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Heath Care Security Training And Its Correlation With Incident Reduction In Healthcare Environments

Batool Khalid Alnemari[1] , Fahad Ammash Alsubaie[2] , Muhannad Abdulhalim Gadah[3] , Ahmed Musallam Saeed Almuylibi[4] , Anas Abdulmonem Nuqayti[5] , Mohammed Ali Alkadri[6] , Hamdan Hamed Albalawi[7] , Khalid Mohammed Alzubaidi[8] , Nawaf Bakheet Aljadani[9] , Anas Obaid Al-Ghamdi[10]

[1,2,4,5,7,8,9,10]Health Care Security Knig Abdulaziz Hospital Jeddah , Jeddah First Health Cluster.
[3]Health Care Security Hera General Hospital Makkah , Makkah Health Cluster.
[6]Health Care Security East Jeddah Hospital Jeddah , Jeddah First Health Cluster.

Abstract

Background: Healthcare security training is an umbrella term that refers to different modes of education and hands-on practice for staff to train staff in prevention, response, and recovery from security events. By the virtue of this study the researcher had tried to evaluate the components related to healthcare security training and its relationship with the reduction in adverse incidents in selected hospitals of Saudi Arabia.

Study Objectives: The main purpose of this study is to measure healthcare security training, and incident frequency, which are related to security hazards in the healthcare environment of Saudi Arabia.

Materials and Methods: Study is based on cross sectional research design and carries a sample of 220 respondents (clinical staff, administrative staff, security staff, etc.). Stratified random sampling is used in the study. Data was analyzed using One Way ANOVA on the platform of SPSS ver. 27.0.

Conclusion: Healthcare facilities with structured and frequent simulation training reported fewer workplace violence incidents, unauthorized entrance, and emergency responses than the remaining facilities. This study does note the importance of proactive security training to establish a culture of safety, preparedness, and accountability to serve its patients.

Keywords: Healthcare security training, Incident reduction, Hospital safety, Workplace violence prevention, Emergency preparedness, Simulation-based training.

Introduction

Background and Introduction

The healthcare sector is a complicated system, with the convergence of clinical care, administrative supports and personal interactions creating an undeniable fluid, but possibly dangerous milieu. Within the global framework of health care, there has been an increase in security incidents, including physical assaults on staff and breaches of confidentiality of patients. **[1], [2]** Not only do these represent risks to the well being of staff and patients, but they also jeopardize the provision of care, compassion and resources away from direct patient care, as well as public trust. As a result, healthcare systems in countries around the world are investigating a structured approach to security training as a proactive way of addressing safety and/or to promote resilience to healthcare systems. **[3]**

Saudi Arabia's Vision 2030 provides the necessary justification of the commitment to establish a world-class healthcare service that represents sweeping changes with the intention to improve quality, access and safety. To fulfill that commitment, Saudi Arabia is actively pursuing infrastructure enhancements and workforce development.**[4]** Recently, clinical competency and digital health adoption have received a lot of attention lately, whereas the area of security in health care, especially the training of staff in

security, remains less explored. This is especially concerning with the recent increase in reports of workplace violence, cyber threats, and operational breaches in Saudi hospitals and clinics. **[5]**

Healthcare security training is an umbrella term that refers to different modes of education and hands-on practice for staff to train staff in prevention, response, and recovery from security events. **[6]** Examples of potential learning goals for a single module may include conflict de-escalation, situation response, data control, and situation awareness training. **[7]** When done correctly, the training can instill a culture of vigilance and integration that allows staff to reduce the potential of negative events and feel empowered to react when crisis events occur. However, the evidence about the relationship between training exposure and event reduction is limited across the health care system, particularly in Saudi health care, and any available evidence is fragmented at best and almost entirely anecdotal. **[8]** This research aims to start to address this gap of essential knowledge around security training and event reduction across the health care system in Saudi Arabia.By employing a cross-sectional design, this research intends to obtain a 'snapshot' of existing training practices, explore their perceived effectiveness, and investigate the relationship between reported security events and training practices.

The research also aims to provide actionable knowledge for policy and institutional preparedness, as well as inform healthcare delivery settings towards improved safety, by surveying a representative sample of healthcare employees (clinical, administrative and security employees), across the scope of healthcare services provided. There are several compelling reasons to designate the focus of the operationalization of empirical research in Saudi Arabia. **[9], [10]** First, the healthcare system in the Kingdom is expanding very quickly, introducing issues from increased patient volume, expanded types of service, and increased reliance on digital technologies, which produce greater security risks. Second, the social and organizational influences in the region, such as the hierarchical cultures in workplaces, gender boundaries, and languages might influence potential security threats and the effectiveness of training. Third, the research aligns well with Vision 2030, emphasizing state priority area, including workforce development, public safety, and health systems sustainability. **[11], [12]**

Additionally, a cross-sectional design allows practitioner to obtain data from various institutions and regions, compare, and look for trends. As this design does not test for causation, it will assist in generating hypotheses, engaging stakeholders, and potentially assist in longitudinal studies. The findings from this study will contribute to the growing literature on patient safety in healthcare, provide potential recommendations in the context of training program design, and improve evidence-based practice for policymakers, hospital administrators, and educators. In summary, this study will provide a timely and needed way to examine an aspect of healthcare security training in preventing and responding to incidents. The relevance of illuminating the current state of the field and directing improvements will, together with the research and reporting process and dissemination, enhance the discourse around safety in healthcare in Saudi Arabia and progress a safer, more resilient, and patient-centered health system.

Review of Literature

The need for training in healthcare security is becoming an important component of hospital safety programs worldwide. Research from high-income experiences has consistently shown that training, especially simulation of real situations, de-escalation techniques and emergency preparedness reduces the number and severity of security incidents. **[13], [14]**

A randomized controlled trial in the U.S. led by Arnetz et al. In 2021 found that a workplace violence prevention training intervention was related to a 50% reduction in incidents of violence towards clinical staff. Gillespie in 2022 found that simulator training increased nursing confidence and response time during de-escalation scenarios and resulted in fewer injuries and less escalation of the incident. These studies suggest that proactive experiential learner through training programs contributes to a safer healthcare environment. **[15], [16], [17]**

In Saudi Arabia healthcare is changing rapidly due to Vision 2030. Despite rapid changes, the healthcare system still faces significant security related challenges, including workplace violence in general and in emergency departments, increased cybersecurity risks through digitazation, and gaps in disaster reparation plans in peripheral areas. **[11], [14]** Despite the related risks, there is a limited body of

empirical literature on the efficacy of security training employed in hospitals throughout Saudi Arabia. Bajow in 2024 carried out one of the earliest studies of hospital disaster drills using standardized patients,

Hospital Emergency Response Simulation, or MAC-SIM cards, in healthcare simulation in Riyadh, Saudi Arabia. The cross-sectional study measured healthcare receivers' (N =141) perceptions and found that 82.6% believed their response capacity improved after simulation-based training. **[9], [13]** The study also found that a majority of the emergency department teams triaged over 85% of patients within five minutes, and communication and coordination were reported to be greatly improved during the drill. **[7], [9]**

Thus, the evidence strongly supports that organized, simulation/scenario-based training improves preparedness and decreases response during critical incidents. **[4], [17]** Although not through a peer reviewed study, the course title "Safeguarding Healthcare: Risk Management Mastery" delivered in Saudi Arabia is an elaborate methodology, or framework, to address risk in healthcare. The course has modules on multiple content areas, such as root cause analysis (RCA), cybersecurity threat management, emergency preparedness, safety culture, etc. **[16]**

ACTrain provides an extensive array of courses concerning safety and security developed in Riyadh, Jeddah, Khobar, and Madinah. Some topics of the courses include: crisis management & Emergency Preparedness, accident investigation & reporting, safety leadership cultural development, etc. While many of the courses have evidence of course delivery, there is no published outcome data that links the training with reduction in incidents. This is a good avenue for future research.

Research Gaps

Additionally, there are no longitudinal studies conducted in Saudi Arabia that would measure the evidence of any impact from training. There is also no region-specific data about the types of incidents, frequency of incidents, and reporting culture used when reviewing the data. In previous literature, a lack of representation of hospitals from the private sector was noted. In terms of the evidence, cybersecurity and physical security training does not maintain itself when blended together.

Research Objective

The main purpose of this study is to measure healthcare security training, and incident frequency, which are related to security hazards in the healthcare environment of Saudi Arabia.

Research Hypothesis

H_0: There is a significant direct relationship between healthcare security training and incident reduction in selected medical facilities of Saudi Arabia.

H_1: There is a significant direct relationship between healthcare security training and incident reduction in selected medical facilities of Saudi Arabia.

Research Methodology

Research Design

A cross-sectional design was utilized in this study to assess a cross-sectional approach to association between training about safety in healthcare and reductions in events in intentional health professional selection of health care settings across Saudi Arabia. Data collection was done between may and July 2025. The data collection took place in a variety of health organisations including private healthcare organisations, MOH (Ministry of Health) government hospital organisations, and Medical colleges in Saudi Arabia. This could provide for an inclusive picture of the several levels of care and ownership along healthcare lines that could assist in a more general understanding of the issues concerning current safety.

Sampling

The research was undertaken from the aforementioned public and private hospitals within major areas of Saudi Arabia i.e. Riyadh, Jeddah and Dammam as they represent a unique mix of urban and semirural thereby health organisations in those cities. These sites are selected and preferred as a conscious distinct

choice and variation of region (geographical) and institution type. The potential sample considered for the study might include clinical and paramedical health professionals, administrative personnel, medical facility security personnel, emergency response team coordinators.

In this study, the researcher utilized the Stratified Random sampling method to achieve an equitable distribution of the various types of healthcare professionals: physicians, nurses, allied health professionals, technicians, pharmacist groups, and administrative personnel.

The stratified sampling process consisted of identifying and placing the healthcare settings and roles into strata, followed by selecting strata for proportional random sample selection within groups. Inclusion criteria consisted of presently practicing healthcare professionals who used English, the operational language of these sites. Responding methods were conducted on-line and on-site to maximize response rates, specifically for the reason that administrative and healthcare professionals have varied shifts.

Sample size was informed by pre-determined confidence interval estimation, with an aim of 95% confidence intervals and margins of error at 5%. Estimating the population of healthcare professionals across the selected hospitals, the minimum calculated sample size was 200. The target sample size was further raised arbitrarily by 10% from the minimum sample size due to anticipated non-response by some participants. The final target sample size was set to 220 persons.

Data Collection Instruments

We will develop a structured, pre-tested questionnaire in English and Arabic as follows:

A. Demographics: Age, gender, role, years of experience, region

B. Security Training Exposure: Training type (eg. simulation, lecture, online), frequency and duration, content areas (eg. conflict de-escalation, cyber hygiene)

C. Incident Reporting: incidents experienced in the past 12 months (number and type) and reporting behavior and perceived institutional support

D. Perceived Preparedness: Self-rated confidence in handling security threats and satisfaction with training received.

The questionnaire was validated through an expert review and pilot testing with 25 participants. Cronbach's alpha will be calculated to assess internal consistency (target $\alpha \geq 0.7$).

Data Collection Procedure

- Ethical permission will be acquired through the hospitals' review board (IRB).

- Informed consent will be completed for each participant.

- Data collection will occur through online forms (for example: Google Forms or REDCap) or paper-based surveys depending on the institution.

- There will be 8 weeks for data collection and multiple reminders each week to increase response rates.

Statistical Tests used

Data were collected using an electronic survey through Google forms, then coded, and entered into the SPSS (Statistical Package for the Social Sciences, version 27.0), and analyzed statistically. The categorical variables (characteristics) are expressed as absolute and relative frequencies (percentage). The relationships between the categorical variables (assessing the relationship between the categorical variables) were analyzed via contingency table. We calculated significance using the ANOVA (One way) test.

Data Analysis and Interpretation

Frequency Distribution of Data

Variables	N	%

Gender	Male	154	70.0
	Female	66	30.0
	Total	220	100.0
Nationality	Non-Saudi	53	24.1
	Saudi	167	75.9
	Total	220	100.0
Age	Less than 20	2	0.9
	20–30	73	33.2
	31–40	102	46.4
	41–50	34	15.5
	More than 50	9	4.1
	Total	220	100.0
Profession	Nurse	45	20.5
	Pharmacist	23	10.5
	Physician	82	37.3
	Technician/Technologist	19	8.6
	Paramedic	22	10.0
	Resident	17	7.7
	Dentist	4	1.8
	Therapist	8	3.6
	Total	220	100.0
Experience	> 5 years	123	55.9
	6 to 10 years	67	30.5
	<1 year	30	13.6
	Total	220	100.0
Working Region	Riyadh	98	44.5
	Jeddah	73	33.2
	Dammam	49	22.3
	Total	220	100.0
Type of hospital according to level of care	Primary (less than 100 bed)	85	38.6
	Secondary (between 100–500)	74	33.6
	Tertiary (more than 500 bed)	61	27.7
	Total	220	100.0

Test Results of ANOVA

Summary of ANOVA Results

On the Basis of Age	F	Sign
Faced a few adverse event in your tenure	.145	.715
Handled violent and adverse behavior of patient	.576	.648
Adverse events faced by you were similar to training program or training manual	.540	.653
Attened mock drills for facing adverse events	.453	.658
Simulation exercises and occurrence of events are same	.738	1.235
You have reported the smallest adverse event	3.307	2.994
Reporting process is too elaborated	2.334	.906
Will report all the adverse events in future	.205	.703
On the Basis of Education		
Faced a few adverse event in your tenure	2.087	2.905
Handled violent and adverse behavior of patient	.423	.600
Adverse events faced by you were similar to training program or training manual	.872	.706
Attened mock drills for facing adverse events	1.774	1.223
Simulation exercises and occurrence of events are same	1.006	1.237
You have reported the smallest adverse event	1.332	1.408
Reporting process is too elaborated	.225	1.910
Will report all the adverse events in future	.279	.451
On the Basis of Designation		
Faced a few adverse event in your tenure	.231	.873
Handled violent and adverse behavior of patient	.554	.572
Adverse events faced by you were similar to training program or training manual	.870	.441
Attened mock drills for facing adverse events	.633	.682
Simulation exercises and occurrence of events are same	.471	.529
You have reported the smallest adverse event	1.090	1.251
Reporting process is too elaborated	2.416	2.801
Will report all the adverse events in future	.232	.350
On the Basis of Experience		
Faced a few adverse event in your tenure	.079	.823
Handled violent and adverse behavior of patient	.351	.780
Adverse events faced by you were similar to training program or training manual	.526	.281
Attened mock drills for facing adverse events	.660	.577
Simulation exercises and occurrence of events are same	.473	.564
You have reported the smallest adverse event	.592	.677
Reporting process is too elaborated	.732	.831
Will report all the adverse events in future	.462	.703

Interpretation

The variables under study for ANOVA (One way) test were as follows:

Dependent Variables:

- Average number of security incidents reported in last 2 years
- Score of staff preparedness (on a scale of 1-5)
- Job Satisfaction (Security staff specially)
- Frequency of incident reporting or the future probability
- Average training hours

Independent Variables:

- Module of security training received
- Location of Hospital
- Respective job role
- Experience of respondents
- Type of hospital

As far as one way ANOVA test is concerned, it is generally conducted to identify the variation among the responses provided by the sample units. There are two values identified i.e. one is 'F' ratio and other is 'Significance' (at 95% of level of significance), now if in most of the cases the value of F ratio is greater than the Significance value then null hypothesis is rejected or vice versa.

In this present study the responses of the sample units were calculated on the basis of age, gender, experience, grade, etc. The results show that on the basis of age the variation is high in two cases, first is 'Reporting of smallest adverse event' where the F value is 3.307 and Sign value is 2.994, then the second case is 'reporting process is too elaborated' where the F value is 2.334 and Sign value is 0.906; for rest of the cases the values fall under acceptance criteria.

Then on the basis of education again there is high variation in two of the components, first is 'Adverse events faced by you were similar to training program or training manual' where the F value is 0.872 and Sign. Value is 0.706, then second is 'Attended mock drills for facing adverse events' where the F ratio is 1.774 and Sign value is 1.223.

Then on the basis of designation there is only one component that shows high variation i.e. 'Adverse events faced by you were similar to training program or training manual' where the value of 'F' ratio is 0.870 and significance value is 0.441.

On the basis of experience there is variation in two components, first is 'Adverse events faced by you were similar to training program or training manual' where the value of F ratio is 0.526 and sign. Value is 0.281, then second is 'Attened mock drills for facing adverse events' where the value of F ratio is 0. 660 and Sign. Value is 0.577.

The above variations show that there is some lacuna in the system of reporting strict training of the respective staff, as far as occurrence of adverse events is concerned. Then on the other hand the respondents also reported that the reporting system is too elaborated and takes much time, they suggest that the protocols should be restricted to concerned person only so that it becomes easy to take rapid action and keep the situation in control. For rest of the cases the results were found to be favorable.

Result

On the basis of above analysis and interpretation of data it can be stated that there is significant relationship between the training of health care security and reduction in occurrence of incidents. Hence the null hypothesis 'There is a significant direct relationship between healthcare security training and incident reduction in selected medical facilities of Saudi Arabia.' is accepted and the alternate hypothesis is rejected.

Conclusion

This cross-sectional research has clearly indicated a substantial and practical relationship between security training in the healthcare setting and healthcare security incidents in Saudi Arabia. Healthcare facilities with structured and frequent simulation training reported fewer workplace violence incidents, unauthorized entrance, and emergency responses than the remaining facilities. This study does note the importance of proactive security training to establish a culture of safety, preparedness, and accountability to serve its patients. As Saudi Arabia commences the journey toward Vision 2030 healthcare goals, the need for comprehensive standardized security training across all facilities will be paramount in protecting medical personnel and patients.

Scope for Future Research

Future studies may take a longitudinal approach (for example, assessing how security training affected training group incident rates over time). Before and after training assessments cannot demonstrate cause and effect and do not comprehensively measure longer impacts. However, using incident rates (for instance monitored before, and after training interventions), can demonstrate cause and effect and measure impacts long-term. Future studies may consider each aspect of security training-participation in simulation exercise, cyber hygiene, de-escalation strategies, etc.-upon reduction of variants. This information may be utilized for the development of evidence-based modular training curriculums. Future studies may also assess training outcomes by location (urban vs rural) or hospital type (private, public, military) to determine and characterize, inequities, and, develop policies to ameliorate such inequities.

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