

Innovative Model for Assessment and Prevention of Mental Health at Work in Healthcare in the Post-COVID Period

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Abstract: COVID-19 burdened the health system unsuspectedly, particularly first-line auditors – doctors, pharmacists, and public health inspectors. The purpose of this study is to investigate the factors that influence occupational stress and burnout among frontline healthcare professionals. The survey includes 491 individuals: 221 master pharmacists, 151 assistant pharmacists and 119 public health inspectors. The following methods have been employed: sociological methods, including a direct survey, accompanied by tools to assess stress, anxiety, depression, and burnout. The occupational characteristics that have the most significant impact on the occupational stress, depression and anxiety of healthcare professionals working on the frontline during the COVID pandemic are the lack of time, the need for urgent decision-making, insufficient professional qualifications for specific professional roles, the lack of clear rules at work, some ergonomic risks and the working atmosphere. Ultimately, the innovative model for mental health at work developed through this research highlights that post-pandemic prevention strategies must prioritize the elimination of “structural-cognitive gaps”. By targeting specific risk factors-namely time scarcity, role ambiguity, and inadequate professional support-the model serves as a vital tool for protecting the psychological well-being of those at the forefront of medical care.

Keywords: Mental health at work, Stress, Anxiety, Depression.

Introduction

The COVID-19 pandemic has had a profound impact on the mental health of the global population. Numerous studies have reported increased levels of anxiety, depression, and post-traumatic stress disorder compared with the pre-pandemic period [7, 14]. A comprehensive review summarizing data from eight countries (China, Spain, Italy, Iran,

United States of America, Turkey, Nepal, and Denmark) reported relatively high prevalence rates of anxiety symptoms (6.33-50.90%), depression (14.60-48.30%), post-traumatic stress disorder (7.00-53.80%), psychological distress (34.43-38.00%), and stress (8.10-81.90%) [21].

A large-scale study involving more than 200 000 participants from Denmark, France, Netherlands, and United Kingdom analyzed similarities and differences in key mental health indicators during the early phase of the pandemic. The findings demonstrated that COVID-19 related mental health symptoms were consistently elevated across all countries but gradually decreased during the period of progressive reopening [18]. In general, during the initial stages of an epidemiological crisis, symptoms such as anxiety and fear tend to increase significantly but decline in later stages. In contrast, depressive symptoms and post-traumatic stress may persist for a longer period of time [20].

Occupational stress is significantly higher among healthcare workers compared with the general population. Numerous studies examining the psychological risks associated with epidemics have demonstrated high levels of anxiety, depression, stress, and burnout among healthcare professionals [3, 19, 22]. The emergence of a sudden and life-threatening disease such as COVID-19 has placed enormous pressure on healthcare systems and professionals. During the pandemic, healthcare workers were required to rapidly adapt to multiple challenges, including fear of infection, increased workloads, limited resources, and constantly evolving clinical information [13].

Consequently, healthcare professionals have been identified as a particularly vulnerable group with regard to mental health problems, including anxiety, depression, fear, and sleep disturbances [12, 17]. Frontline healthcare workers involved in the direct care of COVID-19 patients reported significantly higher levels of psychological distress, anxiety, depression, and stress compared with those not directly involved in frontline care [8, 10]. Cai et al. [2] reported that stress levels among healthcare workers in Hubei Province were extremely high during the COVID-19 pandemic. In addition, a large survey involving 13 000 physicians from 29 medical specialties revealed an increase in reported burnout symptoms from 42.00% in 2020 to 47.00% in 2021, with the highest prevalence observed among emergency medicine physicians [23].

One of the major challenges facing the healthcare system in Bulgaria is the limited availability of human and financial resources, particularly in the context of an ageing population. The COVID-19 pandemic imposed an extraordinary burden on the healthcare system, resulting in increased workloads, overtime, and significant occupational stress, particularly among frontline professionals such as general practitioners, emergency physicians, pharmacists, and public health inspectors.

In a rapidly changing regulatory environment, the introduction of new technologies, electronic prescriptions, and various organizational innovations has required pharmacists to invest additional time and effort in administrative and professional activities. In the context of the COVID-19 pandemic, these factors have contributed to increased professional stress and a higher risk of burnout. Moreover, the excessive administrative workload often reduces the time available for patient consultations, thereby shifting the focus away from pharmacists' primary professional responsibility – pharmaceutical care.

Similarly, public health inspectors have played a crucial role in implementing measures aimed at controlling the spread of the disease during the pandemic. The additional responsibilities

associated with pandemic control, combined with the existing shortage of public health inspectors, have led to a substantial increase in workload and occupational stress, further increasing the risk of burnout.

The occupational strain observed among Bulgarian pharmacists and public health inspectors can be deeply understood through established theoretical frameworks. In the context of the pandemic, the effort-reward imbalance model suggests that the significant stress reported by these professionals stems from a perceived lack of reciprocity between their increased efforts, such as administrative burdens and overtime, and the available professional rewards [16]. This strain is further exacerbated by a chronic lack of control over rapidly changing regulations and resource shortages; as Karasek [9] demonstrates, the combination of high psychological demands and low decision latitude is a primary driver of mental exhaustion. Ultimately, according to the transactional model of Lazarus [11], the pandemic forced a constant state of cognitive appraisal where the overwhelming demands of the health crisis frequently surpassed the individual coping resources of the frontline practitioners, leading to the elevated levels of burnout observed in the sector.

In Bulgaria, there is a lack of systematic studies examining occupational stress and burnout among frontline healthcare professionals working in pre-hospital care. In the context of a health crisis and its aftermath, it is essential to focus on the prevention of burnout and on supporting healthcare professionals in coping effectively with occupational stress.

The aim of the present study is to examine the factors influencing occupational stress and burnout among frontline healthcare professionals.

Materials and methods

The study was approved by the Research Ethics Committee of the Medical University of Varna as per Protocol № 135/28.09.2023. The study was conducted between November 2023 and December 2024. The survey includes 491 individuals, divided as follows: 221 Master pharmacists (45.01%), 151 assistant pharmacists (30.80%), 119 public health inspectors (24.24%).

The following methods have been used:

- Sociological methods – a direct survey including demographic characteristics (sex, age, work experience and exposure to occupational risk factors)
 - risk factors resulting from work tasks such as: excessively high qualitative and quantitative requirements (patients, customers, massively affected groups of society), insufficient time and tight deadlines, information overload, contradictory working instructions from line managers, etc.;
 - stress factors that result from the role in the work, such as: insufficient competence, lack of professional experience, too much responsibility, unclear assignment of tasks, lack of support and assistance, lack of recognition, etc.;
 - stressogenic factors of the working environment such as: toxic substances, biological agents and needle pricks, complex technological systems: overloading the human ability to think and make decisions or exceeding the ability to take up and process information;
 - risk factors from the social environment, such as: poor working atmosphere, little or no communication, conflicts with managers and colleagues, constant change of environment, colleagues and field of work, structural changes, inadequate balance between family and work obligations, lack of staff, etc.

- Hospital anxiety and depression scale (HADS) – self-assessment questionnaire for determining intense anxiety and depressive conditions – a standardised and validated tool for measuring the intensity of anxiety and depressive states. The test includes seven questions about anxiety and seven questions about depression and takes 2-5 min to complete.
- Perceived stress questionnaire (PS-1) – consists of seven positive and seven negatively formulated items that assess the state of the tested in the last month.
- Statistical methods – descriptive statistics, variance analysis, graphical analysis, correlation analysis, and non-parametric tests to test hypotheses.

The results were processed with SPSS v.25 software for Windows (IBM corporation).

Results and discussion

Table 1 presents demographic characteristics of the individuals included in the survey.

Table 1. Demographic characteristics

Demographic characteristics		Master pharmacists		Assistant pharmacists		Public health inspectors	
		N	%	N	%	N	%
Gender	Female	171	77.00	132	87.00	102	85.70
	Male	50	23.00	19	13.00	17	14.30
Age (average)		35.9 ± 0.8		32.05 ± 0.8		40.87 ± 1.3	
Place of residence	Varna	147	67.00	112	75.00	58	48.70
	Outside Varna	74	33.00	39	35.00	61	51.30
Total		221	45.00	151	30.80	119	24.20

Deficiency of time in the performance of tasks is a statistically significant factor for the distribution of respondents in groups with severe stress and high levels of depression. The relative share of those who identified this risk factor as significant is plausibly higher than that of those who did not report it. There is no reliable response to anxiety levels. Disturbances and interruptions in professional activities are a hindrance to the work process, which is more faithfully mentioned as an essential factor in groups that have demonstrated severe stress, a serious level of anxiety and a high degree of depression (Table 2).

Another characteristic of the work of the examined medical specialists is the presence of strict, specific requirements for performing the work. It is an insufficiently significant risk factor for the level of occupational stress, anxiety and depression. Deficiency of information in decision-making affects the level of occupational stress, anxiety and depression. Groups of frontline workers indicating this element as an essential factor in their work are prevalent among workers experiencing severe stress, high levels of anxiety and depression (Table 2).

Setting clear rules at work proves to be a credible preventive measure in workplace risk management. Contradictory requirements (e.g. contradictions between compliance with deadlines and quality) are more reliably cited among those demonstrating high stress, high anxiety and depression (Table 2).

Table 2. Distribution of risk characteristics of the work process and work environment in groups with high stress, severe anxiety and high depression

Group	Risk characteristics of the work process or work environment	Strong stress			Serious level of anxiety			High depression		
		N	%	Chi-square, <i>p</i>	N	%	Chi-square, <i>p</i>	N	%	Chi-square, <i>p</i>
Risk factors that result from work tasks	The lack of time	192	51.50	21.058 $p < 0.001$	23	6.20	$p < 0.05$	10	2.70	13.428 $p < 0.005$
	Not relevant	33	28.00		7	5.90		1	0.80	
	Disturbances and interruptions in professional activities	158	56.20	30.386 $p < 0.001$	21	7.50	18.16 $p < 0.001$	9	3.20	21.613 $p < 0.001$
	Not relevant	67	31.90		9	4.30		2	1.00	
	The presence of strict specific requirements	–	–	$p > 0.05$	–	–	$p > 0.05$	–	–	$p > 0.05$
	Not relevant	–	–		–	–		–	–	
	Without proper information	149	56.70	28.272 $p < 0.001$	24	9.10	36.882 $p < 0.001$	9	3.40	27.660 $p < 0.001$
	Not relevant	76	33.30		6	2.60		2	0.90	
	Conflicting requirements (e.g. contradictions between compliance with deadlines and quality)	151	54.70	22.22 $p < 0.001$	21	7.60	18.314 $p < 0.001$	9	3.30	13.85 $p < 0.005$
	Not relevant	74	34.40		9	4.20		2	0.90	
Stress factors, from the role in the work	Lack of recognition	134	53.20	11.764 $p < 0.005$	19	7.50	14.088 $p < 0.005$	10	4.00	23.084 $p < 0.001$
	Not relevant	91	38.10		11	4.60		1	0.40	
	Tasks lacking sufficient qualifications	119	52.90	9.797 $p < 0.01$	16	7.10	26.893 $p < 0.001$	9	4.00	18.250 $p < 0.001$
	Not relevant	106	39.80		14	5.30		2	0.80	
Risks of the working environment	Employee involvement in planning processes	105	62.10	27.66 $p < 0.001$	17	10.10	21.255 $p < 0.001$	8	4.70	25.625 $p < 0.001$
	Not relevant	120	37.30		13	4.00		3	0.90	
	Adverse impacts of working environment factors	107	55.70	15.195 $p < 0.001$	15	7.80	26.697 $p < 0.001$	7	3.60	14.121 $p < 0.005$
	Not relevant	118	39.50		15	5.00		4	1.30	
Risks of the social environment at work	Lack of cooperation from colleagues and leaders	85	59.40	15.273 $p < 0.001$	18	12.60	29.062 $p < 0.001$	10	7.00	50.346 $p < 0.001$
	Not relevant	140	40.20		12	3.40		1	0.30	
	The working psychoclimate	68	60.70	13.655 $p < 0.001$	17	15.20	31.899 $p < 0.001$	9	8.00	42.811 $p < 0.001$
	Not relevant	157	41.40		13	3.40		2	0.50	
	Social and communication skills	82	56.60	9.58 $p < 0.01$	10	6.90	17.938 $p < 0.001$	6	4.10	33.218 $p < 0.001$
	Not relevant	143	41.30		20	5.80		5	1.40	

Another prophylactic feature of the work process that has proven its importance is the fair assessment of workers' achievements. The feeling of lack of recognition for the efforts made is reliably more prevalent among the groups of first-line health workers with pronounced intense occupational stress, severe anxiety and a high degree of depression (Table 2).

Awareness of the imprecise role in task situations for which sufficient qualifications are lacking also credibly influences the distribution of health workers in the groups by demonstrated levels of stress, anxiety and depression. The presence of stress from sufficient qualification was reported in 119 or 52.90% of high-stress individuals, compared to 106 or 39.80% of high-stress individuals who did not report this role as a factor (Pearson Chi-square 9.797 at $p < 0.01$).

Such concerns were also shared by 16 or 7.10% of individuals with serious levels of anxiety versus 5.30% of those with severe anxiety for whom this feature of the role of work did not apply (Pearson Chi-square 26.893 at $p < 0.001$). It is also true that there are more people with serious levels of depression, 9 or 4.00% of those who do not – 2 or 0.80% (Pearson Chi-square 18.250 at $p < 0.001$).

The communication of the results of the risk assessment and the measures planned to manage it in the study proves their role in ensuring mental health in the workplace. The lack of participation in decision-making proves to be a statistically significant point for reliably larger relative shares of individuals in high occupational stress, high anxiety and depression (Table 2).

The working environment with adverse factors (microclimate, toxic agents, dust, illumination, unfavourable working posture) is reported as a significant risk of credibly higher relative shares of persons in groups of healthcare workers with high occupational stress, high anxiety and depression (Table 1). Previous studies have also found a link between anxiety levels and exposure to risky physical and ergonomic factors of the working environment in hoteliers, seafarers and predominantly manual workers. Team and managerial support have also proven to be a statistically significant prophylactic measure for managing emotional risks in the workplace in healthcare. Lack of cooperation is more often an essential factor for frontline healthcare workers who have experienced severe occupational stress, high anxiety and depression (Table 2) [5, 6].

Psycho-emotional tension is an essential moment in the organisation of work. An essential feature at work is team social and communication skills, and for a greater share of health workers in groups with pronounced occupational stress, high anxiety and depression (Table 2).

The results of this study confirm the importance of some organizational factors such as the lack of communication, the high workload, the working atmosphere and the need for swift decision-making [15]. Lack of support from colleagues, conflicts between members of the therapeutic team, unclear roles, and lack of organisational structure also have an impact on stress levels and psychiatric morbidity [1, 4]. The empirical findings of this study (Table 2) provide strong support for the theoretical models of occupational stress within the Bulgarian healthcare context. Specifically, the effort-reward imbalance model is reflected in the significant correlation between "Lack of recognition" and high levels of stress, anxiety, and depression. These results suggest that when healthcare workers perceive a deficit in social reciprocity for their high-stakes labor, it manifests as severe psychological morbidity [16]. Furthermore, the impact of the job demand-control model is evident in the data regarding "Lack of participation in planning" and "Deficiency of information". The high prevalence of severe stress among those excluded from decision-making processes confirms Karasek's assertion [9]

that high demands, such as “Lack of time” and “Conflicting requirements” become most pathogenic when coupled with low control over the work environment.

Finally, the Transactional model of Lazarus [11] explains why “Tasks lacking sufficient qualifications” and “Lack of cooperation” significantly influence stress and depression levels. These factors represent a mismatch between environmental demands and available coping resources (both personal and social). The cognitive appraisal of these gaps likely mediates the transition from professional pressure to the serious levels of anxiety and depression observed in our respondents.

Synthesizing the empirical evidence from this study, we propose an integrated crisis-induced stress model for healthcare professionals in the post-pandemic era. This model identifies a triple-pathway to burnout:

- 1) Organizational entropy: characterized by a high-pressure imposed rhythm (lack of time) and a systemic lack of control over planning processes;
- 2) Perceived task-inadequacy: where frequent interruptions and a deficiency in specific information lead to a cognitive appraisal of “failing to cope” with complex clinical demands [11];
- 3) Erosion of reciprocity: where the absence of professional recognition and inadequate protection against environmental risks create a profound sense of imbalance [16].

In this innovative framework, stress is not merely a reaction to workload but a result of a structural-cognitive gap: the distance between the mandatory requirements of the healthcare system and the actual resources (time, information, and support) provided to the individual.

Conclusion

The findings of this study culminate in an innovative model that redefines mental health prevention for frontline healthcare workers. This model underscores that effective risk management must transcend basic workload analysis to include the complex interplay of organizational atmosphere, ergonomic risks, and the cognitive strain of high-stakes decision-making. Implementing this integrated assessment is essential for preventing long-term. The need for social and communication skills among teams is of great importance in groups of workers with emotional exhaustion. Based on the study, an approach for evaluation (through a battery of tools) and prevention of mental health (through interventions with workers and managers) in the healthcare field has been developed.

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