emergency preparedness, sanitation and hygiene practices, and hazard identification and risk control measures, while also identifying challenges in compliance and proposing an enhanced safety program. The study utilized a descriptive research design, employing a structured questionnaire administered to 100 Hospitality Management students. Descriptive statistics, including mean and standard deviation, were used to determine the extent of OSH implementation and the challenges encountered. Inferential analyses, such as One-Way ANOVA, independent samples t-test, and Pearson's correlation, were conducted to examine differences and relationships across demographic groups. Results revealed that OSH standards were generally implemented at a moderate to high level, with sanitation and hygiene practices being the most highly adhered to, and fire safety and emergency preparedness demonstrating the lowest compliance. The main challenges identified were lack of knowledge on PPE usage and inadequate training on equipment safety. No significant differences in OSH implementation were observed across age, sex, or year level. Based on the findings, a comprehensive safety program integrating training, drills, and monitoring was proposed to enhance compliance and reduce laboratory-related incidents.

Keywords: Occupational Safety and Health (OSH), hospitality laboratory, PPE utilization, fire safety, student compliance, safety program

INTRODUCTION

Occupational Safety and Health (OSH) play a critical role in ensuring safe and healthy environments not only in industry settings but also in academic institutions offering technical and skills-based programs. In hospitality education, laboratory classes such as culinary arts, food and beverage service, and housekeeping simulation expose students to conditions similar to actual industry workplaces. These include mechanical risks from sharp tools and industrial kitchen equipment, chemical exposure from cleaning agents, and fire risks associated with heat sources and electrical appliances. Such conditions pose dangers including burns, cuts, slips, falls, ergonomic strains, and potential fires. According to the International Labour Organization (2021), preventive safety education and proper hazard control are essential in minimizing occupational injuries and promoting a culture of safety in both training and work environments.

In the Philippines, the Department of Labor and Employment (DOLE) enforces Republic Act No. 11058, also known as the Occupational Safety and Health Law, which mandates institutions and establishments to implement safety

training, risk assessments, and appropriate safety protocols (DOLE, 2018). While the law primarily governs workplaces, its principles are highly relevant to educational institutions that simulate real industry settings, particularly in hospitality programs where laboratory instruction mirrors hotel and restaurant operations. Embedding OSH standards within academic laboratory classes ensures that students develop safe work habits before entering the professional field.

Studies have indicated that insufficient safety training, limited supervision, and lack of strict compliance monitoring contribute to workplace incidents in hospitality-related operations (Amin et al., 2019; Zaid et al., 2020). These concerns highlight the importance of strengthening OSH implementation at the academic level. By integrating structured safety programs into hospitality laboratory classes, institutions can proactively address potential hazards and reinforce industry-aligned safety standards.

At the Iloilo State University of Fisheries Science and Technology – San Enrique Campus, the Bachelor of Science in Hospitality Management program includes laboratory-based courses that require hands-on training in food preparation, service operations, and housekeeping procedures. Given the practical nature of these courses, ensuring strict implementation of OSH standards is essential to protect students and instructors from potential hazards. However, limited documented evidence exists regarding the extent to which OSH standards are implemented within hospitality laboratory classes in this institution.

Despite the recognized importance of OSH, empirical studies focusing specifically on its implementation in academic hospitality laboratories remain limited. Most research concentrates on commercial establishments rather than educational training environments. This gap underscores the need to evaluate how safety standards are practiced in hospitality laboratory classes at Iloilo State University of Fisheries Science and Technology – San Enrique Campus and to identify areas that require improvement.

Therefore, this study aims to assess the implementation of Occupational Safety and Health standards in hospitality laboratory classes at Iloilo State University of Fisheries Science and Technology – San Enrique Campus. By identifying strengths, gaps, and challenges in current safety practices, the study seeks to propose an enhanced safety program that will strengthen safety culture, improve compliance, and ensure the well-being of students and instructors in the academic hospitality setting.

Specifically, the study is guided by the following research questions:

1. What is the demographic profile of the respondents in terms of:
   1.1 Age;
   1.2 Sex; and,
   1.3 Year level?

2. To what extent are Occupational Safety and Health (OSH) standards implemented in hospitality laboratory classes in terms of:
   2.1 Personal Protective Equipment (PPE) utilization;
   2.2 Equipment and tools safety procedures;
   2.3 Fire safety and emergency preparedness;
   2.4 Sanitation and hygiene practices; and,
   2.5 Hazard identification and risk control measures?

3. What challenges are encountered in the implementation of OSH standards in hospitality laboratory classes when classified based on respondents' profile?

4. Is there a significant difference in the extent of OSH implementation when respondents are grouped according to their demographic profile?

5. Based on the findings of the study, what enhanced safety program may be proposed to improve OSH implementation in hospitality laboratory classes?

Conceptual Framework. The purpose of this study was to assess the implementation of Occupational Safety and Health (OSH) standards in hospitality laboratory classes and to identify areas for improvement as a basis for developing an enhanced safety program. The study specifically examined the relationship between the demographic profile of the respondents and both the extent of OSH implementation, and the challenges encountered in its application.

The independent variables of the study were the demographic characteristics of the respondents, which included age, sex, and year level. These variables were selected because they are commonly associated with differences in safety perception, level of exposure, and practical experience in laboratory environments. Previous studies suggest that age and academic level influence an individual's familiarity with safety protocols, as increased exposure and training often lead to better compliance and awareness (e.g., Hinze et al., 2013; Lingard & Rowlinson, 2005). Students in higher year levels are more likely to have repeated laboratory experiences, which enhance their understanding of safety procedures and risk management. Similarly, age may reflect maturity and decision-making ability, which are important in adhering to safety standards.

Sex was also included as an independent variable due to documented differences in risk perception and safety behavior. Research indicates that males and females may differ in their attitudes toward safety, with some studies suggesting that females tend to exhibit higher risk awareness and compliance with safety practices, while males may demonstrate greater risk-taking tendencies (Byrnes et al., 1999; Huang & Hinze, 2006). These differences may influence how safety protocols are followed in hospitality laboratory settings.

The dependent variables were the extent of OSH implementation and the challenges encountered in hospitality laboratory classes. The extent of OSH implementation was measured across five dimensions: Personal Protective Equipment (PPE) utilization, equipment and tools safety procedures, fire safety and emergency preparedness, sanitation and hygiene practices, and hazard identification and risk control measures. Similarly, challenges in OSH implementation were examined using these same dimensions to provide a complete understanding of the barriers affecting effective safety practice.

The study examined the relationship between the independent and dependent variables to determine whether demographic characteristics significantly influenced the level of OSH implementation and the difficulties experienced in maintaining safety standards. By analyzing these relationships, the study provided insights into how individual factors affected safety compliance and implementation practices in hospitality laboratory classes. The findings were used to identify specific areas that required targeted interventions and informed the development of an enhanced safety program aimed at strengthening OSH practices in academic hospitality laboratories.

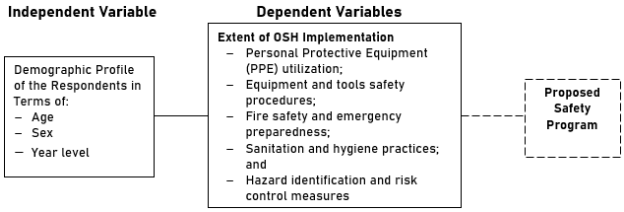

Figure 1
The Conceptual Design Depicting the Relationship Between Variables.

LITERATURE REVIEW

Occupational Safety and Health (OSH) is a fundamental component of technical and vocational education, particularly in hospitality programs where laboratory classes simulate real industry environments. Hospitality laboratory courses such as culinary arts, food and beverage service, and housekeeping operations involve exposure to sharp tools, high-temperature equipment, cleaning chemicals, and electrical appliances. These conditions present risks similar to those found

in hotels and restaurants, including burns, cuts, slips, falls, ergonomic strain, and fire hazards. The International Labour Organization (2021) emphasized that early integration of OSH principles in training institutions plays a crucial role in developing long-term safety behavior and preventing workplace injuries.

In academic settings, laboratory safety management requires structured policies, proper supervision, adequate facilities, and consistent monitoring. Embedding OSH standards within hospitality laboratory instruction ensures that students not only acquire technical competencies but also internalize safe work practices prior to entering the professional industry. Recent empirical studies in educational laboratory contexts further support this, indicating that structured safety orientation, regular drills, and supervised practice significantly improve students' compliance with safety protocols and reduce incident rates (Kim & Park, 2022; Lopez et al., 2023).

In the Philippine context, the Department of Labor and Employment enforces Republic Act No. 11058, which mandates the provision of safety training, hazard identification, risk assessment, and personal protective equipment (DOLE, 2018). Although the law primarily applies to workplaces, its principles extend to educational institutions that replicate industry operations through laboratory-based instruction. Supporting this, the Occupational Safety and Health Center have emphasized the need for continuous OSH education, research, and training programs across sectors, including academic institutions, to strengthen safety awareness and compliance.

Recent Philippine-based studies further reveal that OSH implementation in educational institutions remains uneven. Research conducted in higher education institutions reported that while safety policies are generally present, gaps persist in the availability of personal protective equipment (PPE), laboratory safety facilities, and consistent enforcement of protocols (Estadilla, 2025). Similarly, studies on laboratory safety among students in the Philippines indicate that variations in knowledge, attitudes, and practices (KAP) significantly influence compliance, particularly across different year levels and levels of exposure to laboratory work (Dela Cruz et al., 2022). These findings highlight the importance of strengthening institutional support systems and standardizing safety practices in academic laboratory environments.

Compliance with OSH standards requires institutional commitment, safety training programs, and continuous evaluation mechanisms. Studies have shown that while awareness of OSH regulations is generally high, actual implementation often varies depending on administrative support, availability of safety equipment, and training frequency (Amin et al., 2019; Zaid et al., 2020). These challenges are likewise evident in academic hospitality laboratories, where resource allocation and monitoring systems directly influence safety outcomes.

Effective OSH implementation depends not only on established guidelines but also on institutional leadership and safety culture. Research has demonstrated that management commitment significantly influences safety behavior, compliance levels, and risk reduction outcomes (Arezes & Miguel, 2016). In educational environments, faculty supervision and administrative enforcement play parallel roles in ensuring adherence to safety standards during laboratory sessions. More recent studies also emphasize that a positive safety culture—characterized by active participation, clear communication, and accountability—enhances students' adherence to safety protocols (Garcia & Torres, 2021).

In the Philippine hospitality context, Brian P. Focbit (2025) examined OSH implementation and adherence across accommodation establishments and found that structured safety programs, designated safety officers, and continuous monitoring were significant predictors of effective OSH compliance. The study further revealed that demographic

characteristics and organizational classification were associated with variations in the extent of safety implementation. These findings underscore the importance of systematic safety management and proactive institutional oversight in promoting safe working environments.

Literature identifies several core components of effective OSH implementation relevant to hospitality laboratories. These include: (1) proper utilization of Personal Protective Equipment (PPE), (2) adherence to equipment and tools safety procedures, (3) fire safety and emergency preparedness, (4) sanitation and hygiene practices, and (5) hazard identification and risk control measures. According to the International Labour Organization (2020), a comprehensive OSH framework integrates these elements into daily operational procedures to ensure continuous risk mitigation.

In hospitality education, consistent PPE usage such as hairnets, gloves, aprons, and non-slip footwear is critical in preventing accidents. Similarly, structured emergency drills and fire safety training enhance preparedness and response capability. Recent laboratory-based studies also indicate that hazard identification training and simulation-based learning significantly improve students' ability to recognize and mitigate risks in controlled environments (Santos & Rivera, 2023; Chan & Hawkins, 2018).

Despite established guidelines, challenges in OSH implementation persist across various settings. Common barriers include limited resources, inconsistent monitoring, inadequate safety training, and lack of student engagement (Cheng & Chang, 2019). In academic laboratories, overcrowded classes, insufficient equipment, and varying levels of student discipline further complicate compliance efforts. Philippine-based findings similarly report issues such as limited funding for safety equipment and irregular safety audits, which hinder effective OSH implementation in educational settings.

Existing literature consistently emphasizes the importance of structured safety programs, management commitment, and continuous training in ensuring effective OSH implementation. However, most studies focus on commercial hospitality establishments rather than academic laboratory environments. There remains limited empirical evidence examining how OSH standards are implemented in hospitality laboratory classes within higher education institutions, particularly in the Philippine context. This gap underscores the need for the present study, which seeks to assess OSH implementation and identify challenges in hospitality laboratory classes as basis in creating an enhanced safety program.

METHODOLOGY

Research Design. This study employed a descriptive research design to assess the implementation of Occupational Safety and Health (OSH) standards in hospitality laboratory classes and to identify areas for improvement as a basis for an enhanced safety program. Descriptive research design is appropriate when the aim is to systematically describe the characteristics, conditions, or practices of a specific group without manipulating any variables (McMillan & Schumacher, 2010). This design allowed to examine the current extent of OSH implementation and the challenges encountered by students in a natural academic setting. Henceforth, setting was at Iloilo State University of Fisheries Science and Technology–San Enrique Campus, particularly in the hospitality laboratory classes where students actively engage in practical learning activities.

Population and Samples. A total of 100 respondents have participated in the study, and were distributed evenly across the four-year levels of the Bachelor of Science in Hospitality Management program (Table 1). Each year level contributed 25 respondents, ensuring equal representation across academic levels. The participants included students directly involved in laboratory exercises, who were purposively selected to ensure that they possessed

firsthand experience with laboratory safety protocols and practices.

Table 1
Distribution of Respondents

Respondents Classification	No. of Respondents	Percentage
First year level	25	25%
Second year level	25	25%
Third year level	25	25%
Fourth year level	25	25%
Total	**100**	**100%**

Instrumentation. The instrument was a researcher-made questionnaire was adapted from the Department of Labor and Employment (DOLE) National Occupational Safety and Health (OSH) indicators, as outlined in Department Order No. 198, Series of 2018, which provides the Implementing Rules and Regulations of Republic Act No. 11058. The items were contextualized to fit the laboratory environment of the hospitality program and covered the following five safety dimensions: Personal Protective Equipment (PPE) utilization, equipment and tools safety procedures, fire safety and emergency preparedness, sanitation and hygiene practices, and hazard identification and risk control measures.

The instrument was divided into three parts. Part I collected data on the demographic profile of the respondents, including age, sex, and year level. Part II measured the extent of OSH implementation across the identified dimensions using a five-point Likert scale, ranging from 1 (Very Low Extent) to 5 (Very High Extent). Part III assessed the challenges encountered in implementing OSH standards, using the same scaling format.

To ensure content validity, the questionnaire was reviewed by a panel of experts in hospitality education and occupational safety, as well as the research adviser. Recommendations were incorporated to enhance clarity, relevance, and alignment with the study's objectives. A pilot test was conducted among students who were not part of the final sample to assess the reliability of the instrument. The pilot data were analyzed using Cronbach's alpha, which yielded a coefficient of 0.998, indicating excellent internal consistency.

After establishing validity and reliability, the finalized instrument was administered to the selected respondents. The responses provided the primary data for analyzing the extent of OSH implementation and the challenges encountered, forming the basis in proposing an enhanced safety program tailored to hospitality laboratory classes.

Table 2
*Implementation and Challenge Level Rating Scale**

Scale	Remarks
4.50 – 5.00	Highly Implemented/Very High Challenges
3.50 – 4.49	Implemented/High Challenges
2.50 – 3.49	Moderately Implemented / Moderate Challenges
1.50 – 2.49	Lowly Implemented/Low Challenges
1.00 – 1.49	Highly Non-Implemented/Very low Challenges

**Adapted from Lindner and Lindner (2024).*

Data Analyses. The data collected in this study were analyzed using both descriptive and inferential statistical techniques to address the research objectives regarding the implementation of Occupational Safety and Health (OSH) standards in hospitality laboratory classes and to identify areas for an enhanced safety program.

Descriptive Analysis. Frequency was used to determine the distribution of responses, showing how often certain answers occurred across the sample of Hospitality Management students. This helped identify patterns in demographic characteristics and reported safety practices.

Percentage was derived to present the proportion of responses relative to the total number of participants, providing a clear view of trends and the level of awareness or compliance among respondents while Mean was employed to compute the average scores for OSH implementation and challenges across the five safety dimensions: Personal Protective Equipment (PPE) utilization, equipment and tools safety procedures, fire safety and emergency preparedness, sanitation and

hygiene practices, and hazard identification and risk control measures. This provided insights into the overall extent of compliance and the effectiveness of safety practices in laboratory classes. Lastly, Standard Deviation (SD) was used to assess the variability or dispersion of responses around the mean, indicating the consistency of OSH implementation among students across different demographic groups.

Inferential Analysis. One-Way Analysis of Variance (ANOVA) was used to determine if there were significant differences in the extent of OSH implementation among students across the different year levels. This test was appropriate because it compares the means of three or more independent groups.

Independent Samples t-test was applied to examine whether sex influenced the extent of OSH implementation. This test compared the mean scores of male and female respondents to determine if differences were statistically significant. To explore the relationship between age and the extent of OSH implementation, Pearson's Correlation was employed to identify whether older or younger students differed in adherence to safety practices.

All statistical analyses were conducted using SPSS version 25.0, with a significance level set at $p < 0.05$. The descriptive statistics summarized the overall patterns and compliance levels, while the inferential statistics determined whether demographic characteristics significantly influenced the extent of OSH implementation in hospitality laboratory classes.

Ethical Considerations. Prior to data gathering, ethical considerations were strictly observed. Informed consent was obtained from all participants, ensuring that they were fully aware of the purpose of the study, the procedures involved, and their right to voluntarily participate or withdraw at any time without penalty. Confidentiality and anonymity were likewise maintained by not requiring the disclosure of personal identifiers and by ensuring that all responses were used solely for academic purposes. Additionally, the data collected were securely handled and stored to prevent unauthorized access. Permission to conduct the study was also sought from the appropriate school authorities before the administration of the research instrument.

RESULTS AND DISCUSSIONS

The Demographic Profile of the Respondents. Table 3 presents the demographic profile of respondents based on year level, age, and sex. The results showed that the respondents were evenly distributed across the four-year levels of the Bachelor of Science in Hospitality Management program, with each level contributing 25% of the total sample. In terms of age, the majority of respondents were between 19–21 years old, comprising 50% of the total population. Respondents aged 16–18 years accounted for 30%, while those aged 22–24 years represented 20%. This distribution indicated that most participants were within the typical college-age range, with a smaller proportion of older students in the upper age bracket.

From a practical standpoint, this age distribution suggests that safety interventions should be tailored to students who are still developing their technical skills and safety awareness. Younger students, particularly those aged 16–18, may require more structured orientation, close supervision, and step-by-step safety demonstrations, while older students may benefit from advanced safety training, leadership roles during laboratory activities, and involvement in peer monitoring to reinforce safe practices.

Regarding sex, the sample was relatively balanced, with 52% of respondents being male and 48% being female. Each year level reflected a similar gender distribution, demonstrating that both male and female students were adequately represented in the study. The first-year respondents included 13 males and 12 females, the second-year respondents included 12 males and 13 females, the third-year respondents included 14 males and 11 females,

and the fourth-year respondents included 13 males and 12 females.

This balanced representation provides an opportunity for inclusive safety program design. In practical terms, safety policies and training activities should be gender-responsive, ensuring equal participation in safety drills, leadership opportunities, and risk communication activities. It also highlights the importance of promoting a shared safety culture where both male and female students are equally engaged in compliance, hazard reporting, and adherence to lab protocols.

Table 3

Demographic Profile of Respondents by Year Level, Age, and Sex

Demographic Variable	Category	Frequency (f)	Percentage (%)
First Year	16–18 years	10	10%
	19–21 years	12	12%
	22–24 years	3	3%
	Male	13	13%
	Female	12	12%
Total		25	25%
Second Year	16–18 years	5	5%
	19–21 years	15	15%
	22–24 years	5	5%
	Male	12	12%
	Female	13	13%
Total		25	25%
Third Year	16–18 years	8	8%
	19–21 years	14	14%
	22–24 years	3	3%
	Male	14	14%
	Female	11	11%
Total		25	25%
Fourth Year	16–18 years	7	7%
	19–21 years	9	9%
	22–24 years	9	9%
	Male	13	13%
	Female	12	12%
Total		25	25%
Overall Total		100	100%

Overall, the demographic profile indicated that the study captured a diverse group of respondents in terms of age and gender, while maintaining equal representation across all year levels. This balance provided a comprehensive perspective on the implementation of Occupational Safety and Health (OSH) standards in hospitality laboratory classes.

Practically, these findings imply that safety programs should be differentiated according to students' level of experience and exposure. For instance, lower year levels may require foundational safety training and strict supervision, while higher year levels can be trained in advanced risk management, emergency response, and safety leadership roles. Such targeted interventions can enhance the overall effectiveness of OSH implementation and contribute to safer and more efficient laboratory environments.

Extent of Occupational Safety and Health (OSH) Standards Implemented in Hospitality Laboratory Classes. Table 4 presents the extent of Occupational Safety and Health (OSH) implementation in hospitality laboratory classes at Iloilo State University of Fisheries Science and Technology – San Enrique Campus. The findings indicated that sanitation and hygiene practices were highly implemented with a mean of 4.50 and a standard deviation of 0.48, suggesting that students consistently followed proper hygiene standards during laboratory activities.

Similarly, Personal Protective Equipment (PPE) utilization obtained a mean score of 4.35, equipment and tools safety procedures scored 4.12, fire safety and emergency preparedness scored 3.88, and hazard identification and risk control measures scored 4.20, all interpreted as implemented. The overall extent of OSH implementation was also implemented, with a mean of 4.21 and a standard deviation of 0.57. These results demonstrated that students generally adhered to safety standards, particularly in hygiene practices and PPE usage, while fire safety and emergency preparedness showed slightly lower compliance, indicating a need for enhanced drills and awareness.

These findings corroborated the insights of Singh (2019), who emphasized that adherence to hygiene, PPE usage, and hazard control significantly reduces occupational risks in hospitality environments. Similarly, the study aligned with Arezes and Miguel (2016), who reported that management commitment and continuous safety education positively influence the level of OSH implementation, particularly in laboratory or service-oriented work settings.

Locally, the results supported Mendoza et al. (2019) and Agunos et al. (2022), who highlighted that Filipino hospitality students and employees often demonstrate high compliance with sanitation and hygiene practices but require additional support for fire safety and emergency preparedness. Finally, the findings echoed the observations of Pabilando et al. (2022), indicating that structured training and monitoring in hospitality settings improve adherence to safety protocols and minimize occupational hazards.

Overall, the study suggested that while OSH standards were generally implemented in hospitality laboratory classes, specific areas, particularly fire safety and emergency preparedness, required targeted interventions. These results provided a strong foundation for developing an enhanced safety program tailored to the academic laboratory setting, ensuring both compliance and proactive hazard prevention.

Table 4

Extent of Occupational Safety and Health (OSH) Implementation in Hospitality Laboratory Classes

OSH Dimension	Mean	Standard Deviation (SD)	Interpretation
1. Personal Protective Equipment (PPE) utilization	4.35	0.52	Implemented
2. Equipment and Tools Safety Procedures	4.12	0.61	Implemented
3. Fire Safety and Emergency Preparedness	3.88	0.69	Implemented
4. Sanitation and Hygiene Practices	4.50	0.48	Highly Implemented
5. Hazard Identification and Risk Control Measures	4.20	0.55	Implemented
Overall Extent of OSH Implementation	4.21	0.57	Implemented

Legend: 4.50 – 5.00 (Highly Implemented); 3.50 – 4.49 (Implemented); 2.50 – 3.49 (Moderately Implemented / Neutral); 1.50 – 2.49 (Lowly Implemented); 1.00 – 1.49 (Highly Non-Implemented)

The Challenges Encountered in the Implementation of OSH Standards in Hospitality Laboratory Classes when Classified Based on Respondents' Profile. Table 5 revealed the challenges encountered by Hospitality Management students in implementing Occupational Safety and Health (OSH) standards in laboratory classes, analyzed according to age, sex, and year level. Across all respondents, the overall challenges were interpreted as low to moderate (mean = 2.92, SD = 0.54), suggesting that while students generally complied with safety practices, certain areas still required improvement.

Table 5

Challenges Encountered in OSH Implementation by Respondents

OSH Dimension	Demographic Group	Mean	SD	Interpretation
1. Lack of knowledge on proper PPE utilization	16–18 years	3.20	0.55	Moderate Challenges
	19–21 years	3.25	0.60	Moderate Challenges
	22–24 years	3.10	0.50	Moderate Challenges
	Male	3.15	0.57	Moderate Challenges
	Female	3.25	0.58	Moderate Challenges
	First Year	3.20	0.55	Moderate Challenges
	Second Year	3.15	0.57	Moderate Challenges
	Third Year	3.10	0.60	Moderate Challenges
	Fourth Year	3.25	0.58	Moderate Challenges
2. Inadequate training on equipment and tools safety procedures	16–18 years	3.05	0.60	Moderate Challenges
	19–21 years	3.10	0.62	Moderate Challenges
	22–24 years	3.00	0.58	Moderate Challenges
	Male	3.05	0.60	Moderate Challenges
	Female	3.10	0.62	Moderate Challenges
	First Year	3.05	0.60	Moderate Challenges
	Second Year	3.00	0.58	Moderate Challenges
	Third Year	3.10	0.62	Moderate Challenges
	Fourth Year	3.05	0.60	Moderate Challenges
3. Insufficient fire safety and emergency preparedness drills	16–18 years	2.85	0.55	Low Challenges
	19–21 years	2.90	0.60	Low Challenges
	22–24 years	2.95	0.58	Low Challenges
	Male	2.90	0.57	Low Challenges
	Female	2.85	0.56	Low Challenges
	First Year	2.90	0.55	Low Challenges
	Second Year	2.85	0.56	Low Challenges
	Third Year	2.95	0.58	Low Challenges
	Fourth Year	2.90	0.57	Low Challenges
4. Poor sanitation and hygiene practices due to limited supervision	16–18 years	2.70	0.50	Low Challenges
	19–21 years	2.75	0.55	Low Challenges
	22–24 years	2.80	0.53	Low Challenges
	Male	2.75	0.52	Low Challenges
	Female	2.70	0.51	Low Challenges
	First Year	2.75	0.52	Low Challenges
	Second Year	2.70	0.51	Low Challenges
	Third Year	2.80	0.53	Low Challenges
	Fourth Year	2.75	0.52	Low Challenges
5. Difficulty in hazard identification and risk control measures	16–18 years	2.60	0.50	Low Challenges
	19–21 years	2.65	0.52	Low Challenges
	22–24 years	2.70	0.55	Low Challenges
	Male	2.65	0.53	Low Challenges
	Female	2.60	0.51	Low Challenges
	First Year	2.65	0.53	Low Challenges
	Second Year	2.60	0.51	Low Challenges
	Third Year	2.70	0.55	Low Challenges
	Fourth Year	2.65	0.52	Low Challenges
Overall Challenges Encountered	—	2.92	0.54	Low to Moderate

Legend: 4.50-5.00 (Higher Adherence); 3.50-4.49 (Adherence)I 2.50-3.49 (Neutral); 1.50-2.49 (Non-Adherence); 1.00-1.49 (Highly Non-Adherence)

Among the specific OSH dimensions, lack of knowledge on proper PPE utilization was identified as a moderate challenge, with mean scores ranging from 3.10 to 3.25 across age

groups, sexes, and year levels. This indicated that students experienced some difficulty understanding the correct use of personal protective equipment, which may reflect insufficient prior exposure or limited emphasis on PPE protocols during laboratory sessions. Similarly, inadequate training on equipment and tools safety procedures was also reported as a moderate challenge (mean range: 3.00–3.10), highlighting the need for structured and frequent demonstrations and supervised practice to reinforce correct handling of laboratory tools.

On the other hand, insufficient fire safety and emergency preparedness drills, poor sanitation and hygiene practices due to limited supervision, and difficulty in hazard identification and risk control measures were consistently rated as low challenges across all demographic groups, with means ranging from 2.60 to 2.95. These results suggested that while these areas posed some difficulty, students generally demonstrated awareness and adherence to fire safety, hygiene, and hazard control procedures. Minor variations among age groups, sexes, and year levels were observed, but the overall patterns were consistent, indicating that challenges were not strongly dependent on demographic factors.

Overall, the results suggested that the most significant challenges in OSH implementation were associated with knowledge gaps and limited training, while other areas, such as fire safety, sanitation, and hazard control, were less problematic.

These findings aligned with previous studies emphasizing that effective OSH compliance in hospitality education requires adequate student training, continuous supervision, and reinforcement of safety protocols (Singh, 2019; Mendoza et al., 2019; Brian Focbit, 2025). The study indicated that addressing these moderate challenges through enhanced safety programs and structured laboratory orientations could further strengthen students' adherence to OSH standards.

Extent of Adherence of OSH Practices According to Establishment Types. Table 6 shows that the data on adherence levels to Occupational Safety and Health (OSH) practices across different types of hospitality establishments reveals varying degrees of implementation. Hotels consistently demonstrate "Highly Adherence" to OSH practices across all categories. With mean scores ranging from (M=4.59 to M=4.65), hotels show strong commitment to management, personnel training, promotion, and facilities, indicating that they prioritize and effectively implement OSH practices. In contrast, inns and pension houses exhibit moderate "Adherence", with mean scores between (M=3.08 and M=3.30).

Table 6

Extend of Adherence of OSH Practices According to Establishment Types

	Type of Establishment	N	Mean	SD	Interpretations
Adherence of Extent of OSH Implementation	Hotel	75	**4.62**	0.48	Highly Adherence
	Inns	75	**3.07**	0.87	Adherence
	Motel	75	**2.59**	0.74	Neutral
	Pension House	75	**3.27**	0.92	Adherence
Management Commitment to OSH	Hotel	75	**4.61**	0.52	Highly Adherence
	Inns	75	**3.09**	0.87	Adherence
	Motel	75	**2.59**	0.91	Neutral
	Pension House	75	**3.25**	0.93	Adherence
OSH Personnel Training and Education	Hotel	75	**4.63**	0.46	Highly Adherence
	Inns	75	**2.90**	0.93	Neutral
	Motel	75	**2.57**	0.84	Neutral
	Pension House	75	**3.25**	0.95	Adherence
OSH Promotion and Awareness	Hotel	75	**4.65**	0.47	Highly Adherence
	Inns	75	**3.08**	0.92	Adherence
	Motel	75	**2.61**	0.71	Neutral
	Pension House	75	**3.30**	0.96	Adherence
Facilities and Working Conditions	Hotel	75	**4.59**	0.59	Highly Adherence
	Inns	75	**3.19**	0.93	Adherence
	Motel	75	**2.60**	0.78	Neutral
	Pension House	75	**3.27**	0.99	Adherence

Legend: 4.50 – 5.00 (Very High Challenges); 3.50 – 4.49 (High Challenges); 2.50 – 3.49 (Moderate challenges); 1.50 – 2.49 (Low Challenges); 1.00 – 1.49 (Very low Challenges)

While these establishments show adherence in areas such as management commitment and OSH promotion, there is room for improvement, particularly in training and personnel education. Motels, however, display a "Neutral" stance across most categories, with mean scores ranging from (M=2.57 to M=2.61), suggesting that OSH practices are either inconsistently implemented or not a significant focus. This is particularly evident in training and awareness initiatives, where motels lag behind hotels, inns, and pension houses. The data indicated that

hotels maintain high OSH standards, while motels need substantial improvement in management, training, and facility conditions to align with better OSH practices. Overall, hotels lead in OSH adherence, whereas motels may require significant attention to enhance their OSH systems and practices.

Significant Difference in the Extent of OSH Implementation When Respondents are Grouped According to their Demographic Profile. As shown in Table 7, the mean OSH implementation scores slightly increased from first-year students (M = 4.18, SD = 0.55) to fourth-year students (M = 4.24, SD = 0.56). However, the One-Way ANOVA revealed no significant difference across year levels (F = 0.95, p = 0.420). This suggested that students, regardless of their academic standing, demonstrated a similar level of adherence to OSH standards in hospitality laboratory classes. These findings were consistent with studies by Pabilando et al. (2022) and Focbit (2025), which reported that structured safety programs and consistent laboratory supervision contributed to uniform compliance across different student cohorts, minimizing variations attributable to academic experience.

Table 7
Differences in OSH Implementation Across Year Levels

Year Level	Mean OSH Implementation	Standard Deviation (SD)
First Year	4.18	0.55
Second Year	4.20	0.57
Third Year	4.21	0.58
Fourth Year	4.24	0.56
ANOVA Results	F = 0.95	p = 0.420

Interpretation: No significant difference in OSH implementation was found among students across year levels.

Table 8 indicated that male students (M = 4.19, SD = 0.56) and female students (M = 4.22, SD = 0.57) exhibited comparable levels of OSH implementation. The independent samples t-test confirmed that the difference was not statistically significant (t = 0.78, p = 0.437). This implied that sex did not influence the students' compliance with safety standards, aligning with prior research suggesting that safety awareness and adherence are shaped more by training and institutional practices than by gender differences (Arezes & Miguel, 2016).

Table 9 examined the relationship between age and OSH implementation, revealing a very weak, non-significant correlation (r = 0.08, p = 0.410). This indicated that older or younger students did not significantly differ in their adherence to safety practices.

Table 8
Differences in OSH Implementation Based on Sex

Sex	Mean OSH Implementation	Standard Deviation (SD)
Male	4.19	0.56
Female	4.22	0.57
t-test Results	t = 0.78	p = 0.437

Interpretation: There was no significant difference in OSH implementation between male and female students.

The result corroborated findings by Singh (2019) and Agunos et al. (2022), who noted that age was not a primary determinant of compliance in hospitality laboratory settings; rather, consistent enforcement of safety protocols and clear instructional guidance were more influential in promoting proper OSH behavior.

Table 9
Relationship Between Age and OSH Implementation

Variables	r	p-value
Age – OSH Implementation	0.08	0.410

Interpretation: There was no significant relationship between age and the extent of OSH implementation among students, indicating that adherence to safety practices did not vary with age.

Collectively, the results suggested that demographic factors, including year level, sex, and age, did not significantly affect the extent of OSH implementation among Hospitality Management students at the Iloilo State University of Fisheries Science and Technology, San Enrique Campus. The findings underscored the importance of standardized safety training, continuous supervision, and structured laboratory programs in ensuring uniform compliance across all student groups, supporting the need for a comprehensive and enhanced OSH program (Brian Focbit, 2025; Mendoza et al., 2019; Pabilando et al., 2022).

Proposed Safety Program to Improve OSH Implementation in Hospitality Laboratory

Classes. Based on the findings of the study, an enhanced safety program was proposed to address the identified gaps and challenges in Occupational Safety and Health (OSH) implementation in hospitality laboratory classes. Table 10 summarized the program components, strategies, and expected outcomes corresponding to each OSH dimension.

For Personal Protective Equipment (PPE) utilization, a PPE Training Module was designed. The program included mandatory orientation sessions, demonstrations on proper donning and doffing, and visual guidelines. The expected outcome was an increased knowledge and proper use of PPE among students, addressing the moderate challenges observed in PPE compliance, consistent with prior studies highlighting knowledge gaps as a key barrier to OSH adherence (Brian Focbit, 2025; Arezes & Miguel, 2016).

Regarding Equipment and Tools Safety Procedures, the program introduced hands-on workshops, refresher drills, and the assignment of safety mentors. These strategies aimed to improve students' ability to handle tools safely, reduce equipment-related risks, and reinforce consistent safety behavior, aligning with findings from Mendoza et al. (2019) on the importance of practical training in mitigating occupational hazards in hospitality laboratories.

For the Fire Safety and Emergency Preparedness dimension, which was identified as having the lowest level of implementation, regular fire drills, emergency evacuation simulations, and training on fire extinguisher use were proposed. The expected outcome was improved readiness and confidence in responding to fire emergencies, addressing the moderate extent of current implementation and aligning with Agunos et al. (2022), who emphasized the need for active preparedness in laboratory safety programs.

In terms of Sanitation and Hygiene Practices, the program implemented strict cleaning schedules, supervision, and periodic audits to ensure a safer laboratory environment and higher compliance with hygiene standards. Similarly, for Hazard Identification and Risk Control Measures, risk assessment workshops, hazard checklists, and instruction on control measures were proposed to strengthen students' ability to recognize and mitigate potential risks.

Finally, the overall program integrated all components into a semester-long safety curriculum, with continuous monitoring, feedback, and active student participation in safety committees. The comprehensive approach was expected to enhance consistent adherence to OSH standards and reduce safety-related incidents in hospitality laboratories. This holistic framework reflected best practices cited in prior literature, emphasizing the combination of training, supervision, and participatory strategies to improve occupational safety in academic laboratory settings (Pabilando et al., 2022; Brian Focbit, 2025).

Table 10

Proposed Enhanced Safety Program to Improve OSH Implementation in Hospitality Laboratory Classes

OSH Dimension / Challenge	Program Component	Strategies / Activities	Expected Outcome
1. Personal Protective Equipment (PPE) utilization	PPE Training Module	Conduct mandatory orientation sessions on proper PPE use; demonstrate correct donning and doffing; provide visual aids and guidelines	Increased knowledge and proper use of PPE by all students
2. Equipment and Tools Safety Procedures	Laboratory Equipment Safety Program	Organize hands-on workshops on safe handling of tools and equipment; schedule regular refresher drills; assign safety mentors	Students demonstrate correct handling and reduce equipment-related risks
3. Fire Safety and Emergency Preparedness	Fire Safety and Emergency Drills	Conduct regular fire drills and emergency evacuation simulations; provide training on using fire extinguishers	Improved readiness and confidence in emergency response
4. Sanitation and Hygiene Practices	Hygiene and Sanitation Protocols	Implement strict laboratory cleaning schedules; assign supervisors to monitor hygiene; conduct periodic hygiene audits	Enhanced compliance with sanitation standards and safer laboratory environment
5. Hazard Identification and Risk Control Measures	Risk Awareness Program	Conduct risk assessment workshops; teach students to identify hazards and implement control measures; develop hazard checklists	Improved ability to identify and control potential hazards in laboratory activities
Overall Program	Comprehensive OSH Enhancement Program	Integrate all components into a semester-long safety curriculum; provide continuous monitoring, feedback, and evaluation; encourage student participation in safety committees	Consistent and higher adherence to OSH standards; reduction of safety-related incidents in hospitality laboratories

Conclusion. The study concluded that Occupational Safety and Health (OSH) standards were generally implemented at a moderate to high level in hospitality laboratory classes at Iloilo State University of Fisheries

Science and Technology San Enrique Campus. Among the various OSH dimensions, Sanitation and Hygiene Practices demonstrated the highest level of implementation, followed by Personal Protective Equipment (PPE) utilization, Hazard Identification and Risk Control Measures, and Equipment and Tools Safety Procedures. Fire Safety and Emergency Preparedness recorded the lowest level of implementation, indicating the need for additional drills and awareness programs. Overall, students showed consistent adherence to safety standards across most areas of laboratory practice.

In terms of challenges, lack of knowledge on proper PPE utilization and inadequate training on equipment and tools safety procedures were identified as moderate challenges, suggesting that students experienced some difficulty understanding and applying proper safety measures. Other dimensions, including fire safety drills, sanitation and hygiene, and hazard identification, were considered low challenges, indicating that students generally followed protocols with minimal difficulty. The overall challenges encountered were interpreted as low to moderate, highlighting the importance of targeted interventions in areas such as PPE usage and equipment handling.

Analysis of demographic factors revealed that year level, sex, and age did not significantly affect the extent of OSH implementation. Inferential statistical tests, including ANOVA, independent samples t-test, and Pearson's correlation, showed no significant differences or relationships, suggesting that student compliance with OSH standards was more influenced by institutional training, structured laboratory programs, and continuous supervision than by individual characteristics.

Based on the findings, an enhanced safety program was proposed to address the identified gaps, focusing particularly on PPE utilization, equipment handling, and fire safety preparedness. The program included orientation sessions, hands-on workshops, refresher drills, fire and emergency simulations, hygiene supervision, risk assessment workshops, and continuous monitoring. Integrating these components into a semester-long safety curriculum was expected to strengthen adherence to OSH standards, improve students' knowledge and skills, and foster safer laboratory environment.

Overall, while OSH standards were generally implemented and students demonstrated compliance in most areas, targeted interventions were necessary in dimensions with moderate challenges. Implementing the proposed enhanced safety program was anticipated to further improve adherence to safety protocols, reinforce practical safety skills, and cultivate a proactive safety culture in hospitality laboratory classes.

Recommendations. Based on the findings of this study, the following recommendations are proposed to enhance the implementation of Occupational Safety and Health (OSH) standards in hospitality laboratory classes at Iloilo State University of Fisheries Science and Technology – San Enrique Campus:

Enhance PPE Training and Knowledge. Mandatory orientation sessions, demonstrations, and visual guidelines should be conducted at the beginning of each semester to ensure that all students understand the proper use, donning, and doffing of personal protective equipment. Regular reinforcement activities, such as short refresher workshops, are recommended to sustain students' knowledge and compliance. For policymakers and academic administrators, it is recommended to institutionalize PPE training as a required component of hospitality curricula and allocate budget for adequate and standardized PPE provision across institutions.

Strengthen Equipment and Tools Safety Procedures. Hands-on workshops, supervised practice, and the assignment of safety mentors should be implemented to improve students' skills in handling laboratory equipment and tools safely. Frequent refresher drills and practical assessments may further reinforce

correct procedures and reduce the risk of accidents. Institutional leaders should develop standardized safety manuals and ensure their consistent implementation across all laboratory classes.

Improve Fire Safety and Emergency Preparedness. Since this dimension recorded the lowest level of implementation, the university should conduct regular fire drills, emergency evacuation simulations, and training in the proper use of fire extinguishers. These activities will build students' readiness, confidence, and responsiveness during emergency situations. Policymakers and regulatory bodies may consider requiring periodic safety audits and certification of laboratory facilities to ensure compliance with national safety standards.

Maintain Sanitation and Hygiene Practices. Strict cleaning schedules, periodic audits, and active supervision should continue to ensure compliance with hygiene standards. Assigning specific students or laboratory assistants to monitor sanitation protocols can further strengthen accountability and consistency. Administrators should ensure the availability of sanitation supplies and enforce hygiene policies aligned with industry standards.

Enhance Hazard Identification and Risk Control Measures. Risk assessment workshops, hazard identification exercises, and the use of hazard checklists should be regularly integrated into laboratory activities. Teaching students to proactively recognize and mitigate potential risks will promote a culture of safety and proactive problem-solving. Curriculum planners should embed hazard analysis and risk management competencies as core learning outcomes in hospitality education.

Develop a Comprehensive Safety Curriculum. All components of the enhanced safety program should be integrated into a semester-long curriculum with continuous monitoring, feedback mechanisms, and opportunities for student participation in safety committees. This holistic approach ensures that OSH practices are consistently reinforced across all laboratory activities. Policymakers in higher education may support this by developing national guidelines or model curricula for OSH integration in laboratory-based programs.

Continuous Evaluation and Improvement. Periodic assessment of the effectiveness of OSH programs is recommended to identify gaps and implement improvements. Feedback from students and instructors should be actively sought to enhance safety policies and practices over time. Institutional quality assurance offices should incorporate OSH compliance indicators into their regular program evaluation systems.

Encourage Faculty and Institutional Support. Active involvement of faculty, laboratory instructors, and university administration is essential to reinforce adherence to OSH standards. Institutional support in providing resources, training, and supervision will foster a culture of safety within the hospitality laboratory environment. Leadership commitment should be strengthened through training, policy enforcement, and resource allocation.

Policy Development and Standardization. It is recommended that educational policymakers and regulatory agencies collaborate with higher education institutions to develop standardized OSH policies specifically tailored for academic laboratory settings. This includes clear guidelines on safety protocols, minimum facility requirements, and monitoring mechanisms to ensure consistency across institutions.

Future Research Directions. Future studies may be conducted to validate and extend the findings of this research. Future studies can:

a. Assess the effectiveness of the enhanced safety program through experimental or longitudinal designs;

b. Examine the impact of OSH interventions on actual safety outcomes, such as reduction in accidents and improved compliance rates;

c. Explore additional variables such as students' attitudes, safety culture, and institutional readiness;

d. Conduct comparative studies across institutions or regions to determine best practices in hospitality laboratory safety;

e. Investigate the role of technology (e.g., digital safety monitoring systems) in improving OSH implementation.

Implementing these recommendations is expected to strengthen adherence to OSH standards, reduce safety-related incidents, and cultivate a proactive and sustainable safety culture among Hospitality Management students. Moreover, the inclusion of policy-level actions and future research directions ensures that the study contributes not only to institutional improvement but also to broader educational and safety development initiatives.

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