



IDENTIFICATION AND ANALYSIS OF KEY CHALLENGES HINDERING EFFECTIVE IMPLEMENTATION OF THE OCCUPATIONAL SAFETY AND HEALTH (OSH) ACT 2007 IN MARITIME TRAINING INSTITUTIONS IN MOMBASA COUNTY, KENYA

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Accepted: April 24, 2026

ABSTRACT

This study was an investigation into the factors hindering effective implementation of the Occupational Safety and Health (OSH) Act 2007 in maritime training institutions in Mombasa County, Kenya. Despite the existence of comprehensive occupational safety legislation, maritime training institutions continue to experience elevated workplace incidents and suboptimal employee performance. The study adopted a descriptive research design with a target population of 250 employees across four maritime training institutions. A sample of 152 respondents was selected using proportionate stratified random sampling based on Krejcie and Morgan's formula [1], yielding a response rate of 87.5% (n=133). Data was collected using structured questionnaires and analyzed using descriptive statistics, Pearson's correlation, and multiple regression analysis. The findings revealed that inadequate funding for OSH programs (Mean=4.21, SD=0.93), inconsistent access to personal protective equipment (Mean=4.12, SD=0.89), weak enforcement of safety policies (Mean=3.94, SD=1.19), and limited training on OSH provisions (Mean=3.87, SD=1.11) were the most significant implementation challenges. Compliance with OSH procedures enhanced employees' ability to work safely and efficiently (Mean=4.18, SD=0.92), while institutional commitment to safety demonstrated strong positive impact on job satisfaction and work output (Mean=4.17, SD=0.88). Pearson's correlation analysis indicated strong positive relationships between employee performance and implementation challenges ($r=0.613$, $p<0.01$), existing OSH practices ($r=0.559$, $p<0.01$), and institutional safety culture ($r=0.647$, $p<0.01$). Multiple regression analysis showed that these three factors jointly explained 72.5% of the variance in employee performance ($R^2=0.725$, $F=79.42$, $p<0.001$). The study concludes that resource constraints, weak enforcement mechanisms, and low management commitment significantly undermine OSH Act implementation, thereby affecting employee performance. Recommendations include increased budgetary allocation for OSH programs, regular training, consistent provision of PPE, strengthened safety culture, and enhanced leadership commitment to improve compliance and employee outcomes in maritime training institutions.

Keywords: Occupational Safety and Health Act 2007, employee performance, maritime training institutions, safety culture, OSH implementation challenges, Mombasa County

CITATION: Khasindu, S. P., Karanja, B., & Mitaki, E., (2026). Identification and analysis of key challenges hindering effective implementation of the occupational safety and health (OSH) act 2007 in maritime training institutions in Mombasa County, Kenya. *Reviewed Journal of Science & Technology*, 7 (1), 6 – 19.

INTRODUCTION

Globally, the occupational safety and health (OSH) regulations are recognized as essential for promoting safe working environments and protecting workers from injury, illness, and death. According to the International Labour Organization (ILO), over 2.78 million workers die annually from work-related causes, while hundreds of millions suffer from non-fatal occupational accidents and diseases [2]. In developed countries, these frameworks have led to strict national OSH regulations and significant improvements in workplace safety. For instance, the European Maritime Safety Agency (EMSA) enforces stringent OSH standards across maritime institutions in Europe, resulting in reduced accidents and improved worker performance.

In Africa, the implementation of OSH regulations varies widely across countries, often falling short of legal requirements. The African Union reported that despite widespread ratification of ILO safety conventions, over 70 percent of African workers operate in environments that fail to meet minimum safety standards [4]. Within maritime sectors, where employees face elevated risks such as exposure to harsh weather, dangerous machinery, confined spaces, and hazardous materials, poor implementation of OSH policies results in frequent injuries and fatalities. A study by Okechukwu and Ogunleye in Nigerian maritime institutions revealed that only 39% had safety committees and fewer had ongoing training programs, contrary to the requirements outlined in their national OSH legislation [5].

Kenya, like many African countries, has developed a comprehensive legal framework to address workplace safety. The Occupational Safety and Health Act (OSHA), enacted in 2007, provides a legal structure for safeguarding workers' health and well-being. OSHA 2007 applies to all workplaces and requires employers to take practical steps to prevent accidents and occupational diseases. Key provisions include Section 13, which mandates employers to ensure the safety, health, and welfare of workers through training, supervision, and provision of safety equipment. Section 101 requires employers to supply and maintain suitable personal protective equipment (PPE), while Section 102 mandates emergency preparedness and response procedures. Sections 99 and 100 detail the procedures for reporting occupational accidents and diseases, ensuring accountability and follow-up action. OSHA 2007 also emphasizes the role of safety committees (Section 11) and internal audits and risk assessments (Section 9) in building a sustainable safety culture. Despite this framework, the implementation of OSHA 2007 remains uneven across various sectors in Kenya. According to the Directorate of Occupational Safety and Health Services (DOSHS), Kenya's maritime and technical training institutions have experienced a 22% increase in workplace incidents over the past five years, driven primarily by low awareness of safety regulations and poor enforcement [7]. Studies by Mutuku and Waweru [8] and Kinyua and Kamau [9] confirm that OSH compliance directly influences worker productivity, motivation, and safety. However, many maritime institutions lack structured systems for hazard identification, emergency drills, and safety training, all of which are key tenets of OSHA 2007. Mombasa County, Kenya's principal coastal and maritime hub, offers a focused case for examining the impact of OSH implementation in the maritime education sector. The county is home to major maritime training institutions, including Bandari Maritime Academy, Technical University of Mombasa, Kenya Coast National Polytechnic, and Harbor View Maritime Institute. These institutions are responsible for producing a significant portion of the nation's maritime workforce and, as such, are expected to maintain high safety standards. Yet, current evidence suggests that many of these institutions fall short of the expectations set out in OSHA 2007.

MATERIALS AND METHODS

Research Design

This research adopted a descriptive research design to systematically explore the effect of Occupational Safety and Health practices on employees' performance.

Study Area

The study was carried out in four maritime training institutions located in Mombasa County, Kenya, which spans approximately 294.7 square kilometers along the Indian Ocean coastline, serving as a strategic hub for maritime trade and education [40]. The selected institutions included Bandari Maritime Academy, Harbor View Maritime Training Institute, Technical University of Mombasa, and the Kenya Coast National Polytechnic. These institutions are instrumental in producing skilled personnel for the maritime sector and were chosen due to their direct engagement with Occupational Safety and Health (OSH) policies.

Target Population

The target population consisted of an estimated 250 employees across the four institutions, comprising instructors, administrative staff, and safety officers [10]. The detailed distribution of the target population across the four institutions and staff categories is presented in Table 1.

Table 1: Target Population Distribution by Staff Category and Institution

Institution	Instructors/Trai ners	Administrative Staff	Safety Officers	Total per Institution
Bandari Maritime Academy	45	30	8	83
Technical University of Mombasa	38	25	6	69
Kenya Coast National Polytechnic	32	22	5	59
Harbor View Maritime Institute	22	15	2	39
GRAND TOTAL	137	92	21	250

Source: Kenya Maritime Authority (2022) and institutional human resource records

Inclusion and Exclusion Criteria

The study included permanent staff members who had worked at the institutions for at least six months, ensuring they had adequate exposure to workplace safety policies and practices. These participants were directly involved in OSH activities and provided informed consent to participate voluntarily. Temporary staff, interns, contractors, and employees with less than six months of service were excluded due to their limited engagement with institutional safety frameworks. Additionally, individuals not involved in OSH practices or reluctant to participate were excluded to maintain ethical research standards and ensure data accuracy.

Sample Size and Sampling Procedure

The sample size for this study was determined using the Krejcie and Morgan formula, which is widely used for estimating sample sizes in research based on a known population [1]. The formula is expressed as:

$$s = \frac{(X^2 \times N \times P \times (1 - P))}{(d^2 \times (N - 1) + X^2 \times P \times (1 - P))}$$

Where:

- s = required sample size

- X^2 = chi-square value for 1 degree of freedom at the desired confidence level (3.841)
- N = population size (250 employees)
- P = population proportion (0.50, to maximize sample size)
- d = margin of error (0.05)

$$s = \frac{(3.841 \times 250 \times 0.5 \times (1 - 0.5))}{(0.05^2 \times (250 - 1) + 3.841 \times 0.5 \times (1 - 0.5))}$$

$$s = \frac{240.0625}{1.58275}$$

$$s = 151.64 \approx 152$$

To ensure adequate representation across all staff categories, proportionate stratified random sampling was employed. This technique involved dividing the population into homogeneous subgroups (strata) and then drawing a sample from each stratum in proportion to its size in the overall population [39]. The three strata were instructors/trainers, administrative staff, and safety officers. The proportionate allocation was calculated as:

$$\text{Sample per stratum} = \frac{\text{Stratum population}}{\text{Total population}} * \text{Sample size}$$

Table 2: Proportionate Sample Distribution Across Staff Categories

Staff Category	Population	Percentage	Sample Size
Instructors/Trainers	137	54.8%	83
Administrative Staff	92	36.8%	56
Safety Officers	21	8.4%	13
Total	250	100%	152

Within each institution, simple random sampling was used to select the required number of respondents from each staff category.

Research Instrument

The study employed a structured questionnaire as the primary research instrument for data collection. This tool was designed to align with the study objective and included both closed-ended and Likert-scale questions to enable effective quantitative analysis.

The questionnaire was divided into five sections:

- **Section A:** Demographic information (gender, age, education level, position, experience, institution type)
- **Section B:** Challenges hindering effective implementation of OSH Act 2007 (7 items)
- **Section C:** Impact of existing OSH acts on employee performance (6 items)
- **Section D:** Influence of institutional safety culture on employee performance (6 items)
- **Section E:** Employee performance measures (4 items)

All items in Sections B through E were measured on a 5-point Likert scale where: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree.

Data Collection Procedures

Prior to data collection, ethical approval was obtained from the Jomo Kenyatta University of Agriculture and Technology (JKUAT) Institutional Scientific and Ethics Review Committee (ISEREC) and a research permit was secured from the National Commission for Science, Technology & Innovation (NACOSTI). Permission was also sought from the management of the four selected maritime training institutions. Questionnaires were administered through a drop-and-pick method over a period of four weeks. Respondents were provided with consent forms and assured of confidentiality and anonymity.

Data Analysis

For analysis, data was entered into the Statistical Package for the Social Sciences (SPSS) version 25 for analysis. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarize demographic data and responses to research questions. Inferential statistics, specifically Pearson's correlation coefficient and multiple regression analysis, were employed to examine the relationships between independent variables (implementation challenges, existing OSH practices, and institutional safety culture) and the dependent variable (employee performance). The regression model was specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where:

- Y = Employee performance
- β_0 = Constant
- X_1 = Challenges hindering OSH Act implementation
- X_2 = Impact of existing OSH practices
- X_3 = Institutional safety culture
- $\beta_1, \beta_2, \beta_3$ = Regression coefficients
- ε = Error term

Statistical significance was tested at $\alpha = 0.05$.

RESULTS

Response Rate

A total of 152 questionnaires were administered to the selected respondents. Out of these, 133 were completed and returned, while 19 were not received back. This translates to a response rate of 87.50% and a non-response rate of 12.50%. The 87.50% response rate realized reflects strong engagement and genuine interest among the respondents, thereby enhancing the overall quality and accuracy of the findings.

Table 3: Response rate

Respondents	Respondents	Percentage (%)
Questionnaires Returned	133	87.50%
Questionnaires Not Returned	19	12.50%
Total Questionnaires Sent	152	100.00%

Demographic Characteristics

Table 4: Demographic Characteristics of Respondents (N=133)

Characteristic	Category	Frequency	Percentage
Gender	Male	76	57.0
	Female	57	43.0
Age	18–25 years	16	12.0
	26–35 years	40	30.0
	36–45 years	24	18.0
	46–55 years	32	24.0
	Over 55 years	21	16.0
	Certificate	18	14.0
Education Level	Diploma	35	26.0
	Bachelor's Degree	51	38.0
	Master's Degree & above	29	22.0
	Less than 1 year	15	11.0
Experience	1–5 years	41	31.0
	6–10 years	37	28.0
	Over 10 years	40	30.0
Institution Type	Public	105	79.0
	Private	28	21.0

The demographic results revealed that males constituted 57% of respondents while females represented 43%, reflecting the traditionally male-dominated nature of maritime training institutions. The majority of respondents were aged 26–35 years (30%), followed by those aged 46–55 years (24%). Regarding education, the majority held a Bachelor's degree (38%), followed by Diploma holders (26%). Experience levels were well distributed, with 31% having 1–5 years of experience and 30% having over 10 years of experience. The

majority of respondents (79%) were from public institutions, reflecting the government's dominant role in maritime education in Mombasa County.

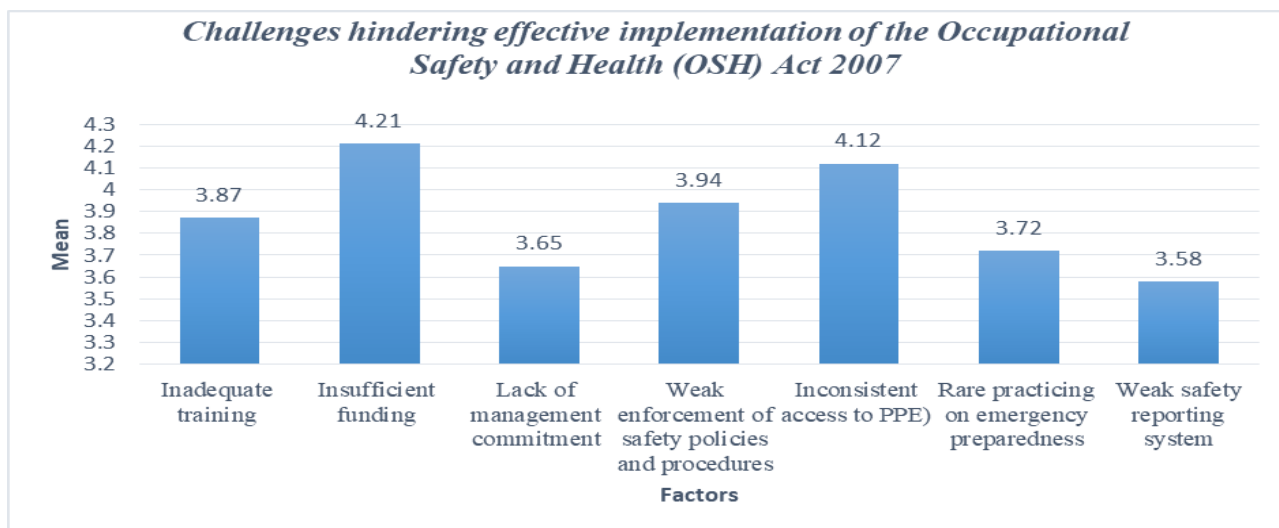
Descriptive Analysis

Challenges Hindering Effective Implementation of OSH Act 2007

Table 4: Challenges Hindering OSH Act 2007 Implementation

Statement	Mean	Std Dev
There is insufficient funding allocated for the implementation of OSH programs and safety initiatives	4.21	0.93
Access to necessary personal protective equipment (PPE) is inconsistent or inadequate	4.12	0.89
Enforcement of safety policies and procedures is weak or inconsistent in this institution	3.94	1.19
Inadequate training on the provisions of the OSH Act 2007 limits compliance in my institution	3.87	1.11
Emergency preparedness procedures and drills are rarely practiced or updated	3.72	1.14
Management does not demonstrate consistent commitment to enforcing OSH Act 2007 standards	3.65	1.07
There is a weak safety reporting system, making it difficult to report hazards or near-miss incidents effectively	3.58	1.23
Average	3.87	1.08

The findings in Table 4 highlight key challenges that hinder effective implementation of the OSH Act 2007. Respondents indicated that inadequate funding for OSH programs (Mean = 4.21) was the most pressing challenge, suggesting that financial limitations significantly restrict the establishment of comprehensive safety systems, acquisition of personal protective equipment, and execution of awareness initiatives. Inadequate access to PPE (Mean = 4.12) was also identified as a major concern, reflecting persistent gaps in resource provision that compromise both trainee and staff safety. Weak enforcement of safety policies (Mean = 3.94) and limited training on OSH provisions (Mean = 3.87) further point to institutional deficiencies in compliance monitoring and capacity building. Emergency preparedness procedures and drills scored 3.72, indicating that these practices are irregularly conducted. Inconsistent management commitment (Mean = 3.65) and weak safety reporting systems (Mean = 3.58) highlight challenges in leadership, communication, and accountability.



Regression Analysis

Table 5: Model Summary

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	0.852	0.725	0.711	0.398

Predictors: (Constant), Challenges Hindering OSH Act Implementation, Impact of Existing OSH Practices, Institutional Safety Culture

Table 5 shows the results of a multiple regression analysis that examined how OSH-related factors affect employee performance. The analysis produced an R value of 0.852, which shows a strong positive link between the independent variables and employee performance. The R² value of 0.725 means that about 72.5% of the differences in employee performance can be explained by these three factors, showing that they play a very important role. The remaining 27.5% of performance differences could be due to other factors not included in the study, such as individual motivation, available resources, or external influences.

ANOVA

Table 6: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	48.315	3	16.105	79.42	0.000
Residual	18.245	129	0.142		
Total	66.560	132			

Dependent Variable: Employee Performance

Predictors: (Constant), Challenges Hindering OSH Act Implementation, Impact of Existing OSH Practices, Institutional Safety Culture

According to the outcome in Table 6, the regression sum of squares was 48.315 with 3 degrees of freedom, while the residual sum of squares stood at 18.245 with 129 degrees of freedom, resulting in a total sum of squares of 66.560. The regression mean square was calculated at 16.105, producing an F-value of 79.42 and a significance level (p-value) of 0.000. Since the p-value is far below the conventional threshold of 0.05, this indicates that the regression model is statistically significant. This finding implies that collectively, the independent variables have a significant effect on employee performance. Therefore, the model is a strong fit, demonstrating that these predictors meaningfully contribute to explaining variations in employee performance.

Regression Coefficients

Table 7: Regression Coefficients

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	1.256	0.316		3.97	0.000
Challenges (X ₁)	0.462	0.088	0.449	5.25	0.005
Existing OSH Practices (X ₂)	0.389	0.082	0.401	4.74	0.012
Safety Culture (X ₃)	0.528	0.092	0.478	5.74	0.000

Dependent Variable: Employee Performance

The regression results in Table 7 provide detailed insights into the hypothesis:

H₀₁:(Challenges Hindering OSH Implementation): The variable CHIEO (challenges hindering OSH implementation) had an unstandardized coefficient (B) of 0.462, meaning that a one-unit reduction in OSH-related challenges leads to a 0.462-unit improvement in employee performance, assuming other variables remain constant. The significance level was 0.005, which is below the standard 0.05 threshold. This indicates that CHIEO has a statistically significant and positive effect on employee performance. Consequently, the null hypothesis H₀₁, which stated that challenges have no significant effect on employee performance, is rejected.

The resulting regression equation is:

$$Y = 1.256 + 0.462X_1 + 0.389X_2 + 0.528X_3$$

Where:

- X₁ = Challenges Hindering OSH Implementation

DISCUSSION

Challenges Hindering OSH Act 2007 Implementation

The study established that inadequate funding for OSH programs (Mean=4.21) and inconsistent access to personal protective equipment (Mean=4.12) were the most significant challenges hindering effective implementation of the OSH Act 2007. These findings align with previous research by Abaya et al., who emphasized that even where OSHA regulations are known, enforcement is frequently weak due to limited institutional capacity and inadequate budget allocations [25]. The resource constraints identified in this study reflect broader systemic challenges documented in African maritime contexts. Okechukwu and Ogunleye found that only 39% of Nigerian maritime institutions had safety committees and fewer had ongoing training programs, contrary to national OSH legislation requirements [5]. Similarly, Chileshe and Banda reported that Zambian maritime workers lacked access to basic safety gear and emergency preparedness procedures [6].

The weak enforcement of safety policies (Mean=3.94) and limited training on OSH provisions (Mean=3.87) identified in this study corroborate findings by Munuhe, who observed that awareness of OSH policies among employees did not always translate to effective implementation unless supported by regular training and strong leadership [26]. The correlation analysis ($r=0.613$, $p<0.01$) and regression coefficient ($B=0.462$, $p=0.005$) confirm that addressing these institutional challenges significantly improves employee performance, supporting the theoretical propositions of Herzberg's Two-Factor Theory. According to Herzberg et al., hygiene factors such as safe working conditions must be present to prevent dissatisfaction; without adequate resources and enforcement, employee motivation and performance cannot be optimized [13].

CONCLUSIONS

This study investigated the challenges affecting the implementation of the Occupational Safety and Health (OSH) Act 2007 and their influence on employee performance in maritime training institutions in Mombasa County, Kenya. Based on the findings, the following conclusions are drawn:

- The effective implementation of the OSH Act 2007 is hindered by several institutional and operational challenges, including inadequate funding for OSH programs, insufficient provision of personal protective equipment (PPE), weak enforcement of safety policies, limited training on OSH provisions, irregular emergency preparedness drills, and low management commitment. Inadequate funding and inconsistent access to PPE emerged as the most critical challenges. The significant positive relationship between addressing these challenges and employee performance ($r=0.613$, $p<0.01$) confirms that overcoming institutional barriers is essential for enhancing OSH compliance and workforce outcomes.
- The combination of OSH implementation challenges, existing OSH practices, and institutional safety culture accounts for 72.5% of the variation in employee performance in maritime training institutions ($R^2=0.725$). This demonstrates that occupational safety factors play a major role in shaping employee outcomes in maritime training environments. Overcoming OSH challenges, strengthening OSH practices, and fostering a positive safety culture are key strategies for improving employee performance, reducing workplace risks, and enhancing institutional effectiveness.

RECOMMENDATIONS

Based on the findings and conclusions, the following recommendations are proposed:

Strengthening resource allocation for OSH Programs

Maritime training institutions should increase budgetary allocation to support OSH programs, including safety training, procurement of PPE, safety audits, and emergency preparedness initiatives. Management should prioritize OSH in annual budget planning and explore partnerships with regulatory bodies such as DOSHS and

KMA for technical and material support. Establishing dedicated OSH units with qualified personnel can enhance policy implementation and compliance monitoring.

Enhancing Training and capacity building

Institutions should conduct regular OSH training and refresher courses for all employees, with specific focus on high-risk departments such as workshops, laboratories, and marine engineering sections. Training programs should cover hazard identification, proper use of PPE, emergency response procedures, and legal provisions under OSHA 2007. Induction programs should include detailed briefings on OSH responsibilities to ensure that all new employees understand safety protocols from the outset.

Improving enforcement of OSH Policies and Procedures

There is need for stronger enforcement of safety guidelines through routine inspections, monitoring, and follow-up actions. Institutions should establish clear accountability mechanisms, with designated safety officers responsible for ensuring compliance. Both corrective and motivational mechanisms should be introduced, including sanctions for non-compliance and recognition for exemplary safety behavior. Regular safety audits should be conducted to identify gaps and track improvement progress.

Ensuring adequate provision of PPE

Institutions should ensure consistent availability of high-quality PPE appropriate for the specific hazards present in maritime training environments. An effective inventory management system should be implemented to prevent shortages, track usage, and ensure timely replacement of damaged or expired equipment. Employees should receive training on proper PPE usage, maintenance, and disposal to maximize protection and minimize wastage.

Promoting a positive safety culture

Management should demonstrate visible commitment to safety through active participation in safety programs, transparent communication, and resource allocation. Open-door policies should be encouraged to facilitate reporting of hazards and safety concerns without fear of retaliation. Peer-to-peer safety reinforcement should be fostered through safety committees, safety champions, and collaborative safety initiatives. Recognition programs that celebrate safe behaviors and safety innovations can further strengthen safety culture.

Strengthening emergency preparedness

Regular emergency drills should be conducted to test and refine response procedures. Emergency plans should be reviewed and updated at least annually, incorporating lessons learned from drills and actual incidents. First aid units should be well-equipped and strategically located, with trained first responders available during all operating hours. Functional alarm systems and clear evacuation routes should be maintained and regularly tested.

Enhancing Collaboration with Regulatory Bodies

Institutions should strengthen partnerships with the Directorate of Occupational Safety and Health Services (DOSHS), Kenya Maritime Authority (KMA), and other relevant agencies. Collaborative activities should include joint inspections, technical support for OSH program development, training on emerging OSH issues, and sharing of best practices from other maritime institutions. Participation in industry safety forums and compliance with regulatory reporting requirements should be prioritized.

Recommendations for further Studies;

The following areas are suggested for future research:

- **Comparative analysis:** A comparative study of OSH compliance between public and private maritime training institutions to identify differential challenges and best practices that could inform targeted interventions.

- **Student safety behavior:** An assessment of student safety behavior and its contribution to institutional safety culture, recognizing that students constitute a significant portion of the institutional population and their safety practices may influence overall safety outcomes.
- **Regulatory effectiveness:** Evaluation of the effectiveness of DOSHS and KMA inspections in improving OSH compliance in maritime training centers, including analysis of inspection frequency, follow-up mechanisms, and impact on safety performance.
- **Longitudinal study:** A longitudinal study to determine how changes in OSH practices influence employee performance over time, tracking improvements in safety culture, compliance rates, and performance metrics following implementation of recommended interventions.
- **Technology integration:** Investigation of the role of technology in enhancing OSH compliance, including digital safety management systems, mobile applications for hazard reporting, and simulation-based safety training.
- **Psychological factors:** Exploration of psychological factors such as risk perception, safety motivation, and stress as mediators in the relationship between OSH implementation and employee performance.

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