

Evaluation the safety standards in the operating room of the medical education hospital of Iran University of Medical Sciences in the year is 2018

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ABSTRACT

Introduction and objective: As one of the main units in the hospital, the operating room constitutes the most important stage in the treatment of patients and because of the physical characteristics, existing medical gases and using diverse electrical devices, observance of safety tips is very important. The objective of this study was to appraise the safety standards observance in the operation rooms of the educational - therapeutic hospitals of Iran University of Medical Sciences. **Materials and Methods:** The current research is cross-sectional type that was conducted in 2018. The research environment and population consisted of all the operating rooms of the educational-therapeutic hospitals of Iran University of Medical Sciences. The used instrument was a graded scale to observe safety operating standards in the operating room (including five fields of physical safety-related standards, firefighting, personnel safety, patient safety, and infection control safety.) The mean and standard deviation were used to analyze the data. **Results:** The total compliance with safety standards in the hospitals was 75.30%. Also, the results disclosed that the patient's safety field had the highest compliance (80.79%). Based on the obtained results, Shahid Rajaee hospital operating room had the highest level of compliance rate (90.36%) and Shahid Motehari Hospital operation room manifested the lowest compliance rate with 65.86%. **Conclusion:** Generally, the results designate the acceptable statue of the studied operating room of the hospitals in line with observing the safety standards in the assessed fields. So, proper corrective measures have to be considered to supply the complete safety of the operating room for all components. With regard to observing the safety standards in line with infectious, which has the lowest percentage of compliance, managers should revise their training practices in this field and by means of new approaches of infection control (increasing the belief in the position of patient safety and the emphasis on personal protection), increase the effectiveness of training courses.

Keywords: Patient safety, Infection control, Operating room

Introduction

With regard to the safety issue, Harding recommended that the starting point of the discussions should be with the emphasis on accidents' prevention, though the entire prevention of incidents is not possible, all efforts should be concentrated on reducing incidents and minimizing their negative effects ^[1]. For that

reason, health centers managers should also do their responsibility to reduce the accidents risks at first by identifying all dangers and then emphasizing the improvement of safety standards ^[2]. Patient safety standards are a set of necessities that are critical conducting patient safety at the hospital level.

As stated by the World Health Organization (WHO), a safe hospital is a center that can provide accessible services to respond to natural disasters and realize its organizational responsibilities at maximum capacity instantaneously ^[3]. Based on their occupational safety and health management standards, the hospital's key role in providing care and reducing the effects of damages is equipping themselves ^[4]. Vredenburg, in his study, has considered employee participation, safety issues training, manpower recruitment policies, reward systems, management commitment, communication and feedback as effective actions in managing hospital environment safety ^[5]. Employees, in order to participate actively in safety plans,

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should receive training that is related to safety issues. By means of increasing knowledge, capabilities and required skills, this training help to do safety tasks completely, and this procedure also has a significant role in designating workplace risk and suitable procedures for preventing, modifying, or justifying these risks [6]. In an organization such as a hospital that is a potential place for incidents, the presence of flammable materials, medical gases, ionizing radiation, and chemicals needs critical care for preserving the patients' lives and employees' safety [7]. Hospitals to enhance their proficiency and performance in emergencies need organized plans and programs to deal with expected and unexpected events, and in this regard, while identifying appropriate control measures and trends, managers are also obliged to increase and enhance the hospital efficiency and developing the most appropriate standards.

Hospital service provider sections are divided into two clinical and diagnostic sections, that the correct, accurate and high-quality performance of both categories is related to compliance with safety standards. One of the most influential functional hospital system contexts, which has a significant role in accelerating clinical activities and providing superior services to patients, is the operating room units. The operating room is one of the most complex working environments in the health care system. This complication is obvious in patient related issues and treatment protocols, also using high levels of technology in the operating room [8]. The aim of observing safety tips in the operating room is to guarantee the operating staff safety and the undergoing surgery patient safety. Providing the essential security in the operating room is a group work and everyone has a common responsibility to afford their and the patients safety; consequently, the periodic examination of the required safety principles and matching it with existing standards is of particular importance because the economic resources and medical equipment limitations necessitate suitable space, carefulness and more thoughtfulness in the provision of services [9]. Investigating the operation room safety can be studied from several aspects that in the current study, controlling operating room infection, fire protection, staff safety and the physical and operational space of the operating room are considered.

In the current research, by means of investigating the safety standards in medical - training centers, identifying safety deficiencies and disadvantages and providing practical and suitable solutions to increase the safety and security index in the stated sections will be considered.

Method

The present study is a descriptive study that the levels of observing safety standards were designated in the operating room of the educational-therapeutic hospitals of Iran University of Medical Sciences.

The research environment and community included all of the operating room of the educational-therapeutic centers of Iran University of Medical Sciences. In this study, all of the

operating rooms of the educational-therapeutic hospitals of Iran University were selected by the census method.

The instrument used in this study was a graded scale of the lifesaving checklist in the operating room. By referring to the operation room, the researcher completed the graded scale by means of observation and interview with the head nurse of the operating room. This graded scale includes five fields of safety standards with regard to the physical environment (20 questions), firefighting safety standards (15 questions), personnel safety standards (14 questions), patient safety standards (12 questions), and infection control safety standards (22 questions). The way of scoring questions, a positive answer: score 3, somewhat: score 2, no answer: score 1, and then the average score of the field was obtained (the indeterminate answer was not considered in the calculations). The average scores for each field were considered as safety scores in that field. If the earned score was less than 80%, it will be considered as an unsafe area, and if it was 80% or higher, that field will be safe. The graded scale of this research was validated by means of a content method in the Mousavi's et al. research. The reliability of the graded scale was confirmed by the test-retest method in Mousavi's et al. research, and the reliability coefficient was reported as 80% [10].

In order to analyze data, mean and standard deviation were used for operating room safety standards variables.

Finding

In Table 1 the overall level of safety standards observance of the operating room of the studied hospitals is presented. Consistent with the results, Shahid Rajaei hospital operating room with 90.36% and Shahid Motahari Hospital operation room with 65.86%. Showed the highest level and the lowest level of observance, respectively.

Table 1. The level of observing the safety standards in the operating rooms of hospitals of Iran University of Medical Sciences

Hospital centers	Answer			Earned score	Score from 100
	No	Some what	Yes		
General Operating of Hazrat Rasoul (PBUH)	17	25	41	190	76.31
ENT Operation room of Hazrat Rasoul (PBUH)	23	25	35	178	71.49
The Neurological Operating Room of Hazrat Rasoul (PBUH)	29	23	31	168	67.47
Operation room of Imam Ali Asghar (AS)	21	13	49	194	77.91
Shafa Yahyaian Operating room	22	32	29	173	69.48
Shahid Rajaei Operating room	7	10	66	225	90.36
Shohaday-e Haft-e Tir	24	11	48	190	76.31

operating room					
Shahid Hasheminejad Operating Room	21	14	48	193	77.51
Firoozgar operating room	25	16	42	183	73.49
Shahid Mottahari Operatin room	31	23	29	164	65.86
Akbarabadi Operating Room	25	19	39	180	72.29
Firouzabadi Operating Room	26	18	39	179	71.89
Hazrat Fatima (SA)	11	22	50	205	82.33

With regard to the overall observance level of hospitals based on different regions, the results also showed that the patient safety field with 80.79% has achieved the highest level of standards observance. The fields of firefighting safety, physical safety, employee safety, and infection control safety were ranked next. The total observance level for safety standards in the hospitals was 75.30%.

Table 2. Observing safety standards in Iran University of Medical Sciences Hospital Operating Rooms – Based on different fields

Safety standards	Safety standard observing the score	Total score	Score out of 100
Standard Physical Safety	45.38	60	75.64
Safety of fire protection	34.08	45	75.73
Employee safety	30.77	42	73.26
Patient Safety	29.08	36	80.79
Infection Control Safety	46.92	66	71.10
Total	37.25	249	75.30

Discussion

The results disclosed that generally, the studied hospitals operating room observed 75.30% of the safety standards in the five separate fields, which is a relatively good state. Jahani et al. in a study on hospitals affiliated with the Babil University of Medical Sciences assessed the status of safety management at the moderate to high level ^[11]. In the Pourreza's et al. research in the diagnostic sections of the University Hospitals of Gilan City, the researchers evaluated the status of hospitals appropriate safety and in some cases quite appropriate ^[12]. In the Kiaei's et al. research, the results indicated that the overall safety level in the four hospitals was good (79.5%) ^[13]. In the Foji's et al. study, the results also expressed that the operating room of the hospitals affiliated with Sabzevar University of Medical Sciences had an acceptable safe level ^[14]. In contradiction of the results of this study, the Pourebrahim's et al. research designated that the safety management principles in the support and diagnostic sections of the studied hospitals in 80% of cases were not

observed and only in 20% cases it was inadequately observed. Controlling electrical, mechanical and medical equipment was not available in a programmed fashion in any of the units studied and examination was done only if needed ^[15].

Numerous researches conducted on safety in hospitals have emphasized the fact that experienced medical staff can be effective on the hospital safety, and perhaps the existence of such personnel in the studied hospitals is considered as another reason of safety status suitability ^[16]. With regard to the conducted studies, it is well clear that employee awareness of safety issues leads to accidents reduction in hospitals. Therefore the necessity of the hospital's safety committee activity and hospital management will be indisputable in this area ^[17]. Another reason for good safety condition in the studied hospitals is the personnel's awareness in the field of safety. Likewise, due to the fact that in accreditation measures special attention has been paid to safety and especially patient safety and infection control, these standards have also had a substantial impact on safety standards in hospitals. Since the head of the hospital as the responsible for safety at the hospital, in cooperation with the safety and accident committee management should prepare safety plans to eliminate possible deficiencies, prevent hazards and enhance the function in the event of a threat. The organization will expand. In addition to the organization leadership's role as an important factor in the safety plan success, other factors such as open occupational communication, the presence of error reporting system, the existence of a capable safety committee and the flow of safety culture in the organization are among the factors that lead to success or failure of a safety program ^[18, 19].

The results indicated that the observance level in the patient's safety field with 80.79% was the highest in line with standards compliance. In the Mousavi's et al. research, the patients' safety field earned the highest and the infection field earned the lowest score that is consistent with the results of the current study ^[20].

In line with the high score of patient safety standards, assuming that patient safety is a professional concern for all those involved in patient care, and patient safety is the first and most significant subject in professional identity, so paying attention to the patient's safety in the operating room is more than in other areas ^[21]. Numerous studies have been conducted on various dimensions of patient safety around the world, and most of them have considered the issues affecting patient safety as one of the most important fields of safety ^[21]. Christian et al. in a prospective study in line with patient safety in the operating room, considered the patient's safety as the most important feature of safety in the operating room. This study indicated that the way of employees' communication, losing information, increasing workload and job responsibilities are considered as the biggest threat to patient safety in the operating room ^[8]. One of the other reasons for considering patient safety is the culture of patient safety from the perspective of the staff. The results of Sharifi's studies in nurses of Mazandaran hospitals ^[22], Rezapoor's et al. research results in Tehran University of Medical Sciences Hospitals ^[23] and Almasi's et al. research results in Kermanshah University of Medical Sciences ^[24] also

indicated that according to the nurses the status of patient safety culture was moderate, and it is consistent with the results of the current study. These findings imply that the development of different dimensions of safety culture in the studied hospitals needs to be enhanced.

After the patient's safety, the safety of fire protection also acquired a high score, so that, it was 75.73% consistent with the standard. In the Pourreza's et al. research in the diagnostic sections of the University Hospitals of Gilan City, the importance of attention to fire extinguishing instruments has been highlighted to prevent the formation and development of fire ^[12]. In the study of Habibi et al. in the radiology section of the Isfahan university hospitals, the fire was introduced as one of the major hazards of the hospital and the importance of employees' attention to the principles of safety against fire and the elimination of fire risk factors has been considered ^[25]. In Kiaei's et al. research, the obtained results of the study showed the overall safety level in the four hospitals is in the good statue (79.5%). In the studied areas, only fire safety (32.3%) was considered to be weak ^[13].

In terms of compliance with safety standards physical safety and staff, safety was also ranked third and fourth and had a favorable condition. The results of the Fathi's research in the radiology section disclosed that the staff had a good safety status and used the required safety equipment in most of the situations, which signified an appropriate structure for training personnel and using safety recommendations by them ^[26]. The Zaboli's study results also designate the effective role of staff in reducing the number of accidents in the hospital ^[27]. The accessibility of suitable and trained personnel, using safety equipment, and the safety and accidents committee monitoring on this section were among the causes that made this level of safety possible in each of the understudy hospitals. Contrary to the results of the present study, in the studies by Chen et al. ^[28] and Alahmadi ^[29], the employee-related component was one of the weakest components, which is due to the inadequacy of nursing staff to work on the patient's bedside, which increases the probability of error. Since employees are very important as patient safety predictors, having a motivated and strong workforce is vital, which is one of the biggest challenges facing hospitals, ^[30]. According to the Sandar's and Cook's studies results, the major disasters in organizations that are dealing with in human resources shortage are more than organizations that are not faced with this problem ^[31].

The lowest score among the inspected field was related to infection control safety. This result is consistent with the Nurian's et al. study in the operating room of Shahrekord. The findings of this study uncovered that the quality of infection control features in the desired hospitals was far from international standards, among the main causes of the gap between standards are the lack of appropriate supervision and control on infection control by managers, using non-professionals in infection control cases such as disinfection of equipment by the operating room staff, lack of necessary facilities for observance of the principles of infection control, for example, insufficient equipment such as scrubs, masks, etc.

in some operating rooms, improper state of physical space of the operating rooms, such as floor coverings, doors, etc., lack of observing the infection control principles by those operating rooms staff, which included the most cases of violation of the standards ^[32], which is consistent with the obtained results of this study. It seems that managers should reconsider their training methods in this field and try to increase the efficiency of training courses by means of novel ways to control infection [increasing the trust in the importance of patient safety and the emphasis on personal protection). The results of the current study are not consistent with the studies by Jang et al. (2010) ^[33] and Carmel et al. (2005) ^[34], but were in line with the results of Erasmus et al. (2010) ^[35] and van Beeck et al. (2009) ^[36].

Nevertheless, the low score of some questions and standards cannot be related to employees, and there are numerous reasons effective on lack of some standards observance. Paying more attention to structural issues of safety in the hospital is necessary, which has been mentioned in numerous studies. Certainly, the presence of safety management in the organization is more important than safety, because the existence of safety thinking and management in the organization will lead to a safe environment in which not only threats will be considered, but also by applying the risk management principles and crisis plans, major probable risks will be identified and they will be reduced or eliminated.

Conclusion

In line with the overall compliance rate of hospitals in different regions, the results presented that the patient's safety field gained the highest standards of compliance. The safety fields of fire protection, physical safety, staff safety, and infection control were in the next ranks. By means of safety models and methods such as OSHAS Safety Management Standard, the safety management coverage coefficient can be increased in the hospital. The expectation of proper action of the safety and accident committee in hospitals, due to the fact that it is the only safety management reference, is subject to having appropriate management and organizational tools. Then, the safety and accident committee should be more active in line with complying safety policies in hospitals and, more importantly, to monitor them well. Given the hospital's mission and their systematic nature, it is necessary to implement crisis management plans in this hospital to provide appropriate responses to its mission, also an appropriate model has to be provided for other hospitals. Generally, the results specify that the studied hospitals operating room have an acceptable condition in line with the safety standards observance in the areas under assessment. Nonetheless, the necessity to pay attention to the problematic fields for increasing the safety factor for employees and patients in the operating room is important because the slightest violation of the safety rules and negligence in implementing related protocols will lead to the emergence of dangerous conditions. Consequently, proper corrective measures should be taken to provide the complete

safety of the operating room with regard to all of the components. While constantly reviewing the standards of the operating room, hospital managers and safety specialists must continually consider their continuous improvement.

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