

Stress and anxiety among physicians and nurses in Romania during the COVID-19 pandemic

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ABSTRACT



Objective. This study aimed at identifying the stress and anxiety levels among physicians and nurses working in Romanian hospitals during the COVID-19 pandemic. **Methods and Results.** We conducted an online survey with a questionnaire completed by 169 healthcare providers aged between 25 and 69 years from COVID and non-COVID hospitals. There were 87.6% physicians and 12.4% nurses, with 61.5% women and 38.5% men. Clinicians experienced high levels of stress in 2.7% of the cases, medium stress in 68.9% of the cases, and low stress in 28.4% of the cases. Women experienced more stress (2.9% high level, 66.3% medium level) than men (1.5% high level, 64.6% medium level), while men are more anxious (73.8% high level, 26.2% medium level) than women (63.6% high level, 33.7% medium level). In both COVID and non-COVID healthcare providers, the stress score directly correlates with the anxiety score. Overall, during this period, the responders felt stressed and anxious ($p=0.001$). **Conclusions.** The COVID-19 pandemic is a strong reason for increased stress and anxiety among physicians and nurses. Men are more anxious and women more stressed. The stress and anxiety scores are different according to the hospital type.

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Introduction

In 2019, the novel coronavirus SARS-CoV-2 was identified as the cause of pneumonia in Wuhan, China, and it rapidly spread, leading to a pandemic in 2020. In February 2020, the World Health Organization designated this condition as the novel coronavirus disease 2019 (COVID-19) [1]. In Romania, the first case of COVID-19 was registered on February 26th, 2020, i.e. an infected Italian man who traveled across Romania. The number of cases increased slowly but daily until March 6th (the first day when the epidemic was officially declared in Romania). After this milestone, the number of cases increased rapidly. On March 18th, 261 cases were registered, 49% of which were imported (66% from Italy; 5% from Spain, France, Germany; 4% from UK and Austria; and 3% from Israel) [2]. Since March 16th, the government declared a national emergency situation with a

complete lockdown in the country. On May 10th, 15,300 infected cases were reported with 961 deaths, and 256,749 RT-PCR tests were performed [3]. In the beginning, in Romania, the emergence of COVID-19 followed the model of a travel-related disease, but it also had some peculiarities [2]. One such case was Suceava County where the departmental hospital was the central cluster of the COVID-19 disease. Starting with 316 cases declared on March 28th, the count rapidly increased to 1,529 on April 10th, and with an impressive number of healthcare providers, that is 462, also infected. In this paradoxical situation, the authorities became determined to invest in a militarized management of the hospital and raised many issues regarding the shortage of caregivers and safety of the hospitals, and induced panic among both the general population and the medical staff all over the country.

Another unusual condition that puts the health system at risk is that Romania has the highest governmental

instability within the EU. The turnover of leadership in the Romanian Ministry of Health is three times higher than in other EU countries because it changed 25 times in 27 years [4]. Thus, Romania represents an example of an extremely vulnerable healthcare system [5]. After the international COVID-19 outbreak, the Romanian Ministry of Health released some recommendations and started the acquisition of medical equipment to reduce the number of COVID-19 cases [6]. The instability of the Romanian healthcare system proved to be more severe because of the high rate of false-negative COVID-19 tests [7]; and the lack of equipment and trained personnel to perform the tests in the hospitals.

Furthermore, a specifically unique measure against the COVID-19 pandemic was imposed in Romania; all over the country, some hospitals were designated to be accessed only by infected patients (COVID hospitals). The non-COVID hospitals had specific areas for the suspected COVID-19 patients, but no more planned surgery, ambulatory activity, or non-emergency treatment was allowed during the pandemic period. If a patient was diagnosed with COVID-19 in a non-COVID hospital, he had to be later on transferred to a COVID hospital.

Given the fact that healthcare professionals in Romania were aware of the vulnerabilities of the healthcare system, including insufficient pandemic-specific equipment and shortage of the medical staff and ventilators even at the beginning of the emergency, panic and anxiety were the common emotional traits among healthcare providers. The information provided daily by the media and social media was frightening as it concentrated mostly on the negative aspects. Extreme situations, as in the case of Suceava Departmental Hospital that was militarized for six weeks and where doctors and nurses accounted for about half of the COVID-19 positive patients, contributed to raising the stress and anxiety levels of the medical staff all over the country. The fear of being exposed and infected led, in some cases, to extreme situations where some doctors quit their jobs; but fortunately, those were exceptions. As time passed, new complications were identified, adding to the severity of the disease [8,9]. Considering these circumstances, we decided to conduct the present study. Thus, our study aimed at identifying the level of stress and anxiety among physicians and nurses working in different hospitals in Romania during the COVID-19 pandemic.

Materials and Methods

We conducted a prospective type 2 cohort study, designated exclusively for Romanian healthcare providers who were involved in the SARS-CoV-2 pandemic. The study started in April 2020, three weeks after the number of COVID-19 cases in Romania increased. All persons who agreed to participate in the study gave their informed

consent. The ethics committee of the hospital approved the study.

We conducted an online survey that included a combined questionnaire addressed to physicians and nurses all over the country. The inclusion criterion was the acceptance of the medical professionals to complete the form. The exclusion criteria were the refusal to participate and incomplete questionnaires. There were no other exclusion criteria based on age or gender characteristics.

The participants completed a questionnaire, which was not standardized, but was developed by combining two standard surveys: stress and anxiety forms. The stress questionnaire included 32 questions evaluated on a scale from 1 to 4 points per item. The total score was used to classify the participants' levels of stress. Stress levels were considered low at 64 points, medium between 65-95, and high when it exceeded 96 points. The anxiety score was evaluated for 20 questions, and a total score of fewer than 40 points represented a low-anxiety level and above 41 points it was a high-anxiety level (based on STAI form Y with license OL-00008851 / 2020-05-03) [10].

The data were analyzed using the SPSS version 25.0. Pearson's correlation coefficients and two-sided tests were applied and considered statistically significant for p values lower than .05.

Results

This study included 169 healthcare providers aged between 25 and 69 years (mean age: 40.42, standard deviation: 10.40 years). The majority of the participants were physicians (87.6%), followed by nurses (12.4%). The gender distribution showed that 61.5% of the respondents were women and 38.5% were men. The hospitals where they worked are university clinics in 39.1% of the cases, emergency hospitals in 37.9% of the cases, municipal hospitals in 10.7% cases, ambulatory clinics in 4.7% cases, and town hospitals in 3% of the cases. It was also identified that 60.9% of the participants worked in non-COVID hospitals and 39.1% of the participants worked in SARS-CoV-2 designated clinics. The majority of the participants, i.e. 39.6% had one child, 35.5% did not have any children, 21.9% had two children, 1.8% had three children, and 1.2% had four children. The consultants and nurses from obstetrics and gynecology departments represented 40.8% of the respondents. However, the study included participants from all departments of medicine: anesthesiology, internal medicine, radiology, surgery, hematology, laboratory medicine, and family medicine.

The stress questionnaire revealed that sometimes participants blamed themselves if things go wrong in their hospital (61.5%), they do not express their feelings (39.1%), they concentrate more on work than on their personal problems (45.6%), they feel tense in a negative

environment (49.7%), they were concerned about the negative aspects of life (49.1%), they feel restless (49.1%) or guilty about their inability to do something (43.2%), they do not have enough time for hobbies (42.6%), they assume more duties for one person (54.5%), they fear failure (45%), and they do not start a job without establishing the priorities (43.8%). The responders also admitted that they never take advice from colleagues or superiors (50.9%), they are never late for important meetings (61.5 %), and they are often too busy to have lunch with friends (44.4%).

The anxiety survey proved that healthcare providers were extremely sad (47.9%), sad (40.8%), nervous (43.8%), scared (45%), irritated (41.4%), worried (47.9%), and agitated (40.2%). They also expressed confidence in their skills (56.8%) and were quite satisfied with their work (43.2%). Among the interviewed persons, it was identified that 8.9% were terrified and 7.1% were very irritated at the examination time.

Table 1. Stress and anxiety measurements by gender.

Gender	Parameter	Minimum	Maximum	Mean	Std. Deviation
Men (n=65)	Age (years)	25	69	40.50	11.111
	Stress level	1.00	3.00	1.67	.51117
	Stress score	46.00	106.00	69.21	10.82631
	Anxiety level	31.00	65.00	46.31	8.01729
	Anxiety score	1.00	2.00	1.6635	.47481
Women (n=104)	Age (years)	26	65	40.29	9.250
	Stress level	1.00	3.00	1.72	.50335
	Stress score	47.00	106.00	70.31	12.36362
	Anxiety level	29.00	61.00	45.78	7.96181
	Anxiety score	1.00	2.00	1.7385	.44289

In our study, the overall level of stress was average (65.7%), followed by low (32%), and high levels only in 2.4% of the cases. The anxiety score was high in 69.2% of the cases. During our study, some gender differences were identified in stress and anxiety scores (Table 1). It was observed that women experienced more stress (2.9% high level, 66.3% medium level) than men (1.5% high level, 64.6% medium level). According to our study, men are more anxious (73.8% high level, 26.2% medium level)

than women (63.6 % high level, 33.7% medium level). There were no significant differences in the degree of stress between physicians and nurses. Physicians experienced a high level of stress in 2.7% of the cases, average in 68.9% of the cases, and low in 28.4% of the cases. Meanwhile, none of the nurses experienced high stress, 55% had low-level and 45% had medium-level stress. The anxiety ratio among nurses was 47.6 % and low level 52.4%. High levels and low levels were similar for physicians.

There is a correlation between the category interviewed and the stress level $\chi^2=7.231$, $p=0.027$, but physicians experience a higher level of stress than nurses. There is no correlation regarding the age, the professional experience, the number of children of the responder (nurse or doctor) and the level of stress or anxiety.

The level of stress is experienced differently in hospitals. For COVID hospitals, the highest level was registered in town COVID hospitals (mean = 72.00), and the lowest was in emergency hospitals (mean = 69.42). The differences are not statistically significant. The level of anxiety in COVID hospitals is a little higher in town hospitals (mean = 51.83), followed by university hospitals (mean = 47.03) and emergency hospitals (mean = 45.39), but with no statistical significance.

For COVID hospitals, it is observed that consultants are more stressed (3.7% high level, 72.2% medium level, 24.2% low level) than nurses (0% high level, 33.3% medium level, 66.7% low level). The consultants (71.3%) were also more anxious than nurses (55.6%). For COVID hospital workers, stress was correlated with the years of experience ($p=0.014$). People with more professional experience were more stressed during this period. This was identified as a strong statistical correlation.

In non-COVID hospitals, the highest levels of stress (mean=80.00) and anxiety (mean=56.00) were identified in outpatient clinics and the lowest stress (mean=69.42) and anxiety (mean=46.39) were identified in emergency hospitals. Physicians were more stressed (2.1% high level, 67.0% medium level, 30.9% low level) than nurses (55.6% medium, 44.4% low); the consultants (71.3%) were also more anxious than nurses (55.6%).

In non-COVID hospitals, the highest level of stress is in town hospitals (mean = 71.8), as well as anxiety (mean = 47.6). The lowest stress level (mean = 64) and anxiety level (mean = 39.0) is in outpatient clinics. Physicians register the highest level of stress (2.1% high level, 67% medium level, 30.9% low level) compared to nurses (55.6% medium level, 44.4% low level). The differences have no statistical significance.

In addition, for both COVID and non-COVID healthcare providers, the stress score is directly correlated with the anxiety score. Overall, it was proven that the responders felt stressed and anxious ($p=0.001$) during this period (Table 2).

Table 2. Stress and anxiety measurements according to the type of hospitals.

Hospital type	Parameter	Minimum	Maximum	Mean	Std. Deviation
NON-COVID hospital (n=103)	Age (years)	26	69	41.08	9.963
	Stress level	1.00	3.00	1.6990	.50166
	Stress score	46.00	106.00	69.00	11.33753
	Anxiety level	29.00	62.00	45.6796	7.71072
	Anxiety score	1.00	2.00	1.6990	.46092
COVID hospital (n=66)	Age (years)	25	64	39.39	11.062
	Stress level	1.00	3.00	1.7121	.51932
	Stress score	47.00	106.00	70.6364	11.59129
	Anxiety level	30.00	65.00	45.00	8.38958
	Anxiety score	1.00	2.00	1.6818	.46934

Comparing the COVID with non-COVID hospitals, the level of stress is (mean = 70.63) for COVID hospitals and (mean = 69.41) for non-COVID ones. The anxiety score is for COVID hospitals (mean = 46.78) compared to non-COVID ones (mean = 45.67).

The level of stress for physicians from COVID hospitals (mean=72.2) compared to non-COVID ones (mean=69.78), there are no significantly significant differences. The same trend is for anxiety score COVID = 48.03 versus non-COVID = 45.87 for physicians. Nurses from COVID hospitals are less stressed (mean = 63.58) than those in non-COVID hospitals (mean = 65.55). The same applies to anxiety levels: COVID hospitals 41.16% versus non-COVID hospitals 43.66%.

Discussions

It was proven that the transmission of COVID-19 varies according to the type and duration of the exposure, individual use of preventive measures, or the virus concentration within the respiratory secretions. Secondary infections were identified among household contacts or in long-term care facilities and hospitals when the personal protective equipment was misused [11,12]. The COVID-19, which was declared a pandemic in the early 2020, was recently associated with sleep problems, depression, and anxiety in infected patients [13]. Other categories of individuals, such as immunocompromised patients, patients with chronic diseases, or individuals older than 70 years, are predisposed to depression, increased anxiety, and worries [14,15].

A study that included Chinese students who were quarantined at home because of COVID-19 for an average of 34 days, revealed that they experienced depression and anxiety symptoms in approximately 20% of the cases, and almost two-thirds were concerned about the possibility of infection [16,17]. Moreover, it was demonstrated that COVID-19 could cause psychiatric problems in clinicians who attend patients who are suspected or confirmed with COVID-19. A study that included 1,200 physicians and nurses who treated COVID-19 patients in China was conducted between January 29th and February 3rd, 2020. It evaluated the prevalence of moderate-to-severe psychiatric symptoms among healthcare professionals. Traumatic distress was identified in 35% of the cases, followed by depression in 15% of the cases, insomnia in 8% of the cases, and anxiety in 12% of the cases. The symptoms were mild in one-third of the clinicians. The incriminated risk factors for psychological disorders among clinicians who care for COVID-19 patients are based on proximity to the infected patients and possibly infected hotspots [18]. Another study conducted in Singapore, between February and March 2020, which included 300 nurses and physicians treating COVID-19 patients, proved that few clinicians had posttraumatic stress disorder, depression, or anxiety. The explanation was their previous experience with the severe acute respiratory syndrome (SARS) epidemic in 2003 or a better prepared background [19]. Both studies used self-report screening tools.

The present study evaluates the psychological impact of the COVID-19 pandemic on healthcare personnel. It revealed high degrees of stress among them. There are some differences between COVID and non-COVID hospitals; however, in general, all healthcare professionals are tensed, and clinicians are more tensed than nurses. This may be explained by some specific factors in Romania: the lack of national-level crisis management experience and training for such situations, the vulnerability of the national health system, and insufficient personnel in the hospitals. Furthermore, many factors augmented stress levels within the hospitals: the need to adapt and change the daily routine in hospitals, to create new procedures and circuits, the lack of personal protective equipment in the first weeks of the pandemic, the necessity of continuous adaptability to COVID-19 case definition changes, and absence of medical simulations for such medical cases. Moreover, the media contributed mainly to increased anxiety by broadcasting unreliable information and, in some cases, accusing the medical staff of sub-par performance.

Posttraumatic stress disorder is described as “the complex somatic, cognitive, affective, and behavioral effects of psychological trauma.” It is characterized by flashbacks of past traumatic events, avoidance of reminders of trauma intrusive thoughts, hypervigilance,

nightmares, and sleep disturbances that cause interpersonal, occupational, and social dysfunction [20]. Furthermore, psychiatric disorders that occur during the pandemic are associated with psychosocial conditions such as economic hardships and insecurity, fear of infecting family members, physical distancing, home confinement, and quarantining; increased workloads; lack of access to testing and medical care; shortages of available resources (foods, paper products, and personal protective equipment); inconsistent messages and directives regarding public health measures such as wearing face masks, frequency and extent of exposure to individuals infected with COVID-19; and diminished personal freedom [21,22]. Thus, the study reveals that Romania is likely to have a severe degree of posttraumatic stress disorder resulting from the COVID-19 pandemic.

Generalized anxiety disorder (GAD) is one of the most frequent mental disorders in primary care settings [23]. In a study conducted in four Northern countries, the rates of GAD ranged between 4.1% to 6.0 % for men and between 3.7% to 7.1 % for women who provide primary care [24]. By comparison, studies of national samples from the United States reveal a prevalence of GAD of 5.1% to 11.9% [25-28]. In Europe, a prevalence of 1.7% to 3.4 % annually, and 4.3% to 5.9% as lifetime prevalence was found [29,30].

Anxiety develops more often in individuals who have a genetic determination, as proved by the twin studies; GAD appears to have a common heritability point with significant depression and with “neuroticism” [31-33]. Their presence makes the diagnosis of GAD of persistent, generalized, and excessive anxiety associated with different somatic symptoms. DSM-5 diagnostic criteria for GAD require the occurrence of excessive anxiety and worry: the difficulty to control worry, anxiety, fear; or physical symptoms led to clinically significant distress; impairment in social, occupational, or other important areas of functioning. The disturbance is not attributable to the physiological effects of a substance or another medical condition [34]. This study did not include the evaluation of genetic factors or factors other than the COVID-19 pandemic for anxiety occurrence among clinicians and nurses. However, it was observed that the majority experienced high levels of anxiety.

In Romania, there are some studies that analyzed the level of anxiety and stress, but also the changes in hospital protocols during the SARS-COV-2 pandemic. However, they included different categories of healthcare providers, and for this reason, the results are somewhat different [35-37]. The particularity of the present study is that it was performed at the beginning of the pandemic and it includes various healthcare providers.

The limit of the study is represented by the reduced number of responders and the heterogeneity among

specialties. Furthermore, there are few responders from the frontline healthcare specialties (some anesthesiologists, but no infectious disease doctors or pulmonologists) [38,39]. A possible explanation is that the study was performed at the beginning of the pandemic and the distribution of the questionnaire was online, resulting in such a diversity of replies.

Highlights

- ✓ Most study participants show high levels of anxiety during the COVID-19 pandemic.
- ✓ Physicians are more stressed than nurses.
- ✓ Highly experienced male physicians with families show the highest stress levels.

Conclusions

The COVID-19 pandemic is a strong reason for stress and anxiety among physicians and nurses all over the world, but in Romania, this problem is overlooked by culture. There are many particular factors involved in this phenomenon in Romania, which is known to have one of the least performant medical systems in the EU. Among them, we identified lack of training for epidemic situations, inconsistent and sometimes contradictory information about the disease, and lack of a proven cure, an uncertain future, and impending economic and professional crises. Men are more anxious and women more stressed. The stress and anxiety scores are different according to the hospital type.

As the epidemic situation is far from the ending point, more studies are needed in order to further psychologically evaluate and design a plan to reduce the long-term consequences of posttraumatic stress among healthcare providers in Romania.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

Authors' Contributions

Conceptualization: O.G.O., R.M.S., A.C., and L.P.; original draft preparation: O.G.O., R.M.S., A.C., M.T.D., and M.P.; critical review and editing: O.G.O., R.M.S., and C.S.; supervision: O.G.O., R.M.S., and L.P. All authors have approved the final article.

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