

## A Survey on the Associated Factors of Stress among Operating Room Personnel

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**Background:** Experiencing stress can notoriously affect people's mental and physical health. A major source of stress can be the workplace environment. According to the numerous studies, job stress among nurses is relatively higher than that of the other jobs.

**Objectives:** The aim of this study was examination of the relation between workplace environment and stress among operating room personnel in the training hospitals of Ilam University of Medical Science (IUMS).

**Materials and Methods:** This cross-sectional study was performed on all personnel of operating rooms (operating room technicians, anesthesia technicians and nurses) in training hospitals of IUMS. Fifty subjects were selected by sequential sampling. To collect data, demographic data and job stress questionnaires (Cooper) were used. Data were analyzed by descriptive and inferential statistics tests such as Chi-square, Pearson correlation coefficient, ANOVA and T-test.

**Results:** Higher levels of stress were due to the fear of being infected by HIV and hepatitis patients with mean of 3.2 and 58%; and lack of weekends with mean of 3 and 44%. The lowest levels of stress were related to inadequate skills with mean of 2.18 and 32%, and environment light with mean of 2.14 and 34.7%. Stress was significantly related to job status, conflict of doctors and nurses as well as spouses' attitude about work ( $P < 0.05$ ). But there was no significant relation between stress and work shift, age, being experienced, type of hospital and marital status.

**Conclusions:** According to the pivotal role of environmental and mental factors in the emergence of stress among operating room personnel, several considerations such as increasing the level of knowledge regarding infections, providing adequate resting time and improvement of the communications should be given among operating room personnel.

**Keywords:** Stress; Personnel; Operating Rooms

### 1. Background

Stress is referred to a pressure that may disrupt the balance of the living system and organism (1). It arises when there is inconsistency between the one's understanding of needs and his/her abilities to meet such needs (2). Stressors are factors that can affect people's mental and physical health and consequently disturb their normal function (3). Gastrointestinal disorders, headache, dizziness and severe fatigue are among side-effects and complications of stress (4, 5). Among the many different types of stress, the stress attributed to workplace environment is the most common by means of which persons go through mental and physical pressures and may fail to achieve their career goals (6). Also, job stress arises when the requirements of a certain job are far more than one's capabilities; consequently, people may undergo unpleasant and obnoxious emotional and physical reactions (7).

US National Association of Professional Safety indicated that among 40 professions, nursing has the highest level of stress (5). In their study, Enger Mayer et al. concluded that nursing, compared to other professions, is more subjected to stress (8). In addition to mental and physical disorders, it leads to such aberrations as absence from work, burnout, and developing problems for their family and patients (8, 9) (10). Studies indicated various levels of stress among nursing personnel, ranging from 54.1% to 90% (11, 12).

The operating room is a complex, stressful and potentially hazardous environment. Risks have to do with patients' condition, competence of the surgeon to perform difficult procedures, team dynamics and organizational and environmental conditions (13). In addition, work pressures can result in decreased patient safety (14). This has been confirmed in a study by Elfering et al. that

#### Implication for health policy/practice/research/medical education:

According to the obtained results, there are different factors that induce stress in operating room personnel; accordingly, to reduce or remove the effects of stressors on occupational, individual and family behaviors and performances, concrete measures should be taken such as training the personnel about infectious diseases, providing adequate resting time and improvement of the communications.

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showed a direct correlation between stressful work situations and the patients safety (15). A review of over 300 empirical studies by Segerstrom and Miller) concluded that there is a direct correlation between workplace stress and the health of employees (16). Studies show that stressors present at operating rooms are of two types; stressors of the first type are mental stressors such as poor communication with team, and frequent and urgent need to decide, while stressors of the second type are physical environment factors such as light, moisture and structure of operating rooms (6). Other stressors are lack of job security, and variables such as working time, mortality of patients and possibility of providing wrong services to patients (17).

## 2. Objectives

Due to the importance of identifying stressors among the operating room personnel as well as inadequate studies in the field in Iran, this study was conducted to examine the relation between workplace environmental factors and stress among operating room personnel of IUMS training hospitals in 2012.

## 3. Materials and Methods

### 3.1. Subjects

This cross-sectional study was done among operating room personnel (operating room technicians, anesthesia technicians, and nurses) consisting of a total of 63 people. Of the 63 questionnaires distributed, 50 were completed. Study population was comprised of all the operating room personnel employed at the three training hospitals with different specialties of Ilam University of Medical Science (IUMS) with the following inclusion criteria: operating room technicians with associate degree and above, anesthesia technicians and nurses, with at least one year of work experience. They were all selected by sequential sampling. Subjects who did not wish to participate in the study, and subjects who had an irrelevant stressor outside the study environment were excluded.

### 3.2. Data Collection Tools

Data collection tools included two questionnaires. First questionnaire was developed by researchers and included physical environment and mental stressors and the second questionnaire was a Persian translation of the Cooper job stress test that was previously applied by researchers in other studies (6, 18-20). It included demographic variables too. Physical environment stressors included the structure and organization of the operating room, personnel equipment, working equipment, number of employees, level of moisture, heat, cold, light, unpleasant odors, chemicals, rays, fear of being infected

(HIV, hepatitis) and occupational hazard (such as contamination with secretions, blood and being injured by a needle). Mental stressors consisted of poor communication and collaboration with the team, bad planning, inadequate skills, urgent and frequent need to decide, and variables such as working time, lack of holidays, weekends and vacations. Questionnaires of physical environment and mental stressors included 20 questions in Likert scale with four options (never, sometimes, often, always) scoring from one to four. Demographic variables were age, gender, education, and marital status, work experience, working status, working shift and hospital workplace. Cooper standard questionnaire had 32 questions in Likert scale with four options (never, sometimes, often, always) scoring from one to four. Every subject answered the questions according to his/her corresponding level of stress. In this test, stressors were divided into four levels: lack of stress (> 32 scores), low stress (32 - 64 scores), moderate stress (64 - 96 scores) and severe stress (< 96 scores) (21).

### 3.3. Statistical Analysis

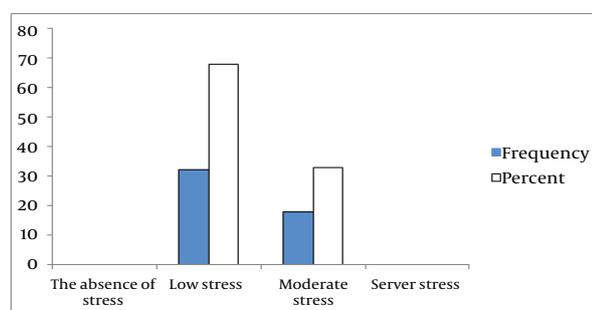
Validity of the questionnaires was approved by experts in behavioral and psychological sciences. Reliability of the questionnaires was estimated 90% by Chronbach's alpha coefficient. Data were analyzed by SPSS 16 using descriptive statistical methods (frequency, mean, standard deviation) and inferential statistics test (Chi-square, Pearson correlation coefficient, ANOVA and T-test). Subjects' consents were obtained and confidentiality of their data was maintained.

## 4. Results

Among the study population, majority of the subjects were female and married (68%). Additionally, 22 - 32 year age group was the most frequent (52%) age group of the study. The majority of operating room personnel had associate degree (66%) and 56% of the subjects had 1-8 years of work experience. Also, 50% of the subjects were operating room technicians and all of them had variable working time. Among physical environment stressors of the operating room, light had the lowest effect on the level of stress (34.7%) and the highest level of stress was related to fear of being infected by patients (58%). Among mental stressors of the operating room, the lowest and the highest level of stressors pertained to inadequate skills (32%) and lack of weekend and vacation time (44%), respectively. Among all physical environment and mental stressors of the operating room, light (34.7% and mean of 2.14), inadequate skills (32% and mean of 2.18) and fear of being infected (58% and mean of 3.24) were of highest importance (Table 1). Results showed that the majority (66%) of operating room personnel had low rates of stress (Figure 1).

**Table 1.** The Level of Physical and Mental Stress of the Operating Room Environment

Stressful Factors, Physical Environment and Mental	Never, No. (%)	Sometimes, No. (%)	Often, No. (%)	Always, No. (%)	Total, No. (%)
Operating Room Structure	15 (30)	14 (28)	15 (30)	6 (12)	50 (100)
Equipment and Personnel Resources	10 (20)	15 (30)	9 (18)	16 (32)	50 (100)
Working Equipment	6 (12.2)	21 (40.8)	11 (22.4)	12 (24.5)	50 (100)
Number of Employees	11 (22)	17 (34)	9 (18)	13 (26)	50 (100)
Moisture	12 (24.5)	22 (42.9)	11 (22)	5 (10.2)	50 (100)
Heat	9 (18)	14 (28)	16 (32)	11 (22)	50 (100)
Cold	12 (22.9)	21 (41.7)	9 (18.8)	8 (16.7)	50 (100)
Light	17 (34.7)	17 (34.7)	6 (12.2)	10 (18.4)	50 (100)
Unpleasant Odors	3 (6)	15 (30)	9 (18)	23 (46)	50 (100)
Chemicals	0 (0)	11 (22)	14 (28)	25 (50)	50 (100)
Rays	4 (8.2)	9 (18.4)	12 (24.5)	25 (49)	50 (100)
Type of Work	5 (10.9)	13 (24.1)	17 (32.6)	15 (30.4)	50 (100)
Fear of Being Infected (HIV, Hepatitis)	2 (4)	13 (26.1)	6 (12)	29 (58)	50 (100)
Occupational Hazard	3 (6)	13 (26)	10 (20)	24 (48)	50 (100)
Poor Communication and Collaboration with Team	6 (12)	27 (54)	9 (18)	8 (16)	50 (100)
Bad Planning	3 (6.1)	25 (49)	13 (26.5)	9 (18.4)	50 (100)
Inadequate Skills	16 (32)	17 (34)	9 (18)	8 (16)	50 (100)
Urgent and Frequent Need to Decide	11 (22.4)	23 (44.9)	9 (18.4)	7 (14.3)	50 (100)
Variable Working Time	8 (16)	22 (44)	13 (26)	7 (14)	50 (100)
Lack of Weekends and Vacation Time	4 (8)	14 (28)	10 (20)	22 (44)	50 (100)

**Figure 1.** Professional Life Stress Test Scores

There was a significant difference between stress and work status among operating room technicians having the highest level of stress ( $F = 4.793$ ,  $P = 0.013$ ). However, we did not detect any significant relation between gender, age, education, experience and marital status with stress (Table 2). Conflict with doctors and conflict with nurses were significantly related to spouses' attitudes toward work ( $P < 0.05$ ).

## 5. Discussion

This study showed that the majority of participants

were experiencing a low level of stress, most likely because they were young, so they had adequate physical and mental fitness. Yao et al. reported that majority of nurses (72%) experienced low rates of stress and a small group (23%) had severe job-related stress (22). In the study of Schaefer and Moos which was performed on 405 ICU nurses, level of job stress was reported to be normal (23). Elamo et al. conducted a job stress study on 1320 nurses and demonstrated a higher rate of job stress in this group (24). Examining the effect of demographic variables indicated a significant relation between work status and stress; anesthesia technicians had more stress compared to other operating room personnel. Noteworthy, the work status stress is probably due to the technicians' critical job as any mistake can lead to serious complications and even death. Another study performed by Khodaveisi et al. showed that stress occurred among 70.4% of operating room personnel and among 8.7% of ICU staff (25). Results of the study of Santa Maria and Sullivan conducted on 47 people showed that this group experienced higher stress rates (26). In the present research, a significant relation was detected between stress and the quality of the relationships nurses had with physicians and other colleagues. Conflict with colleagues can cause improper communication and collaboration and this in turn leads

to a sense of diminished mental and social support received from colleagues (27).

**Table 2.** Relation Between Stress and Demographic Variables

Demographic Variables	Mean $\pm$ SD	P value
<b>Age, y</b>		0.069
22 - 32	60.03 $\pm$ 8.65	
32 - 42	57.50 $\pm$ 10.20	
42 - 52	58.00 $\pm$ 18.63	
<b>Gender</b>		0.190
Female	59.26 $\pm$ 8.86	
Male	58 $\pm$ 12.53	
<b>Education</b>		0.242
Degree	60.42 $\pm$ 9.20	
BA	55.00 $\pm$ 8.53	
MA	59.66 $\pm$ 22.54	
<b>Position</b>		0.013
Operating Room Technician	62.96 $\pm$ 10.74	
Anesthesia Technician	54.93 $\pm$ 7.48	
Nurse	54.50 $\pm$ 7.97	
Shift, in Circulation	58.86 $\pm$ 10.06	0.05
<b>Hospital Work</b>		0.833
Imam Khomeini	58.29 $\pm$ 10.32	
Shahid Mostafa Khomeini	59.94 $\pm$ 10.33	
Taleghani	57.50 $\pm$ 8.88	
<b>Experience, y</b>		0.144
1 - 8	60.89 $\pm$ 8.50	
10 - 19	57.93 $\pm$ 9.27	
20 - 30	52.71 $\pm$ 15.37	
<b>Marital Status</b>		0.082
Single	59.25 $\pm$ 8.12	
Married	58.50 $\pm$ 11.73	

The significant association between stress rate and the spouses' attitude toward work shows that if people do too much activity and spend too much energy, they may become more exhausted which may eventually lead to troubles among family members. A study performed by Mehrabi et al. on nurses showed that among job stressors, conflict with physicians caused highest rates of stress (28). Roberts et al. suggested that poor communication and collaboration with team was one of the job stressors in the nursing profession; also a large part of stress could come from inter-personnel relationships and job-related issues (29). The study conducted by Caregnato RC et al. performed on the interviews of 32 surgical team members suggested that inter-personnel relationship is one of the major stressors (30). According to findings of the present study, light had the lowest level of importance

as a stressor in physical environment while the highest level of stress was attributed to the fear of being infected (HIV and hepatitis). Working in hospitals and clinics with poor physical standards and equipments such as light, heat, cold etc. may result in physical and mental problems for nurses (27). Results of a study by Fathi showed that light is one of the major sources of environmental stress in the ICU (31). Ahangarzadeh et al. also introduced inadequate light and limited space as physical environment stressors (18). Fear of being infected can result from occupational hazards such as contamination with secretions, blood and injury by a needle and syringe. Blegen et al. reported that taking care of the infected patients is one of the major sources of stress among nurses (32).

Among the mental stressors of operating room, inadequate skills and lack of weekend and vacation time were related to the lowest and highest levels of stress, respectively. The more nurses feel they have insufficient skills, the more they feel disqualified for the job and this in turn leads to stress. Michie et al. showed that skills being increased by nurses can reduce job stress (33). In the study by Khodayar on nurses, 48% of the personnel complained about work overload and lack of vacation (34). In the present study, there was no significant relation between age, gender, work record, educational degree, marital status and stress. Juthberg et al. showed that there is a negative and significant relation between age and stress (35). Also, Sherbafnejad suggested that a significant relation exists between age and job stress (36). However, the study of Shahraki Vahed demonstrated that there was no significant relation between nurses' ages and job stress (37). Also, a significant association was reported between experience and job stress in the study of Lee et al. among nurses (38). In the study performed by GhulamNejad on 140 nurses of various wards, a direct and significant correlation was reported between job stress and gender (39). In another prospective study conducted by Eriksen et al. on nurses a significant inverse correlation was found between work experience and stress (40). In the study by Asad Zandi on 272 nurses working in military hospitals, there was a significant association between stress and education level (41). In this study, the insignificant relation between such variables and stress may be due to the small sample size.

Findings of this study showed that the majority of subjects had low stress rates. Operating room technicians were experiencing higher rates of stress compared to the other operating room personnel. According to the obtained results, different factors may induce stress in operating room personnel. Accordingly, to reduce or remove the effects of stressors on occupational, individual and family behaviors and performances, several important steps such as training the personnel about infectious diseases, providing adequate resting time and vacation for the staff and improvement of the communications should be taken.

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## Authors' Contribution

Yosra Azizpour: %40; Masoumeh Shohani: %40; Kourosh Sayehmiri: %10; Sattar Kikhavani: %10

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