

Dynamics of the Influence of Functional Stress on the Development of Burnout Syndrome in Nurses

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Abstract Researchers from the medico-psychological, general psychological, psychological and pedagogical points of view consider emotional exhaustion syndrome as a medico-psychological phenomenon. Determining the functional state of a person and its changes under the influence of various stimuli in natural conditions is a very important and at the same time difficult task. When studying the development of the burnout syndrome, priority should be given not only to psychological, but also to physiological methods of research, since they allow an accurate assessment of the potential capabilities of the body and identify early changes in the functional state under the influence of various loads.

Keywords Burnout syndrome, Chronic fatigue, Functional stress, Attention, Anxiety

1. Introduction

It is very important to determine the changes in the functional status of secondary medical personnel under the influence of various loads during their career. Because not only psychological, but also physiological factors influence the development of fatigue syndrome [1,2,3 and 6].

Under the influence of a certain level of load on the central nervous system and cardiovascular system, changes in the functional state of the body, including decreased attention, increased heart rate as a result of increased workload, and early detection of chronic fatigue of the body make it possible to detect early symptoms of emotional exhaustion syndrome [4,5].

2. Materials and Methods

The sample consisted of nurses operating in the above-mentioned medical institutions, based on the goals and objectives of the study, totaling 100 people.

A set of methods characterizing the functional state of the organism was sorted out. Various indicators of the central nervous system and vegetative shifts were taken as available indicators of the dynamics of functional states. Indicators of the dynamics of functional states are used, which usually include various parameters of activity, including cardiovascular, neuromuscular.

Methods for assessing the physiological state:

1. Determination of the Ruffier-Dixon index based on measuring pulse rate before and after dosed loading. The state of the cardiovascular system was determined by the level of arterial blood pressure and pulse rate. Determining your heart rate is the simplest, most convenient and accurate way to assess the impact of various factors on the human body. A change in pulse rate is a universal reaction of the body in response to any load. The Ruffier-Dixon index made it possible to characterize the ability of the body of the nurses under examination to bear the burden.
2. One of the effective criteria for the level of Health is the adaptive potential of the circulatory system. In our study, we also used the method of assessing the adaptive potential of the circulatory system proposed by Baeovsky in 1987.
3. In order to determine and evaluate the effectiveness of the process of attention, which are considered indicators of the functional state of the central nervous system, B. reflecting the mental performance developed by us in Experimental Psychology. We used Bordeaux's proofreading test. In the Burdon exam: indicators such as the time spent on work, the total number of letters seen up to the last selected letter, the total number of rows considered, the total number of letters to be considered, the total number of letters considered, the correctly selected letters, the total missed letters, the amount of mistakenly selected letters are determined.
4. We used the "HAM" questionnaire for a quick assessment of the functional states of the study participants – health, activity and mood. In the study, the daily working capacity of nurses was studied as a subject of analysis. The main indicators of a change in

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status in this situation are a change in the quantitative and qualitative characteristics of work efficiency.

Methods for assessing the emotional state:

1. Determination of the level of emotional exhaustion Syndrome K. Maslach and S. N of the "MBI" survey" produced by Jackson. E. It was carried out using the option adapted by Vodopyanova. The questionnaire included a list of questions of a hygienic, professional and psychological nature, questions about the mode of work and rest, the state of Health and the distribution of overtime.
2. To identify reactive and personal anxiety was used the questionnaire which proposed by Charles D. Spielberger and adapted by Yuri Khanin. As a personality trait, it is very important to assess anxiety, since this trait largely determines the behavior of the subject. A certain level of anxiety is a natural and mandatory characteristic of the active activity of an individual. Each person has their own acceptable or desired level of anxiety, which is called beneficial

anxiety. Assessing a person's condition in this regard is an important component of self-control and self-education for him. The survey consists of 40 affirmations, the first half of which allows you to identify reactive anxiety, the remaining 20-personal anxiety.

3. The HADS hospital scale helped nurses determine the level of anxiety and depression. The anxiety and depression scale (HADS) consist of fourteen elements, seven of which are questions about anxiety and seven about depression.

3. Results and Discussion

Studies have shown that, according to HAM, the performance of secondary medical personnel changes significantly under the influence of the production load. The pre- and post-workout results of the HAM test in nurses are presented in figures 1 and 2.

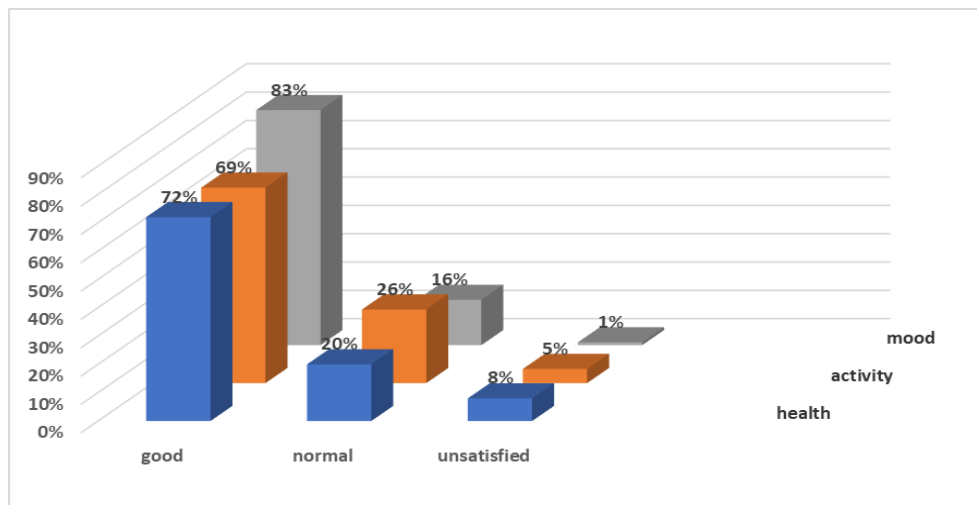


Figure 1. Pre-employment results of HAM test in nurses

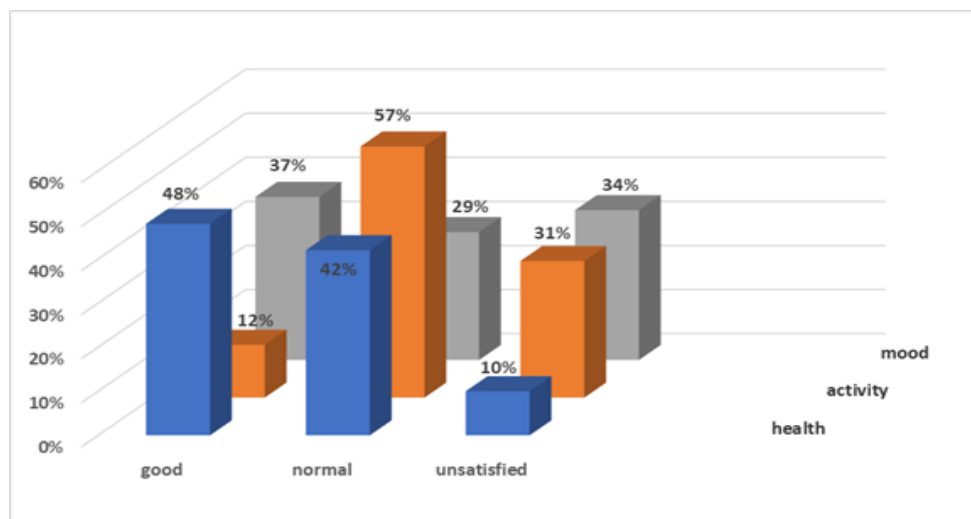


Figure 2. Post-employment results of HAM test in nurse

As it can be seen from the given data, due to the workload of the nurses, fatigue, negative mood changes and a significant decrease in the level of activity were observed. As a result of these changes becoming chronic, medical workers may be more susceptible to the early development of emotional exhaustion syndrome.

We used a technique developed in experimental psychology - Burdon's Corrector test (1997), which reflects mental performance, to determine and evaluate the effectiveness of the attention process of nurses. Concentration of attention (CA), stability of attention (SA) and fatigue index (FI) were evaluated in the correction test.

As an additional criterion confirming fatigue of the central nervous system, the dynamics of the attention index was calculated, and a significant decrease in the level of attention concentration and stability of attention concentration was found in the studied group (Table 1).

Thus, the average value of the level of attention concentration before work for nurses was $82.0 \pm 3.84\%$, which indicates a very good concentration of attention.

After work, these indicators decreased to $60.0 \pm 4.87\%$, respectively, it is worth noting that attention concentration decreased to medium level.

Table 1. Dynamics of changes in the level of concentration of attention

CA Levels (%)	Manifestation of CA level	
	Before work	After work
Very good 81 - 100%	$56 \pm 4.9\%$	$41 \pm 4.91\%$
Good 61 - 80%	$34 \pm 4.73\%$	$39 \pm 4.71\%$
Middle 41 - 60%	$10 \pm 3.0\%$	$13 \pm 3.36\%$
Bad 21 - 40%	-	$5.0 \pm 2.17\%$
Very bad 0 - 20%	-	$2.0 \pm 1.4\%$

Note: * - statistically significant difference ($P < 0.05$).

Based on the table above, significant changes were found when analyzing the stability of attention concentration. The SA before work for nurses was 8.06 ± 0.21 points, and it was found that it decreased to 5.7 ± 0.24 points after work (Table 2).



Figure 3. Dynamics of fatigue index in nurse

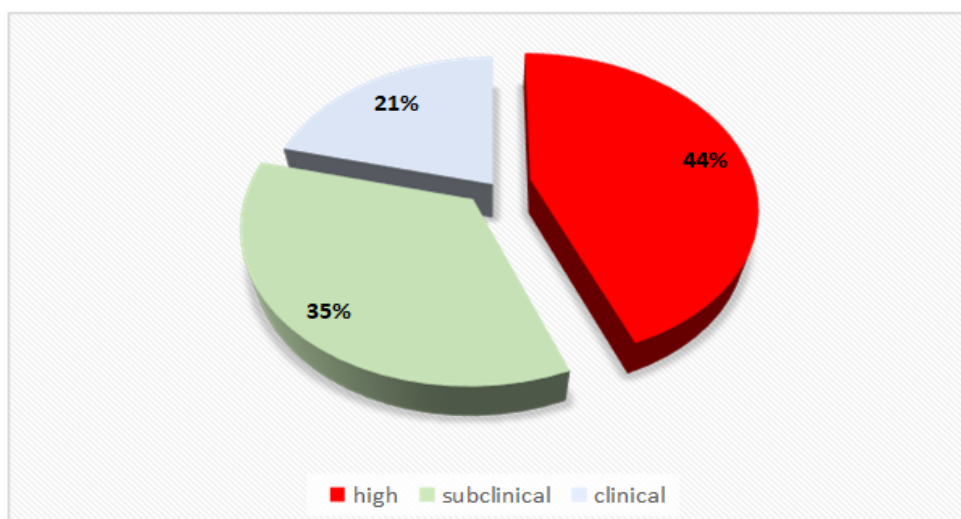


Figure 4. Manifestation of anxiety level in nurses

Table 2. Dynamics of changes in the stability of attention concentration as a result of functional stress in nurses

SA Levels (points)	Before work	After work
Low 1-3 points	-	12±3,02%
Medium 4-6 points	27 ±4.43%	33±4,24%
High 7-9 points	41±4.91%	34±4,73%
Very high 10-12 points	32±4.21%	21±4.07%
Stability of attention	8.06±0.21	5.7±0.24

Note: * - statistically significant difference ($P < 0.05$).

If the fatigue index is less than one ($FI < 1$), the greater the probability of increased fatigue of the subject, the lower the level of attention and mental performance, as well as the need for prompting for speech, mental movement and other activities, and the lack of motivation is observed. In Figure 3, we can see that the nurses' fatigue index decreased after the daily workload.

As you know, the level of blood pressure is one of the main indicators that reflect hemodynamic adaptations to the needs of the body. The height of blood pressure is largely determined by two factors— the amount of blood that travels from the heart to the arterial system in a unit of time and the resistance that responds to blood flow in the vessels. Precisely with this in mind, we used the Ruffier test, which is based on physical load, with the aim of evaluating the performance of the heart during the exercise of the nurses.

When comparing the average values of the Ruffier index for nurses, it should be noted that, index changed to 5.8 ± 0.85 units before work and 7.3 ± 0.78 units after work. It was found that the working capacity of nurses decreased from the norm level to the middle level. As an additional informative criterion, the method of assessing the adaptive potential of the circulatory system was used. Adaptation potential is the level of functioning of the circulatory system and the degree of adaptation to environmental conditions. And it is the ability to balance with the environment, mobilize functional reserves with a certain degree of voltage of regulatory mechanisms.

Significant changes were found in nurses when analyzing the dynamics of the adaptation potential of the circulatory system (APCS). The pre-work APCS for nurses was 1.72 ± 0.46 , while after work this figure increased to 3.06 ± 0.37 . From this it can be concluded that nurses have been observed the tension of adaptation mechanisms towards the end of the working day, as a result of which the body sets the stage for tension and exhaustion.

A total analysis of the presented statistical indicators made it possible to identify significant differences in the level of functional stress of the body of medical workers, both in terms of the professional factor and in terms of dynamics in the work process.

To determine the level of anxiety and depression, we tested nurses in our study on the Hospital Anxiety and

Depression Scale HADS. The results showed that 44% of nurses had clinical anxiety and 35% had subclinical anxiety. In 21%, it was found that the level of anxiety was normal (Figure 4), and when analyzing the results of the assessment of the level of depression, no clinically significant changes were detected.

4. Conclusions

The workload of nurses significantly affects their level of psychophysiological performance, while the high intensity of the working day, the result of communication with employees and patients, and great responsibility for the performance of assigned professional activities, a significant number of interpersonal relationships based on emotional stress, are chronic effects of the functional state of the organism. can lead to fatigue and subsequently increase susceptibility to burnout syndrome.

Anxiety scores predominated over depressive scores in nurses. This situation among nurses can be explained by the fact that the level of communication with patients is very high in their professional activities, and the patients' distressed state due to illness is projected onto nurses. At the same time, the occurrence of problems in family relationships of nurses is directly related to the fact that personal anxiety and emotional stress of a specific style appear at more and more levels.

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