

Concerns, attitudes and comparison of the COVID-19 epidemic impact on the mental state of medical and nonmedical employees

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Summary

Aim. The aim of this study is to compare the manifestation of anxiety and depressive disorders as well as attempt to identify factors influencing their occurrence among healthcare system employees and nonmedical staff.

Method. A survey was conducted with participation of 921 people using the Hospital Anxiety and Depression Scale – Modified (HADS-M) and a survey prepared to assess the attitudes of the respondents towards the epidemic.

Results. The obtained results allow to state that the examined groups do not differ in the level of perceived anxiety or the level of depression, however, they had different attitudes towards the epidemic. A number of factors increasing the risk of occurrence of these disorders have been identified. Among medical professions, nurses are the professional group particularly vulnerable to anxiety disorders.

Conclusions. The epidemic has a significant impact on human mental well-being. Recognizing the factors increasing the risk of mental disorders and their prevalence during an epidemic can help identify individuals who are particularly at risk of developing them. The knowledge resulting from empirical explorations is the basis for implementing preventive and therapeutic measures among people affected by mental disorders during the pandemic.

Key words: COVID-19, depression, anxiety

Introduction

In December 2019, the world was informed about the spreading epidemic in China caused by a new type of coronavirus (SARS-CoV-2: Severe Acute Respiratory Syn-

drome Coronavirus 2). On January 11, 2020 the World Health Organization officially named the disease caused by this virus COVID-19. “CO” – refers to the crown (corona), “VI” – to the virus, “D” – to the disease, “19” refers to the year the disease appeared. By May 9, 2020, 4,041,789 cases were confirmed, including 276,945 deaths in 212 countries around the world [1]. The most common symptoms include fever, cough and weakness [2]. The spread of COVID-19 is much wider than previous epidemics, i.e., MERS (Middle East Respiratory Syndrome) or SARS (Severe Acute Respiratory Syndrome) [3], and the mortality rate given by the World Health Organization on March 3, 2020 was about 3.4% [4].

During the COVID-19 epidemic, because of working in chronic stress, medical personnel are being exposed to mental disorders. In the group of physicians working in Wuhan, 63% of them had symptoms of mental disorders [5]. One of the factors causing the greatest stress during the COVID-19 epidemic is its unpredictability. Lack of knowledge related to its symptoms, treatment and prognosis caused uncertainty among professionals and society. Media hype and disinformation on the media only increase the anxiety associated with the epidemic. Similarly to the other epidemics, uncertainty of survival, dying in loneliness or desolation of people in quarantine is crucial for people’s psychological state. These factors can hugely contribute to the occurrence of anxiety and depressive disorder symptoms among the population affected by the coronavirus epidemic [6].

Studies have been conducted to determine the increased amount of anxiety and depressive disorder experienced by medical personnel during the pandemic [7]. The collected data are extremely important in the context of planning psychiatric, psychotherapeutic and psychological help for people directly affected by epidemic as well as the whole society, especially in a situation when it is difficult to predict a return to normality, and very large groups of people are affected [8]. Psychiatry, as a branch of medicine, successfully adapts to the situation by using telemedicine.

There are few studies available that would compare the prevalence of mental disorders in the group of medical professions against the population during an epidemic. Studies conducted so far have assessed the impact of the epidemic on the medical employees’ mental health [9]. In the study conducted by Zhang et al. [10], during the COVID-19 epidemic physicians experienced disorders such as insomnia (38.4%), anxiety disorders (13%), depressive disorders (12.2%), somatization (1.6%), obsessive compulsive disorder (5.3%). Knowledge of differences in mental disorders occurrence in specific groups can be useful in identifying groups that are particularly in need of psychiatric help. Developing a support system for large groups of people affected by the experience of a mental crisis after various types of disasters is a challenge for psychiatric care in the forthcoming future.

Three study objectives were formulated:

1. To compare anxiety and depressive disorders occurrence between medical staff and nonmedical employees.

2. To examine these people's attitudes towards the epidemic.
3. To determine the factors that can modify the experienced level of anxiety and depression.

Method

This project was carried out from March 27, 2020 to April 13, 2020. Due to the epidemiological situation and risk of infection associated with the direct contact, the study was conducted online. The respondents were of legal age and agreed to participate in the study, which was voluntary and anonymous. All data were provided by respondents filling in specially prepared material created on the Google Forms portal. The survey was published on the social networking site Facebook in groups of physicians of various specialties, male and female nurses, paramedics, as well as people not related to hospital work.

Demographic characteristics of the study group

921 participants took part in the study – 750 women (81.43%) and 171 men (18.57%); mean age 32.64 ± 10.17 years. The largest number of respondents was in the 25–34 age group, i.e., 408 (44.30%) people. The study involved 384 medics (41.70%) and 537 non-medics (58.30%). Detailed demographic data are provided in Table 1. The study groups differed in terms of age structure ($p < 0.001$), but no difference in sex structure was observed ($p = 0.052$).

Table 1. Demographic characteristics of the study group

Feature	N (%)
Sex	
Women	750 (81.43)
Men	171 (18.57)
Age	
<24	199 (21.61)
25–34	408 (44.30)
35–49	238 (25.84)
>50	76 (8.25)
Age [in years] (mean \pm SD)	32.64 ± 10.17
Profession	
Doctors	166 (18.02)
Nurses	73 (7.93)
Paramedics	21 (2.28)

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Other medicine-related	175 (13.46)
Other not related to medicine	537 (58.31)

Methods used in the study

A set of three online tools was used in the study: (1) a structured interview that was used to collect demographic data; (2) a set of questions to determine attitudes towards the epidemic and experiences related to COVID-19 disease; (3) the Hospital Anxiety and Depression Scale – Modified (HADS-M, A. Zigmond and R. Snaith, 1983), which aimed to assess the occurrence of anxiety and depression.

Demographic data

The collected demographic data included questions about gender (female/male), age (years), current occupation (doctor/nurse/paramedic/other related to medical service/other not related to medical service). These professions were divided into two groups: (1) “medics” (doctor/nurse/paramedic/other related to medical service) and (2) “non-medics”.

Attitudes towards the epidemic

The second part of the survey included questions about the causes of anxiety. The created set of questions was based on the Questionnaire for assessing general hospital staff’s worries, perceived sufficiency of information and attitudes towards the A/H1N1 pandemic (P. Goulia et al., 2010), which assessed the medical staff fears during the A/H1N1 epidemic in Greece [11]. Some of the questions were on a 0–9 numerical scale, and some were yes/no questions. The questions were divided into 6 groups: (a) concerns about the epidemic, (b) personal experience related to the epidemic, (c) stigmatization, (d) views on individual knowledge and public knowledge, (e) job satisfaction, (f) recommendations for prevention. The value of Cronbach’s α coefficient was 0.79.

Assessment of mental state

The self-assessment Hospital Anxiety and Depression Scale – Modified (HADS-M) was used to assess the mental state. It contains three subscales: depression, anxiety and aggression. It consists of 16 questions, 7 for anxiety disorders, 7 for depression and 2 for assessing aggression. For each answer it was possible to receive 0–3 points. For the subscales of depression and anxiety, the results show no disorders, borderline state, occurrence of disorders for the ranges 0–7, 8–10, 11–21, respectively. For ag-

gression these ranges are 0–2, 3, 4–6 points. The level of anxiety was also determined declaratively by each participant on a numerical scale of 0–9.

Statistical analysis

Statistical data were developed using the Statistica 13.1 software. The level of significance was set at $\alpha = 0.05$. The distribution of variables was examined using the Shapiro-Wilk test, no normal distribution was obtained. Chi-square and Mann-Whitney U tests were used to compare variables. In order to determine the factors associated with perceived anxiety and level of depression, multiple regression models were created using stepwise regression. A model with the highest regression match was developed.

Results

Characteristics of mental disorders frequency

Based on the results obtained on the HADS-M scale, 367 (39.85%) people can be diagnosed as having anxiety disorders, including 40.9% of medics versus 39.1% of non-medics, and 206 (22.37%) people as having depressive disorders, including 22.9% of medics and 22.0% of non-medics. Comparing the data obtained from the group of medics and non-medics, there are no statistically significant differences in the disclosure of anxiety ($p = 0.171$) and depressive symptoms ($p = 0.804$) (Table 2). The vast majority of people taking part in the survey (medical staff 94.5%, nonmedical professionals 92.9%) admitted that they felt anxiety about the epidemic.

Table 2. Comparison of anxiety and depressive disorders between two professional groups

Factor	Medical staff (N = 384, 41.70%)	Nonmedical staff (N = 537, 58.30%)	χ^2	p-value
Sex			3.77	0.052 ^(a)
Male	60 (15.6)	111 (20.7)		
Female	324 (84.4)	426 (79.3)		
Age			127.04	<0.001 ^(a)
<24	15 (3.9)	184 (34.3)		
25–34	205 (53.4)	203 (37.8)		
35–50	116 (30.2)	122 (22.7)		
>51	48 (12.5)	28 (5.2)		
HADS-M Anxiety			0.57	0.750 ^(a)
0–7 (no disorder)	145 (37.8)	216 (40.2)		
8–10 (threshold state)	82 (21.3)	111 (20.7)		
11–21 (disorder)	157 (40.9)	210 (39.1)		

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HADS-M Depression			0.148	0.929 ^(a)
0–7 (no disorder)	218 (56.8)	306 (57.0)		
8–10 (threshold state)	78 (20.3)	113 (21.0)		
11–21 (disorder)	88 (22.9)	118 (22.0)		
HADS-M Anxiety (mean ± SD)	9.59 (4.98)	9.17 (5.00)		0.171 ^(b)
HADS-M Depression (mean ± SD)	6.92 (4.77)	6.78 (4.59)		0.804 ^(b)

^(a) Chi-square test; ^(b) Manna-Whitney *U* test

Attitudes towards the COVID-19 epidemic

In the carried out statistical analyzes, no intergroup differences were observed at the level of anxiety declared by participants ($p = 0.326$), which is consistent with the obtained HADS-M results. However, significant differences were observed between the group of medics and non-medics in the scope of some of the studied variables. When determining the causes of anxiety, it was found that more common reason for medical personnel was the perception of danger associated with coronavirus ($p = 0.022$). In contrast, health concerns for family members and close relatives, isolation from loved ones and the environment, the effects of epidemic in the professional and social field were equally identified by both groups as the causes of anxiety.

When assessing the level of knowledge about infection, the group of medics significantly differed (i.e., their knowledge was greater) from the others in the following categories: self-assessment of their own knowledge of disease symptoms ($p = 0.049$), prevention ($p = 0.002$), treatment ($p < 0.001$), and prognosis and consequences ($p = 0.001$). Moreover, medics assessed public knowledge in terms of knowledge of symptoms ($p = 0.026$), prevention ($p = 0.012$), routes of infection ($p = 0.008$), and treatment of the disease ($p = 0.002$) as more limited than the group of non-medics (Table 3).

Table 3. Causes of anxiety among medical and nonmedical staff based on self-assessment and assessment of society

	Medical staff N = 384	Nonmedical staff N = 537	p-value
I feel anxious about the COVID-19 epidemic (Y/N;N;%)	363 (94.5)	499 (92.9)	0.326 ^(a)
Degree of anxiety (scale 0-9; mean ± SD; median)	6.1 ± 2.0; 6/ 9	5.9 ± 2.1; 6/9	0.189 ^(b)
The most common cause of anxiety was:			
The danger of the disease	182 (47.4)	214 (39.9)	0.022 ^(a)

table continued on the next page

Concern for the health of family and relatives	322 (83.9)	447 (83.2)	0.804 ^(a)
Isolation from family and surroundings	132 (34.4)	172 (32.0)	0.456 ^(a)
Professional and social consequences	200 (52.1)	301 (56.1)	0.233 ^(a)
Assessment of self-knowledge and public knowledge about the COVID-19 epidemic			
(scale 0-9; mean \pm SD, median)	7.1 \pm 2.0; 8/9	6.9 \pm 1.9; 7/9	0.049 ^(b)
I have sufficient knowledge of the symptoms	7.3 \pm 1.8; 8/9	6.7 \pm 2.0; 7/9	0.002 ^(b)
I have sufficient knowledge of prevention	7.6 \pm 1.6; 8/9	7.4 \pm 1.7; 8/9	0.088 ^(b)
I have sufficient knowledge of the path of infection	5.0 \pm 2.5; 5/9	4.3 \pm 2.5; 4/9	<0.001 ^(b)
I have sufficient knowledge of the treatment	5.8 \pm 2.5; 6/9	5.2 \pm 2.6; 6/9	0.001 ^(b)
I have sufficient knowledge of the prognosis/ consequences	3.8 \pm 2.3; 4/9	4.2 \pm 2.4; 4/9	0.026 ^(b)
Society has sufficient knowledge of the symptoms	3.8 \pm 2.3; 4/9	4.2 \pm 2.4; 4/9	0.012 ^(b)
Society has sufficient knowledge of prevention	4.0 \pm 2.4; 4/9	4.5 \pm 2.5; 4/9	0.008 ^(b)
Society has sufficient knowledge of the path of infection	2.4 \pm 2.1; 2/9	2.8 \pm 2.2; 3/9	0.002 ^(b)
Society has sufficient knowledge of the treatment	3.0 \pm 2.3; 3/9	3.2 \pm 2.4; 3/9	0.132 ^(b)

^(a) Chi-square test; ^(b) Manna-Whitney *U* test

Factors related to anxiety

The study allowed to assess many factors that may affect the anxiety experienced by the subjects. The proposed multiple regression model illustrates the contribution of significant factors that are shown in Table 4. Among the factors associated with anxiety perception is gender ($p < 0.001$) (women are more prone to anxiety). The factor that increases the anxiety is the profession of a nurse ($p < 0.001$), while the role of a doctor or paramedic is not associated with the level of experienced anxiety. Individual views on the epidemic were also important. The assessment of knowledge about symptoms was associated with greater anxiety ($p = 0.046$), and knowledge about disease prevention significantly reduced the level of anxiety ($p = 0.006$). The assessment of public knowledge regarding the disease prevention ($p = 0.002$) was significant and also reduced the anxiety. Among social factors, experience such as contact with an infected person turned out to be important. The level of perceived job satisfaction and individual attitude to absence at work due to the epidemic were one of the predictors with a high level of significance ($p < 0.001$) of the examined feature.

Table 4. Factors related to anxiety during the COVID-19 epidemic

Factors	Multiple regression analysis ⁽¹⁾	
	Beta ⁽²⁾	p-value
Sex	1.899	<0.001
Profession		
Nurse	1.343	<0.010
Doctor	0.127	0.734
Paramedic	-1.035	0.284
I have sufficient knowledge regarding disease symptoms	0.213	0.046
I have sufficient knowledge regarding disease prevention	-0.304	0.006
The public has sufficient knowledge regarding disease prevention	-0.196	0.002
I believe that the risk of getting infected with the virus is significant	0.507	<0.001
I have had contact with an infected person	0.586	0.354
A member of my family was infected with coronavirus	3.600	0.021
I was in quarantine	-1.040	0.078
Because of fears related to the epidemic, I thought about not going to work	3.357	<0.001
I feel job satisfaction	-0.463	<0.001

⁽¹⁾ Multiple regression analysis of dependent factor “anxiety” measured on the HADS-M; Adjusted $R^2 = 0.337$; $F(13.907) = 36.9$; $p < 0.001$; ⁽²⁾ Non-standardized beta regression coefficient

Factors related to the level of depression

Table 5 presents the factors related to the level of depression taken into account in the multiple regression analysis. Demographic factors that were associated with the level of depression were gender ($p = 0.004$) and age ($p = 0.001$). The occupation was not significant for the severity of this variable. Among the attitudes towards the epidemic related to the level of depression were self-assessment of participants' knowledge regarding disease prevention ($p = 0.009$) and assessment of public knowledge regarding disease symptoms ($p = 0.001$). One of the factors affecting the level of depression was having an infected person in the family ($p = 0.001$). In the analysis of the severity of depression, significant role played ($p < 0.001$) job satisfaction and attitudes towards absence at work.

Table 5. Factors related to depression during the COVID-19 epidemic

Factors	Multiple regression analysis ⁽¹⁾	
	Beta ⁽²⁾	p-value
Sex	1.002	0.004
Age	0.045	0.001
Profession		
Nurse	0.417	0.413
Doctor	-0.157	0.656
Paramedic	-0.816	0.356
I have sufficient knowledge regarding disease prevention	-0.185	0.009
The society has sufficient knowledge of disease symptoms	-0.193	0.001
I think the risk of getting infected is significant	0.467	<0.001
I follow the recommendations related to the prevention of epidemic spread	2.544	0.022
I think that being infected with coronavirus would have major consequences on my health	-0.010	0.050
A member of my family was infected with coronavirus	4.755	0.001
Because of fears related to the epidemic, I thought about not going to work	2.533	<0.001
I feel job satisfaction	-0.471	<0.001

⁽¹⁾ Multiple regression analysis of dependent factor “depression” measured on the HADS-M; Adjusted $R^2 = 0.298$; $F(13.907) = 31.1$; $p < 0.001$; ⁽²⁾ Non-standardized Beta regression coefficient

Discussion

The study compared the occurrence of mental disorders in the study groups. It examined the attitudes towards the pandemic and determined the factors related to the level of anxiety and depression. The study revealed no differences in anxiety and depression between the study groups. This may indicate that having medical knowledge does not protect against these disorders. The state of the pandemic is so severe that each individual is at risk of developing mental disorders.

Pandemic is a condition in which people experience increased levels of stress. This period is even more difficult because it is impossible to predict the duration of the epidemic. It may lead to a number of mental disorders. The most common disorders that occur during epidemiological disasters include: depressive disorders, anxiety disorders, post-traumatic stress disorder, insomnia, problem of addiction to psychoactive substances [8].

The study shows that among various medical professional groups, the profession of a nurse is associated with the risk of anxiety disorders during the epidemic. Moreover, the risk of anxiety disorder is higher for women. This is in line with earlier reports [12]. This important conclusion can be used to plan personalized psychiatric and psychological care in crisis situations such as an epidemic for the most vulnerable professional group. It turns out that the risk of anxiety and depression was higher in people who, due to fear of an epidemic, considered work avoidance. It is important to create good working conditions during an epidemic because job satisfaction is a protective factor against anxiety and depression.

Among the factors that were associated with the onset of anxiety and depression, the most important was having a family member infected with coronavirus. This may indicate that people directly affected by the epidemic and people in their immediate surroundings have a greater risk of developing anxiety or depression. Another important factor related to these disorders was the attitude of the examined person to absenteeism at work. This may be related to exposure to coronavirus at work. Further factors included the subject's perception of the risk of COVID-19 infection as significant. It follows that the feeling of being able to get infected quickly and easily is a factor that increases the risk of anxiety and depression. On the other hand, having knowledge about disease prevention reduced the risk of both anxiety and depression, while knowledge about disease symptoms additionally reduced the risk of anxiety disorders. This conclusion confirms the importance of carrying out information programs on the media related to the prevention and symptoms of SARS-CoV-2 infection.

Another conclusion drawn from the conducted analysis is that in the entire surveyed population the most common cause of anxiety chosen by the respondents was concern for the health of family and loved ones (83.9% in the group of medics and 83.2% in the group of non-medics). These results are consistent with the results of studies on the A/H1N1 influenza epidemic [11]. People associated with medical professions more often indicated the danger of infection as a cause of anxiety. This may be related to the higher level of knowledge as well as knowledge of the consequences of the disease by people with medical education.

Limitations of the study

There are several limitations to this study. The first is the lack of knowledge about the prevalence of depressive and anxiety disorders in the surveyed individuals before the COVID-19 outbreak. The survey was not an experiment, so no cause and effect conclusions can be drawn. Another limitation of the study is the use of a scale measuring the severity of anxiety and depression, and this is not a clinical assessment. Probably, the heterogeneous age structure of the respondents is also important.

Conclusions

The COVID-19 pandemic is accompanied by an increase in the incidence of anxiety and depressive disorders. There was no difference between the disclosure of anxiety and depression in the group of medics and non-medics. Among medical professions, nurses are particularly at risk of developing anxiety disorders. Knowledge about the prevention of coronavirus infection can be a factor in reducing the incidence of anxiety and depressive disorders. Taking into account the above-presented analyzes of the collected data, the drawn conclusions seem to be crucial for understanding the phenomenon of the increase in the frequency of mental disorders during the epidemic, and especially for undertaking clinical remedial actions. The phenomenon of the severity of depressive and anxiety disorders during the epidemic requires further research exploration, including longitudinal studies. The presented results of this research allow to plan adequate care for people affected by these disorders and to assess the effectiveness of therapeutic interventions.

References

1. Worldometers. Covid-19 Coronavirus Pandemic. <https://www.worldometers.info/coronavirus/#countries> (retrieved: 9.05.2020).
2. Huang C, Wang Y, Li X et al. *Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China*. *Lancet* 2020; 395(10223): 497–506. Doi: 10.1016/S0140-6736(20)30183-5.
3. Hu Y, Sun J, Dai Z, Deng H, Li X, Huang Q et al. *Prevalence and severity of corona virus disease 2019 (COVID-19): A systematic review and meta-analysis*. *J. Clin. Virol.* 2020; 127: 104371. Doi: 10.1016/j.jcv.2020.104371.
4. WHO Director-General's opening remarks at the media briefing on COVID-19 – 3 March 2020 – World Health Organization, March 3, 2020.
5. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R et al. *Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study*. *Brain Behav. Immun.* 2020; 87: 11–17. Doi: 10.1016/j.bbi.2020.03.028.
6. Xiang Y-T, Yang Y, Li W, Zhang L, Zhang Q, Cheung T et al. *Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed*. *Lancet Psychiatry* 2020; 7(3): 228–229. Doi: 10.1016/S2215-0366(20)30046-8.
7. Lu W, Wang H, Lin Y, Li L. *Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study*. *Psychiatry Res.* 2020; 288: 112936. Doi: 10.1016/j.psychres.2020.112936.
8. Sani G, Janiri D, Di Nicola M, Janiri L, Ferretti S, Chieffo D. *Mental health during and after the COVID-19 emergency in Italy*. *Psychiatry Clin. Neurosci.* 2020; 74(6): 372. Doi: 10.1111/pcn.13004.
9. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P. *Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pan-*

- demic: A systematic review and meta-analysis*. *Brain Behav. Immun.* 2020; 88: 901–907. Doi: 10.1016/j.bbi.2020.05.026.
10. Zhang WR, Wang K, Yin L, Zhao WF, Xue Q, Peng M et al. *Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China*. *Psychother. Psychosom.* 2020; 89(4): 242–250. Doi: 10.1159/000507639.
 11. Goulia P, Mantas C, Dimitroula D, Mantis D, Hyphantis T. *General hospital staff worries, perceived sufficiency of information and associated psychological distress during the A/H1N1 influenza pandemic*. *BMC Infect. Dis.* 2010; 10: 322. Doi: 10.1186/1471-2334-10-322.
 12. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N et al. *Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019*. *JAMA Netw. Open.* 2020; 3(3): e203976. Doi: 10.1001/jamanetworkopen.2020.3976.

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