

STRESS AMONG ANESTHESIOLOGY NURSES/TECHNICIANS WORKING IN THE INTENSIVE CARE UNIT (ICU): EXPERIENCES AND COMPARISONS

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SUMMARY

Background: The International Labour Organization (ILO, 2000) has defined stress and exhaustion from working shifts and night work, and psychological and organizational stressors conditions that create health risks for surgical nurses. Among the OR nurses/ technicians 41.9% reported that causes of their stress included inadequate teamwork, ineffective communication, and especially surgeons' negative attitudes.

Subjects and methods: The study has been held in Clinical Hospital Centre Split, the sample consists of a total of 62 out of 109 possible respondents participated in the study. A total of 23 (37%) anesthesiology technicians and 39 (63%) ICU nurses / technicians participated in the survey. In the empirical part of this research, the importance of selected stressors was tested using quantitative methods in biomedicine. The existence of stress was tested by the Wilcoxon test.

Stress level in the ICU was tested by T-test. The analysis was elaborated in the statistical software STATISTICA 12. Conclusions were made at a significance level of 5%. The research was conducted through the questionnaire taken from the paper Milan Milošević entitled: "Development of a measuring instrument of stress in the workplace hospital health professionals and an assessment of its use value" (2010).

Results: Based on the empirical t value of 3.42 at 59 degrees of freedom the conclusion is that there was found a statistically significant difference in the level of stressors in the workplace between nurses / technicians in the ICU and anesthesiology technicians. The conclusion was reached at an empirical level of significance <0.001.

Conclusion: The highest level of stress among medical staff is caused by the factor of insufficient number of employees, followed by work overload, inadequate material resources for work (financial constraints), poor organization at work, and the factor of poor communication with superiors.

Key words: stress – anesthesiology – nurses – technicians - Intensive Care Unit

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INTRODUCTION

Stress in the workplace is an issue of growing concern. There is an increasing recognition that job stress has significant implications for the physical and mental wellbeing of workers and costs for employers and the economy (Russell et al. 2018). It ranks second in the scale of health problems of employees in the European Union, and according to a survey by the European Agency for Safety and Health at Work, it is present in every third worker in the European Union (28% or 41.2 million workers, more women than men) (Juras et al. 2009). A recent European Enterprise and Emergency Risk Survey (ESENER), covering more than 28,000 businesses in 31 countries across Europe, found that work-related stress being reported as one of the key concerns regarding to occupational safety and health in European companies. Only about half of the companies surveyed have reported informing their employees about psychosocial risks and their effects on health and safety, and less than a third had procedures in place to address work-related stress (Wynne

et al. 2014). In the world research of work stressors so far, six main areas of their source have been identified: job requirements, work role and responsibilities, lack of control over the job requirements, lack of work environment support, poor interpersonal relationships and changes in work (Lipnjak 2011). Frequent or sustained activation of brain systems that respond to stress can lead to heightened vulnerability up to a range of behavioural and physiological disorders over a lifetime (Shonkoff et al. 2014). The International Labour Organization (ILO 2000) has defined the conditions that create health risks for surgical nurses as injuries caused by sharp objects used during surgery; exposure to anesthetic gases, medications, and radiation; the effects of disinfectants, sterilizing gas and other cleaning agents on the skin, mucosal, and respiratory systems; burns from contact with hot surfaces, electricity, or fires; musculoskeletal problems, most commonly lumbar pain from lifting heavy patients and fatigue, and lower extremity problems from standing for long periods; stress and exhaustion from working shifts and night work, and psychological and organiza-

tional stressors. The study showed participants' exposure to psychosocial and cultural risks. Over 43% of the participants defined the OR environment as stressful, and 48.6% defined it as very stressful. Among the OR nurses/technicians 41.9% reported that causes of their stress included inadequate teamwork, ineffective communication, and especially surgeons' negative attitudes (Ugurlu et al. 2015).

Stress at work causes illness, less motivation among workers, unproductivity and a feeling of less self-confidence in one's own work abilities at work. Good work organization as well as good results of the professional activity are the best ways to prevent stress at work. Employers should be able to identify workers under stress and introduce intervention measures to reduce stress at work (Lazarus et al. 1984). Thus, work-related stress may be prevented or counteracted by organisational redesign (e.g. by empowering the employees, and avoiding both - over and underload), by improving social support, and by promoting reasonable reward for the effort invested. And of course by adjusting occupational physical settings to the workers' abilities, needs and reasonable expectations (Levi 1999). Consequences of stress that could provide linkage to health conditions have been identified, such as increases in smoking, substance use, accidents, sleep problems, and eating disorders. Populations that live in more stressful environments (communities with higher divorce rates, business failures, natural disasters, etc.) smoke more heavily and experience higher mortality from lung cancer and chronic obstructive pulmonary disorder (Colby et al. 1994). According to the Institute of Public Health in Croatia, every third person smokes, which puts us at the very top of the world in terms of cigarette consumption, and every other Croatian smoker smokes an average of 15-24 cigarettes a day. Physiological responses to stress include increased cortisol levels, higher cholesterol levels, increased blood pressure, palpitations, chest pain, insomnia, the appearance of some cancers, indigestion, headaches, musculoskeletal problems, and decreased immune function (McCunney et al. 1994). Following the perception of an acute stressful event there is a chain of changes in the nervous, cardiovascular, endocrine, and immune systems. These changes constitute the stress response and are generally adaptive, at least in the short term (Schneiderman et al. 2005).

SUBJECTS AND METHODS

The aim of this research is to examine the differences in the perceived level of stress caused by different aspects of the work in the hall in anesthesiology technicians and nurses/technicians of the ICU in Clinical Hospital Centre Split.

Respondents

A total of 62 out of 109 possible respondents participated in the study. Respondents who did not participate were prevented due to sick leave, maternity leave, or did not want to participate in the survey (16 employees). A total of 23 (37%) anesthesiology technicians and 39 (63%) ICU nurses/technicians participated in the survey. According to the gender of the surveyed health care staff, a larger number were women, 54 of them (87.10%), compared to the number of surveyed male staff, 8 of them (12.90%). The largest number of surveyed health care staff was aged 18 to 35, 33 of them (53.23%), who made up the majority of respondents. The smallest number was in the age group between 56 and 65, 3 of them (4.84%). According to marital status, the largest number of examined medical staff was married, 36 of them (58.06%). The largest number of surveyed staff had completed secondary education, 30 of them (48.39%). The most common form of working time among the surveyed health professionals is in three shifts (morning, afternoon, night), which is characteristic of the largest number of respondents 33 (53.23%). 21 (33.87%) examined health workers work in the morning shifts and on duty (24 hours), while 5 (8.06%) examined health workers work in two shifts (morning, afternoon), and 3 (4.84%) health workers. employees work only in one shift.

Methods

In the empirical part of this research, the importance of selected stressors was tested using quantitative methods in biomedicine. The existence of stress was tested by the Wilcoxon test. Stress level in the ICU was tested by T-test. The analysis was elaborated in the statistical software STATISTICA 12. Conclusions were made at a significance level of 5%.

The research was conducted through the questionnaire. The first part of the Questionnaire contains general data related to socio-demographic characteristics (gender, age, level of education, occupation, professional degree, job, length of total employment, length of employment in the current job, working hours). The second part of the questionnaire contains questions related to stressors in the workplace, which were used in further statistical processing to develop a measuring instrument for assessing stress at work of health professionals employed in hospitals. Respondents were offered 37 job claims related to work organization, shift work, professional advancement, education, professional requirements, interpersonal communication, communication of health professionals with patients and the fear of dangers and harms in health care. Respondents rated their experience of a particular stressor using the Likert scale (Milošević 2010).

RESULTS

According to the workplace, the largest number of respondents are nurses/technicians employed in the ICU of 39 people (62.90%), while anesthesiology technicians are represented in the sample with 23 people (37.10%).

The largest number of surveyed health professionals are employed for an indefinite period of time 55 (88.71%), while temporary employees are represented in the sample of 7 respondents (11.29%).

Stress at work using stressors was examined through a set of claims that collected data on stressors. The largest number of nurses/technicians despite gender, age, level of education and length of service showed a high level of stress caused by poor organization at work 23 (37.7% of respondents), time constraints for examining

patients due to stress 17 (29.31% of respondents), poor level of communication with superiors 22 (36.07%), low opportunities for progress and promotion 21 (34.43%), insufficient number of employees 28 (45.90%). Using the methods of descriptive statistics, the mean values and indicators of stress dispersion according to stress factors are presented (Table 1).

From the table of descriptive statistics from the table with associated empirical Z and p values of the Wilcoxon test it was found that the highest level of stress among medical staff despite gender, age, level of education and length of service was caused by insufficient staff, followed by work overload, poor organization at work, and poor communication with superiors. The total stress level represents the cross-section of stress caused by all observed stress factors (Table 2).

Table 1. Aggregate frequency distribution on stress factor claims

		1	2	3	4	5
There is poor organization at work	No. of respondents	7	5	14	12	23
	%	11.48	8.20	22.95	19.67	37.70
The time limit for examining patients make me stressed	No. of respondents	5	15	10	11	17
	%	8.62	25.86	17.24	18.97	29.31
The introduction of new technologies is stressful for me	No. of respondents	18	17	10	6	9
	%	30.00	28.33	16.67	10.00	15.00
It is stressful for me to be "bombarded" with new information from the profession	No. of respondents	15	17	10	8	10
	%	25.00	28.33	16.67	13.33	16.67
The lack of proper continuing education causes me stress	No. of respondents	7	7	18	13	16
	%	11.48	11.48	29.51	21.31	26.23
The unavailability of the necessary literature causes me stress	No. of respondents	8	14	18	8	13
	%	13.11	22.95	29.51	13.11	21.31
Inadequate material resources for work (financial constraints) cause me stress	No. of respondents	2	5	18	18	18
	%	3.28	8.20	29.51	29.51	29.51
Poor communication with superiors causes me stress	No. of respondents	6	8	13	12	22
	%	9.84	13.11	21.31	19.67	36.07
Poor communication with colleagues causes me stress	No. of respondents	11	18	15	8	9
	%	18.03	29.51	24.59	13.11	14.75
The low possibility of advancement and promotion causes me stress	No. of respondents	10	13	11	6	21
	%	16.39	21.31	18.03	9.84	34.43
Insufficient staff causes me stress	No. of respondents	2	7	8	16	28
	%	3.28	11.48	13.11	26.23	45.90
Everyday unforeseen or unplanned situations cause me stress	No. of respondents	3	10	16	12	18
	%	5.08	16.95	27.12	20.34	30.51
Conflicts with a superior cause me stress	No. of respondents	5	12	17	10	17
	%	8.20	19.67	27.87	16.39	27.87
Conflicts with colleagues cause me stress	No. of respondents	4	20	13	11	13
	%	6.56	32.79	21.31	18.03	21.31
Conflicts with other co-workers (nurses, clerks, etc.) cause me stress	No. of respondents	1	20	19	7	14
	%	1.64	32.79	31.15	11.48	22.95
24-hour responsibility causes me stress	No. of respondents	7	11	17	7	16
	%	12.07	18.97	29.31	12.07	27.59
Inadequate expectations from patients and family cause me stress	No. of respondents	11	14	16	9	10
	%	18.33	23.33	26.67	15.00	16.67

Table 2. Descriptive statistics of high-level stressors

Statement – stress factor	N	Average	Median	Q1	Q3	St. dev.	Z	P
Insufficient staff causes me stress	61	4.00	4.00	3.00	5.00	1.17	5.074	<0.001
I feel overwhelmed with work	61	3.79	4.00	3.00	5.00	0.91	4.982	<0.001
There is poor organization at work	61	3.64	4.00	3.00	5.00	1.37	3.206	0.010
Poor communication with superiors causes me stress	61	3.59	4.00	3.00	5.00	1.36	3.151	0.002
The lack of proper continuing education causes me stress	61	3.39	3.00	3.00	5.00	1.31	2.187	0.029
Conflicts with a superior cause me stress	61	3.36	3.00	2.00	5.00	1.30	2.281	0.023

Table 3. Total stress levels

Stress level	N	%	Cumulative series (%)
1	0	0.00	0.00%
2	4	6.56	6.56%
3	23	37.70	44.26%
4	20	32.79	77.05%
5	14	22.95	100.00%
Total	61	100.00	100.00%

Table 4. Overall level of workplace stressors

	N	Average	Median	Q1	Q3	St. dev.	t-value	P
Total level of stressors in the workplace	61	3.24	3.08	2.52	3.88	0.86	2.15	0.036

Table 5. Total level of stress factors at the workplace

	Average - n/t	St. dev. - n/t	Average – a.t.	St. dev. – a.t.	t-value	df	P
Overall level of stressors at the workplace	2.97	0.71	3.69	0.92	3.42	59	0.001

n/t: nurse/technician at the ICU; a.t.: anesthesiology technician;

T-tests; Grouping: Position: Group 1: nurse/technician at JIL Group 2: anesthesiology technician

The table shows that most of the examined medical workers have moderate stress levels (value 3) (Table 3).

Overall stress levels were obtained based on agreement with all claims about stressors. The average level of total stress is 3.24 (SD=0.86), while based on the empirical p value of 0.036, brings to the conclusion that high level of stress is present among health professionals, when working under above described conditions (Table 4).

Based on the empirical t value of 3.42 at 59 degrees of freedom the conclusion is that there was found a statistically significant difference in the level of stressors in the workplace between nurses/technicians in the ICU and anesthesiology technicians. The conclusion was reached at an empirical level of significance <0.001 (Table 5).

DISCUSSION

The research confirmed that the medical staff performing the work of anesthesiology nurses/technicians in the ICU perceive their workplace as a source of stress. By comparing the level of stress among the respondents, it can be determined that the level of stress among anesthesiology technicians is higher compared to the nurses in the ICU. Most studies focused on nur-

ses, and it was harder to figure out what kind of medical staff was taken into consideration when it came to operating room staff. There are numerous studies that have investigated work stress among health professionals in many countries. Most of the studies focused on nurses, but by searching the database through the University Library in Zagreb we found that studies were not always clear about what type of medical staff participated in the research, but the main focus was on nurses and / or all operating room staff (AbuAlrub 2004). The largest number of medical staff showed a high level of stress caused by poor organization at work (23; 37.7% of respondents), time constraints for examining patients (17; 29.31% of respondents), poor level of communication with superiors (22; 36,07%) which leads to the conclusion that poor communication, organization and education are main causes for stress on work. This research does not clarify the mechanism of social support, but it suggests that co-workers and superiors at all levels should consider the importance of mutual support that increases security, mutual respect and positive feelings in general.

Work support shows a strong association with work tension and a strong positive relationship with work performance perception (Laschinger et al. 1997). Psychological support, on the other hand, has a strong positive

effect on job satisfaction and a strong negative impact on hard work. Likewise, as the perceptions of support increased, nurses reported less emotional exhaustion and depersonalization, and a greater sense of personal success, (sample of 263 American hospital nurses and 40 non-American nurses who were accessible via Internet) (Hatcher et al. 1996). Various studies have been designed to evaluate ways to relieve stress. Numerous studies have proven the importance of social support and empowerment. Although social support is an ambiguous construction, the importance of collaborative support has been confirmed in various studies. In other studies "organizational support" has been shown to be important in a work environment where respondents who feel supported report less subjective feelings of exhaustion (Blau et al. 2003).

A recent European Enterprise and Emergency Risk Survey (ESENER), covering more than 28,000 businesses in 31 countries across Europe, found that despite work-related stress being reported as one of the key concerns regarding occupational safety and health in European companies, only about half of the companies surveyed reported informing their employees about psychosocial risks and their effects on health and safety, and less than a third had procedures in place to address work-related stress (Lipnjak 2011). Feeling vulnerable to professional self, insecurity, increased level of anxiety, the possibility of more frequent feelings of guilt and/or shame due to insufficient level of professionalism, which also favors obsessive thinking in this sense.

With all the importance of anesthesia interventions in ICU, the epidemic caused by SARS-COV-2 virus and COVID-19 disease has led to the full expression of the burden that exists in such work, especially because the direct danger was shown for medical staff for the first time. With a high level of responsibility for the patient's condition working in the intensive care unit, and the level of pathophysiological risk in the situation of spreading infectious diseases, which in addition to the common flu is now shown as the extremely high virulence Covid-19, shows an unprecedented risk of health care. A new threat to one's own health and responsibility for the transfer of contagion and psychosocial threats to family life and the general intimate circle, and beyond. There is an exhaustion of compensatory mechanisms that reflect the cognitive-emotional balance of individual members of the health team, which is then further reflected in the defensive/avoidant behavior and ultimately absence from work due to emotional exhaustion. Prolonged emotional exhaustion is often expressed not only in terms of psychological but also psychosomatic functioning in the form of a spectrum of psychosomatic reactions. Working on communications frees up the exchange of experiences and one's own experience of demanding professional tasks, which facilitates "peer supervision", ie the division of perceptions and experiences. To the extent that this spontaneous exchange is

placed within the framework of supervisory meeting at certain intervals and through fixed time limits, the exchange of observations, therapeutic experiences and one's own emotional reactions is condensed and stimulated. In this way, very valuable personal experience is added to professional knowledge and constantly mutually fertilized by exchanges.

CONCLUSION

Total stress level represents the cross-section of stress caused by all observed stress factors encountered by anesthesiology technicians and nurses. The largest number of surveyed medical professionals shows moderate levels of stress (value 3). Stress level results were obtained based on agreement with all claims about stressors. The average level of total stress is 3.24, while based on the empirical p value of 0.036, it can be concluded that a high level of stress is present among health professionals. In this study the largest number of medical staff surveyed showed a high level of stress caused by the poor organization at work (37.7% of respondents), time constraints for examining patients (29.31% of respondents), poor level of communication with superiors (36,7%), low opportunities for progress and promotion (34.43%), insufficient number of employees (45.90%). Other similar researches conducted around the world show the similar results. The highest level of stress among medical staff is caused by the factor of insufficient number of employees, followed by work overload, inadequate material resources for work (financial constraints), poor organization at work, and the factor of poor communication with superiors. Existence of statistically significant difference in levels of stress on workplace among JIL's nurses/technicians and anesthesiology technicians was concluded on basis of empiric t value of 3,42 with 59 degrees of freedom. Conclusion was made with empiric significance value of <0.001. According to the Union of Autonomous Trade Unions of Croatia, the Croatian workers are at the very bottom of the European Union on the scale of the satisfaction with the quality of their workplace. Research has shown that in Croatia the workplace is one of the most common places where there are no rules established regarding human relations on workplace, and misbehaviour is rarely punished. The superiors are mostly misbehaved (Pintarić et al. 2017). Most employers in Croatia did not bring any special rulebooks on the procedure and measures for the protection of the dignity of workers. They did not include any measures for dignity protection of workers and the protection against discrimination in their interior rules and procedures (Hranj et al. 2017). The prevention of psychosocial risks affecting the mental health of employees is not, or not properly, implemented in Croatia, as is the systematic control of protection against physical injuries (Soltanmoradi et al. 2017).

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Contribution of individual authors:

Andrea Russo participated in the design of the study, analyzed the data results and interpretation of data.

Ana Slišković participated in analyses, in statistical analyses and interpretation of data.

Anđela Paštar participated in patient enrollment and questionnaire distribution, in literature searches, analyzed the data results, took part in interpretation and formatting of data.

Ivan Urlić interpretation of data.

Zorana Škare contributed to the write up and the final appearance of the paper.

Rosanda Mulić participated in statistical analyses and interpretation of data.

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