Investigation of the Physical Ergonomic Conditions of the Operating Rooms in the Province of Izmir

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ABSTRACT

The aim of this study is to examine the physical ergonomic conditions of the operating rooms and to evaluate the risk factors in the hospitals of Izmir. This study was descriptive and cross-sectional design. The research was conducted in a total of 58 operating rooms of a university and eight hospitals of the health ministry. In the study, the data were collected by using the form of the ergonomic conditions and risk factors in the operating room by the researcher through observation in the operating theater rooms and face to face with the head nurses in the operating room. None of the operating rooms included in the study have a surgical smoke evacuation system (n: 58). At the same time, 5.2% of the operating rooms (n:3) do not have an evacuation system for anesthetic gases. The average hourly air changes of the operating rooms are 29.27 ± 4.40 times, all of which are open air. The average temperature of the operating rooms was found to be 20.29 ± 2.09 °C and the average humidity was found to be $36.48 \pm 14.40\%$. The noise level in the operating rooms (n: 58) included in the study was found to be 54.29 ± 7.85 dB (A). During the operation, 29.3% of the operating rooms do not have high stools used for the purpose of allowing the health personnel to rest for a short period of time. At the same time, there is no pressure absorbing mat in any operating room. No special equipment is available at any hospital for conditions such as transporting / lifting patients in operating rooms. As a result of the study, it has been found that the operating rooms which are evaluated as a result are inadequate in terms of physical and ergonomic conditions, such as surgical and anesthetic gas evacuation system, noise level in the operating room, equipment used for operations such as patient handling / lifting, high stool-pressure absorbing mat. It is important to improve the working health of the operating rooms that are inadequate in terms of physical ergonomic conditions.

Key Words: Ergonomics, Operating Room, Staff Health and Safety

1. Introduction

Ergonomically appropriate working environments are very important for staff safety. In terms of staff safety, ergonomics is closely related to the fact that physical conditions are sufficient. The operating room (OR) includes many ergonomic risk factors like standing for a long time, noise pollution, transport of surgical equipment that affect health. However, ergonomics is an issue that is overlooked in terms of the safety of health care workers in the OR. The operating room is one of the highest risk areas with regard to safety working in hospitals. It includes biological, chemical, physical and psychosocial risks for health care workers. One of the physical risks is the ergonomic problems that arise due to the inadequate ergonomic conditions in the OR. (Aslan ve Öntürk 2011; Sheikzadeh, Gore, Zuckerman, Nordin, 2009; Eren 2008; Parlar 2008). Unsuitable ergonomic conditions causes to the musculoskeletal system diseases on the OR workers. In addition, due to the inadequate ergonomic conditions, OR staff may experience falls, bumps, sprains and fatigue, nervousness, headache

(Korkmaz, 2015; AORN, 2013; Cebeci, 2013; Saygun, 2012, Çinal ve Demir, 2011; Resmi Gazete 2011; Devedakan, 2007). For this reason, it is important to evaluate the physical ergonomic risk factors of the OR and to make necessary improvements.

In Turkey and the World, work-related diseases and their causes have been researched and it has been found that physical ergonomic factors are also important. However, studies on the physical ergonomic status of OR environments could not been reached. It is important to examine the current physical ergonomic conditions and risk factors of OR, which are considered high risk for nurses. Therefore, this study was carried out with the aim of examining the physical ergonomic conditions of the ORs in the hospitals of İzmir province. It is thought that this study will allow to determine the adequacy and inadequacy of the current situation in the OR and to make the regulations.

2. Method

This study was descriptive and cross-sectional design. The research was conducted in a total of 58 operating rooms of a university and eight hospitals of health ministry. In the study, the data were collected by using the form of the ergonomic conditions and risk factors in the operating room by the researcher through observation in the operating theater rooms and face to face with the nurses responsible for the operating room. Used form was developed by researchers after the literature search was done. The data of the study were evaluated with the SPSS 20 package program. Descriptive statistical methods (number, percentage, mean) were used for the analysis of data.

3. Results

The characteristics of the hospitals and operating rooms in the sample of the study are given in Table 1.

Table 1. Features of Hospitals and Operating Rooms (n:58)

Hospitals	n	%
University hospital	36	62.1
Hospital of health ministry	22	37.9
Operating Rooms	Sayı	Yüzde
General Surgery	14	24.1
Urology	11	19.0
Orthopedics and Traumatology	9	15.5
Neurosurgery	7	12.1
Cardiovascular Surgery	4	6.9
Thoracic Surgery	3	5.2
Otolaryngology	3	5.2
Eye Surgery	2	3.4
Obstetrics And Gynecology	2	3.4
Transplantation	2	3.4
Pediatric Surgery	1	1.7
Total	58	100.0

None of the operating rooms included in the study have a surgical smoke evacuation system (n: 58). At the same time, 5.2% of the operating rooms (n:3) do not have an evacuation system for anesthetic gases. The average hourly air changes of the operating rooms are 29.27 ± 4.40 times, all of which are open air. The average temperature of the operating rooms was found to be 20.29 ± 2.09 °C and the average humidity was

found to be $36.48 \pm 14.40\%$. The noise level in the operating rooms (n: 58) included in the study was found to be 54.29 ± 7.85 dB (A) (Table 2.)

Table 2. Ventilation and Noise Properties of Hospitals and Operating Rooms (n:58)

Features	X ± SS	(min-max)
Temperature in operating room	20.29 ± 2.09	14.40-23.20
Air humidity in operating room (%) (n:56)	36.48 ± 14.40	17.00-80.00
Air pressure in operating room (Pa) (n:38)	2.43 ± 2.36	1-10
Hourly air change (number of changes) (n:18)	29.27 ± 4.40	20-36
Noise level in operating room (dBA)	54.29 ± 7.85	45.00-76.00

During the operation, 29.3% of the operating rooms do not have high stools used for the purpose of allowing the health personnel to rest for a short period of time. At the same time, there is no pressure absorbing mat in any operating room. All operating tables used in operating rooms have the ability to adjust to the position of the patient as well as the height of the healthcare personnel. However, in 5.2% of the operating tables (n:3), the ability to adjust to the size of the health personnel in charge at the tables is not working. No special equipment is available at any hospital for conditions such as transporting / lifting patients in operating rooms (Table 3.)

Table 3. Surgical Equipment Features of Operating Rooms (n:58)

Features	n	%
Booster equipment for health care workers with height difference		
Yes	55	94.8
No	3	5.2
High stool for health care workers		
Yes	41	70.7
No	17	29.3
Pressure-absorbing mat or health care workers		
Yes	0	0
No	58	100.0
Wheeled vehicle to transport surgical instrument kit		
Yes	58	100.0
No	0	0
Special equipment to transport patient		
Yes	0	0
No	58	100.0
Total	58	100.0

4. Conclusion

As a result of the study, it has been found that the operating rooms which are evaluated as a result are inadequate in terms of physical ergonomic conditions, such as surgical and anesthetic gas evacuation system, noise level in the operating room, equipment used for operations such as patient handling / lifting systems, high stool-pressure absorbing mat. It is considered that hospitals should establish a protocol for physical ergonomic conditions and pass on these protocols to progress positively in terms of employee safety. It is also important to improve the working health of the operating rooms that are inadequate in terms of physical ergonomic conditions.

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