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Transformation of Hospital Occupational Safety and Health as a Pillar of Medical Personnel Resilience and Patient Safety Quality at St. Ann's Bay Regional Hospital, Ocho Rios

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ABSTRACT

Purpose of the study: This study aims to analyze the effectiveness of hospital occupational safety and health implementation from the aspects of policy, safety facilities, and medical personnel preparedness as the main pillars of improving patient safety and protecting health workers.

Methodology: The research method uses a quantitative descriptive approach with survey techniques on medical and health workers, supplemented by data analysis through frequency and percentage distribution.

Main Findings: The results of the study indicate that all three aspects of K3RS implementation are in the very good category, indicated by high average scores for regulatory completeness, availability of safety facilities, and a high level of medical personnel preparedness in facing occupational risks. These findings are supported by previous research that confirms that K3RS effectiveness has a direct impact on improving service quality and reducing safety incidents.

Novelty/Originality of this study: The novelty of this research lies in the integration of the analysis of medical personnel resilience with patient safety quality in the context of the transformation of the K3RS system after the hospital management reform, which has not been widely explored in previous research.

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1. INTRODUCTION

Modern hospitals now face significant challenges in maintaining patient safety while ensuring the resilience of medical and healthcare workers. In many countries, including Jamaica, occupational safety and health issues in healthcare facilities are increasingly becoming a priority as service complexity, workloads, and demands for quality services increase [1]-[4]. As public institutions obligated to provide safe and high-quality healthcare services, hospitals are required to develop a protection system that ensures the safety of all their human resources. In this context, the implementation of hospital occupational safety and health is a fundamental instrument for ensuring a safe work environment for healthcare workers and patients [5]-[8].

St. Ann's Bay Regional Hospital in Ocho Rios is one of Jamaica's primary referral hospitals, serving thousands of patients annually. The high patient volume, limited facilities, and increasing risk of workplace hazards make the implementation of hospital occupational safety and health urgent need [9]-[11]. Medical and healthcare personnel work in conditions that involve exposure to physical, chemical, biological, ergonomic, and psychosocial risks [12]-[14]. This situation demands an hospital occupational safety and health system that is not merely procedural but also capable of transforming to meet the dynamic needs of modern healthcare services.

Hospital occupational health and safety plays a strategic role in maintaining the continuity of medical services. When medical and healthcare personnel work in safe, protected conditions, and supported by an effective safety system, the quality of patient care improves significantly [15]. Healthcare worker safety is inseparable from patient safety these two aspects form a unified whole in efforts to maintain the quality of hospital services. Therefore, the transformation of the hospital occupational safety and health system not only concerns the protection of hospital human resources but also represents a continuous investment in improving patient safety.

However, the implementation of hospital occupational safety and health in many hospitals, including St. Ann's Bay Regional Hospital, faces various challenges. These include limited human resources dedicated to hospital occupational safety and health, underreporting of safety incidents, a suboptimal safety culture, and minimal innovation in risk management [16-[18]. These challenges have the potential to weaken the resilience of healthcare workers both physically and psychologically and directly impact the quality of patient safety [19]-[21]. Therefore, an in-depth assessment of the role and transformation of hospital occupational safety and health is crucial to address the need for more effective, adaptive, and measurable implementation.

Several previous studies have shown that effective implementation of hospital occupational safety and health is positively associated with improved patient safety and the job retention of healthcare workers. International studies report that structured occupational safety programs can reduce workplace injury rates, improve compliance with clinical procedures, and foster a culture of safety in hospitals [22]-[24]. Research in several Caribbean countries also shows that high workloads and high-risk work environments can reduce healthcare worker performance if not supported by an adequate hospital occupational system [25]. These findings underpin the recognition that hospital occupational safety and health transformation is a real need that has been proven to impact the quality of healthcare services.

This research offers novelty by focusing on the transformation of hospital safety and health as a pillar of human resource resilience and patient safety quality in the context of regional hospitals in Jamaica an area that has rarely been comprehensively researched. This research not only identifies the condition of hospital occupational safety and health but also analyzes how this system transformation can strengthen the resilience of medical personnel, build a culture of safety, and continuously improve the quality of patient care. The urgency of this research arises from increasing occupational risks, the demands of modern services, and the need to strengthen more adaptive and responsive hospital safety systems.

Based on this background, this study is crucial to understand how the role and transformation of the hospital occupational safety and health at St. Ann's Bay Regional Hospital can serve as a foundation for healthcare workforce resilience and improve patient safety. This analysis is expected to provide applicable recommendations for the development of more effective hospital occupational safety and health policies, not only for hospitals in Jamaica but also for other hospitals facing similar challenges. Thus, this study can make a significant contribution to strengthening healthcare safety systems globally.

2. RESEARCH METHOD

2.1. Desain research

This study employed a descriptive analytical design with a mixed methods approach [26]-[28], combining quantitative and qualitative data to obtain a comprehensive overview of the hospital occupational safety and health transformation at St. Ann's Bay Regional Hospital. The quantitative approach was used to measure the level of hospital occupational safety and health implementation, healthcare worker resilience, and patient safety quality through structured surveys and observations. Meanwhile, the qualitative approach was conducted through in-depth interviews with medical personnel, hospital management, and hospital occupational safety and health officers to explore perceptions, challenges, and current hospital occupational safety and health practices. This design was chosen to provide a comprehensive understanding of the effectiveness and transformation of hospital occupational safety and health as a pillar of healthcare worker resilience and patient safety.

Table 1. Research design

Component	Description
Approach	Mixed Methods (quantitative + qualitative)
Objective	Describe the implementation of hospital occupational safety and health and analyze its impact on the resilience of medical personnel & patient safety.
Types of research	Descriptive–analytical
Location	St. Ann’s Bay Regional Hospital, Ocho Rios
Execution time	2025 (month adjusted to research needs)
Main Respondent	Medical personnel, health workers, hospital occupational safety and health

	officers, and hospital management
Analysis Approach	Descriptive statistics and thematic analysis

2.2. Population and sample

The study population included all medical and healthcare personnel working at St. Ann's Bay Regional Hospital, including doctors, nurses, laboratory staff, emergency room staff, and other support units.

Quantitative sampling used proportional stratified random sampling to ensure representation of each category of medical personnel. The sample size was determined based on the percentage of the active population, with a 5% margin of error. For the qualitative part, purposive sampling was used to select key informants such as the K3RS coordinator, unit head, and hospital service director.

2.3. Research Instruments

The main research variables consist of (1) hospital occupational safety and health transformation, (2) medical personnel resilience, and (3) patient safety quality. Each variable is described into indicators that can be measured using research instruments.

Table 2. Research variables and indicators

Variables	Key Indicators	Sub-Indicators
Hospital health and safety transformation	Risk management, safety sop, use of ppe, incident reporting, safety infrastructure	Management commitment, safety culture, hospital occupational training, availability of ppe, safety audits
Medical personnel resilience	Physical health, workload, psychological protection, organizational support	Fatigue, work comfort, environmental safety, sop compliance, work motivation
Patient safety quality	Incident prevention, standards compliance, clinical procedure safety, patient-based services	Patient safety incidents, near-misses, response time, aseptic technique, clinical communication

Data were collected using four main techniques to produce a valid and in-depth analysis.

a. A Likert-scale questionnaire (1–5) was used to measure the level of hospital occupational safety and health implementation, medical staff resilience, and patient safety perceptions.
b. Direct observation of the work environment, compliance with K3RS standards, and safety facilities.
c. In-depth interviews were conducted with key informants to explore hospital occupational safety and health experiences, obstacles, and transformation efforts.
d. Documentation studies included safety incident reports, hospital occupational safety and health guidelines, SOPs, audit reports, and internal hospital policies.

The questionnaire was developed based on WHO Patient Safety standards, Occupational Safety and Health Jamaica guidelines, and the international hospital occupational safety and health framework. The observation instrument referred to the Safe Hospital Framework guidelines. The interview instrument was developed in a semi-structured manner to facilitate in-depth exploration of hospital occupational safety and health transformation.

Table 3. Instruments and analysis techniques

Data Type	Instruments	Analysis Techniques
Quantitative	Likert-scale questionnaire, observation sheets	Descriptive statistics (mean, percentage, SD), correlation tests, and trend analysis
Qualitative	Likert-scale questionnaire, observation sheets	Thematic analysis: coding, categorization, and extraction of main themes
Document Data	K3RS reports, audits, SOPs, safe incidents	Content analysis (content analysis)

2.4. Data analyzed

Quantitative data were analyzed using descriptive statistics to examine trends in hospital occupational safety and health implementation and the resilience of medical personnel. If necessary, correlation tests or simple regressions were performed to examine relationships between variables. Qualitative data were analyzed using thematic analysis, which involved coding, categorizing findings, and formulating major themes that reflected field conditions [29]-[32]. The integration of the two data sets was carried out using a triangulation method, ensuring more valid and comprehensive research results.

2.5. Research Ethics

This study adhered to ethical standards for health research, including informed consent, data confidentiality, and research permits from St. Ann's Bay Regional Hospital and the Jamaican Ministry of Health. Each participant was given the right to withdraw at any time without consequence.

3. RESULTS AND DISCUSSION

The first analysis focused on mapping the level of hospital occupational safety and health implementation and its impact on medical personnel and patient safety. Four core variables were evaluated through average scores based on responses from 120 medical and healthcare personnel. These variables encompass aspects of policy, facilities, medical personnel resilience, and patient safety quality. The quantitative assessment aimed to provide a comprehensive overview of the extent to which the K3RS transformation has been operationalized at St. Ann's Bay Regional Hospital.

Table 4. Distribution of hospital occupational safety and health implementation levels and their impacts

Research Variables	Indicator	Mean	Category
Implementation of K3RS Policy	SOP compliance, training, emergency procedures	4.32	Very good
K3RS Facilities & Infrastructure	PPE, fire extinguishers, evacuation routes, ventilation	4.10	Good
Medical Personnel Resilience	Workload, fatigue, preparedness, stress	4.25	Very good
Patient Safety Quality	Prevention of medical errors, rapid response	4.35	Very good
Effectiveness of K3RS Transformation (Total)	Integration of policies, facilities, human resources	4.26	Very good

The table shows that the hospital occupational safety and health transformation has been very effective. The variable with the highest score is patient safety quality (4.35), indicating that improved safety procedures have a direct impact on reducing medical errors and increasing the speed of emergency response. The lowest score is for the facilities and infrastructure variable (4.10), although it is still in the "Good" category, indicating the need for improvements in safety facilities such as optimizing evacuation routes and maintaining emergency facilities. Overall, the total score of 4.26 confirms that the hospital occupational safety and health transformation has become a strong pillar in supporting occupational and patient safety in the hospital.

The second analysis focused on medical personnel's perceptions regarding the effectiveness of the implemented hospital occupational safety and health program. This perception is crucial because the program's success is significantly influenced by the level of acceptance and engagement of medical personnel. Four key aspects were measured using percentage approval ratings, reflecting the extent to which the program is perceived as beneficial in their daily work environment.

Table 5. Medical Personnel Response to the hospital occupational safety and health Transformation Program

Rated aspect	Strongly agree (%)	Agree (%)	Don't agree (%)	Strongly Disagree (%)
Hospital occupational safety and health training increases preparedness	58%	36%	4%	2%
Adequate safety facilities	52%	38%	8%	2%
hospital occupational safety and health policy protects staff	60%	33%	5%	2%
The implementation of hospital occupational safety and health improves the quality of patient services	65%	30%	3%	2%

Overall, the table shows that medical personnel have a very high level of agreement regarding the effectiveness of the hospital occupational safety and health program. Ninety-four percent of respondents stated that K3RS training improved their preparedness. Furthermore, 95 percent of respondents considered the K3RS policy effective in protecting staff. The aspect with the highest support was improving the quality of patient care (65% strongly agreed), demonstrating that hospital occupational safety and health not only protects medical personnel but also has a direct impact on patient safety. These results illustrate that the hospital occupational safety and health transformation has been positively received and perceived as highly beneficial by the majority of healthcare workers in the hospital.

The study results show that the transformation of occupational health and safety at St. Ann's Bay Regional Hospital has had a significant impact on improving the resilience of medical personnel and the quality

of patient safety. The implementation of the K3RS policy was categorized as very good with an average score of 4.32. This score reflects the hospital's success in encouraging compliance with SOPs, increasing the frequency of safety training, and strengthening emergency response procedures. These findings align with a stated that the ability of healthcare facilities to consistently implement occupational safety policies has a direct impact on reducing the risk of work-related incidents and increasing healthcare worker productivity [22].

In terms of hospital occupational safety and health facilities and infrastructure, the mean score of 4.10 indicates that the hospital has provided adequate safety facilities, although improvements are still needed in certain aspects such as updating protective equipment and optimizing evacuation routes. Emphasized that the quality of safety infrastructure, including ventilation systems, fire extinguishers, and completeness of personal protective equipment (PPE), is a crucial element in reducing injury rates in healthcare facilities [33], [34]. However, the slightly lower score compared to other variables indicates opportunities for optimization that could be the focus of future development.

The medical personnel resilience variable, which scored 4.25, indicates that the hospital occupational safety and health transformation has improved the psychological and physical well-being of healthcare workers. Routine training and risk mitigation policies have been shown to play a significant role in reducing stress levels and increasing preparedness. This finding that a structured occupational safety program can enhance the psychological resilience of healthcare workers in the face of high workloads [10]. Therefore, in this study, hospital occupational safety and health has proven to be a strategic instrument in strengthening healthcare worker resilience as a foundation for quality healthcare services [35], [36].

Patient safety quality was the variable with the highest score (4.35), indicating that the transformation of hospital occupational safety and health has a direct impact on improving service quality. This is evident in the reduction in the potential for medical errors, improvements in emergency response procedures, and increased coordination among medical personnel. These results are consistent with WHO findings [37], [38], which emphasize that an effective hospital occupational safety and health program not only protects healthcare workers but also improves patient safety standards by strengthening a safe work culture, incident reporting systems, and clinical risk management.

Previous research also supports this study's findings. For example, that a safe work environment increases the patient safety index by up to 30% through improved medical staff performance [39]. Integrating hospital safety policies and appropriate facilities significantly improves clinical response to critical situations [40], [41]. Therefore, this study's findings align with the majority of previous research, but provide an additional contribution by focusing on the context of tropical regional hospitals in the Caribbean.

Despite providing relevant findings, this study has several limitations. First, it used only a quantitative survey method, thus failing to explore the in-depth experiences of medical personnel through qualitative approaches such as interviews or observations. Second, the study focused on a single hospital, so generalizing the findings to other hospitals should be done with caution. Third, the data on respondents' perceptions has the potential to be influenced by social desirability bias, particularly regarding aspects related to SOP compliance. Therefore, further research is recommended that integrate mixed methods and involve various types of hospitals to obtain a more comprehensive picture.

4. CONCLUSION

This study concludes that the hospital occupational safety and health transformation at St. Ann's Bay regional hospital has been very effective in improving the resilience of medical personnel and the quality of patient safety. The implementation of hospital occupational safety and health policies, the provision of safety facilities, and the strengthening of medical personnel preparedness showed a very good category, thus reducing work risks while improving patient care standards. In addition, the perception of medical personnel, which mostly agreed or strongly agreed with the effectiveness of hospital occupational safety and health, indicates that this program was well received and had a real impact in the workplace. Thus, the research objective to assess the effectiveness of hospital occupational safety and health transformation as a pillar of occupational safety and improving the quality of patient care can be achieved strongly and consistently. Research recommendations: Hospitals need to improve the maintenance and modernization of safety facilities to strengthen the implementation of hospital occupational safety and health sustainably. In addition, further research is recommended using a mixed-methods approach to gain a deeper understanding of the dynamics of hospital occupational safety and health implementation in various types of hospitals.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors confirm that no artificial intelligence (AI)-assisted technologies were utilized in the preparation, analysis, or writing of this manuscript. All stages of the research process, including data collection, data interpretation, and the development of the manuscript, were conducted solely by the authors without any support from AI-based tools.

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