Emotional impact of covid-19 on medical and nursing staff in intensive care units

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Συναισθηματικές επιπτώσεις του covid-19 στο ιατρονοσηλευτικό προσωπικό Μονάδων Εντατικής Θεραπείας

Abstract at the end of the article

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Introduction: The COVID-19 pandemic has undoubtedly induced changes in many aspects of people's lives in general, including changes in health behaviors, such as sleep, eating habits and physical exercise, but also in social relationships. High rates of psychological disturbance such as anxiety and depression, were observed among health care professionals, during pandemic. The **aim** of this study was to explore fear, trait anxiety and perceived vulnerability to disease that experience medical and nursing staff working in COVID-19 clinics and Intensive Care Units (ICUs). **Material and Methods:** In the present cross-sectional study were enrolled 111 doctors and nurses working in COVID-19 clinics and ICUs in public hospitals of Athens from March to June 2024. Data were collected by the completion of the scale fear of COVID-19 (FCV-19S), the Trait Anxiety Inventory for adults (STAI) and the scale Self-perception of Vulnerability to Infectious Diseases Scale (PVDS) which includes the dimension of perceived infectability (PVD-Infection) and the dimension of germ aversion (PVD-Germ). The significance level was set at 0.05.
Results: Medical and nursing staff experience fear of low-intensity 21.5±10.4 (values range 7-49), trait anxiety of moderate-intensity 49,3±8,1 (values range 20-80) and moderate perceived vulnerability to disease 65.5±12.7 (values range 15-105). Higher disease fear was reported by nurse assistants (p=0.002) and those working in COVID clinics (p=0.037). Higher trait anxiety was reported by unmarried participants (p=0.002), nurse assistants (p=0.021), those having no children (p=0.036) and no postgraduate studies (p=0.022). In dimension PVD-Infection of PVDS, higher scores were observed by participants with a chronic health problem (p=0.005) while in the dimension PVD-Germ, by participants having 16-36 years of work experience (p=0.047).

Conclusions: Medical and nursing staff experienced trait anxiety and disease perceived vulnerability of moderate intensity and fear of low intensity. Demographic, professional, and social factors are associated with the total score of each scale.

Key-words: *Fear of COVID-19, Trait Anxiety, Vulnerability to Infectious Diseases*

Introduction

Coronavirus disease 2019 (COVID-19) is a highly contagious disease caused by the SARS-CoV-2 virus.[1] The severity of COVID-19 was underestimated until the National Health Commission officially classified it as a type B infectious disease and took measures to deal with it on 20th of January 2020.[2] The World Health Organization announced the disease as a pandemic in March 2020.[3] COVID-19 causes damages to respiratory system and is associated with increased morbidity and mortality. Apart from physical health, COVID-19 affects mental health.[2]

Fear, anxiety and depression are common in health care professionals providing direct care to COVID-19 patients. Several reasons are to be held responsible for this emotional burden such as changes in daily life, information about disease, fear of virus transmission, lack of predictability as well as uncertainty, financial insecurity, and worries about the well-being of loved ones.[2,3] A crucial factor associated with anxiety in health personnel, especially nurses amid the COVID-19 pandemic was the high rate of healthcare worker infection and mortality.[4]

Furthermore, public health emergencies provoke negative emotions. Many theories suggest that uncertainty and lack of predictability related to COVID-19 affect individuals' mental health, and more specifically the emotions and cognitive functioning. According to the Behavioral Immune System (BIS) theory, individuals are likely to respond with negative emotions and negative evaluation for their self-protection. In the long term, maintenance of negative emotions affects immune function and the balance of physiological mechanisms.[5] Additionally, in the period of COVID-19 health professionals did not only encounter with the burden of pain and death but also with a tremendous imbalance between patients' or personal needs and resources, thus affecting physical and emotional resilience.[6,7]

During health emergencies, several psychological disturbances come to the fore and are reflected in emotions and cognition. Therefore, it is essential to monitor psychological burden through emotional (such as negative and positive emotions) and cognitive indicators (such as social risk assessment and life satisfaction).[2]

The **purpose** of the study was to explore fear, trait anxiety and perceived vulnerability to disease among medical and nursing staff in COVID-19 clinics and COVID-19 intensive care units (ICUs).

Material and methods
Setting, and Period of the Study

In the present cross-sectional study were enrolled 111 health care professionals (nurses, doctors) working in COVID-19 clinics and in COVID-19 ICUs of two public hospital in Athens from March to June 2024. Participants were selected by the method of convenience sampling.

Inclusion and Exclusion Criteria of the Sample

Criteria for inclusion in the study were as follows: a) work in COVID-19 clinic or in COVID-19 ICU, b) not having any psychiatric diagnosis or treatment for it, c) not taking any courses about coping with anxiety and stress, and d) willingness to participate in the study.

Research instrument

Data were collected using a research instrument which included participants' characteristics and the following scales: a) COVID-19 Fear Scale (FCV-19S), b) Trait Anxiety Inventory for adults (STAI) questionnaire and c) Perceived Vulnerability to Infectious Diseases Scale (PVDS). More in detail:

The Fear of COVID-19 Scale (FCV-19S) was designed in 2020 by Ahorsu et al.,[8] to assess the level of fear related to SARS-CoV-2. To explore the aspects of fear in Greek population, the instrument was translated and validated by Tsipropoulou et al.,[9] in 2021. FCV-19S scale consists of

seven items. Respondents are able to answer every item in a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree). Total scores range from 7 to 35 with higher scores representing greater fear of coronavirus disease. The original scale showed very good internal consistency (**α** = .82).[10]

The questionnaire "State Trait Anxiety Inventory for adults" (STAI) by Ch. Spielberger is a key tool for measuring anxiety. It has the ability to distinguish between transient-momentary anxiety (state anxiety) and permanent and more general (trait anxiety). It has been adapted to more than forty languages and is the most widespread tool for measuring anxiety. The reliability of the scale for measuring trait anxiety is high from 0.65 to 0.86 while for state anxiety the reliability is 0.16 to 0.62. This anticipated low stability reflects the impact of various emotional states that are experienced by an individual when completing this scale. Respondents have the opportunity to indicate their agreement with each variable on a four-point Likert-type scale ranging from not at all, somewhat, moderately to very much for state anxiety and almost never, sometimes, often, almost always for trait anxiety. STAI is a reliable tool for assessing both state and trait anxiety. In the present study was completed only trait anxiety scale.[11,12]

The Perceived Vulnerability to Disease Scale (PVDS) is a 15-item scale that measures concerns about transmission of infectious disease. The PVDS scale assesses two dimensions: a) perceived infectability, PVD Infection (7 item subscale) and b) perceived germ aversion PVD-Germ (8-item subscale). Participants respond to each item on a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree) with approximately half of the items reverse-scored. Higher scores indicate greater perceived infectability, perceived germ aversion, and overall perceived vulnerability to disease.[13]

Ethical Considerations

The present study was approved by the Research Committee of the public hospitals. Participants who met the entry criteria were informed by the researcher for the purposes of this study. All subjects participated in the study after they had given their written consent. Data collection guaranteed anonymity and confidentiality. All subjects had been informed of their rights to refuse or discontinue participation in the study, according to the ethical standards of the Declaration of Helsinki (1989) of the World Medical Association.

Statistical analysis

A normality test was performed on continuous variables using the Kolmogorov-Smirnov test. Categorical data are presented with absolute and relative (%) frequencies, while continuous data are presented with mean values ± standard deviations. The t-test was used to test for the correlation between two quantitative continuous variables that follow a normal distribution, while ANOVA was used for more than two. The problem of multiple testing was overcome by performing a Bonferroni correction. The Pearson Correlation test was also applied. A significance level of ≤5% was considered statistically significant. All statistical analyses were performed with the SPSS-25 statistical package.

Results
Descriptive results

The study sample consisted of 111 medical and nursing personnel who worked at two public hospitals, of whom the largest percentage were women (64.0%). Regarding age, 24.3% were under 30 years old, 63.1% were 31-50 years old and 12.6% were over 50 while in terms of marital status the largest percentage were married or cohabiting. (63.1%). Furthermore, 24.3% of the sample were doctors, 50.0% nurses and 20.7% nurse assistants while 34.2% had a master's degree and 9.9% had a doctorate. Moreover, the 42.3% of the sample had children and the 41.4% had family members belonging to a vulnerable group. In terms of hospital department, 53.2% were working in a COVID ICU and 46.8% in a COVID clinic. Regarding health, 83.8% of the sample got sick with COVID while 29.7% had comorbidities. (Table 1).

The mean value of total fear score was 21.5±10.4 (range 7-49). The mean value of trait anxiety score was 49.3±8.1 (range 20-80). The mean value of total score of perceived vulnerability (PVDS) was 65.5±12.7 (range 15-105). In terms of perceived vulnerability (PVDS) dimensions, the mean value of perceived infectability score (PVD-Infection) was 27.2±6.8 (range 1-49) and the mean value of perceived germ aversion (PVD-Germ) was 38.2±7.8 (range 1-56). (Table 2).

Statistical results

From the application of the t-test, no statistically significant differences were found between gender and fear score (p=0.291) as well as in the dimension

of perceived infectability (p=0.977), perceived germ aversion (p=0.212) and in total score of perceived vulnerability (p=0.430). Also, no statistically significant differences were found in score of trait anxiety, (p=0.196). Notably, both genders experienced moderate intensity of trait anxiety, with greater intensity in women (50 vs 48 and p=0.195). (Table 3).

In relation to age, no statistically significant differences were found in all above dependent variables explored in this study (p>0.05). (Table 4).

Unmarried participants experienced higher levels of trait anxiety (p=0.002) and differed statistically significantly from both married participants (p=0.022) and divorced/widowed (p=0.007). (Table 5).

Regarding the specialty of health professionals, a statistically significant difference was found in fear score, where nurses assistants experienced higher levels (p=0.002) and differed statistically significantly only from nurses (p=0.002). Also, nurses assistants experienced higher trait anxiety (p=0.021) and differed statistically significantly only from doctors (p=0.022). (Table 6).

Regarding postgraduate studies, participants having no postgraduate studies experienced higher levels of trait anxiety (p=0.022) and differed only from those who had a doctorate (p=0.038). (Table 7).

Data statistical analysis showed that participants having no children experienced higher trait anxiety (p=0.036) while no statistically significant differences were found in the other scales, although higher scores on both scales were observed by participants who had children in the family (p>0.05). (Table 8).

No statistically significant differences were found in any scale in relation to the existence of family members belonging to a vulnerable group (p>0.05). (Table 9).

In terms of COVID department, participants working in a COVID clinic and not in a COVID ICU had a higher score on fear scale (p=0.037) while no statistically significant differences were found on the other scales (p>0.05). (Table 10).

Regarding years of professional experience, a statistically significant difference was found only in dimension of the germ aversion, where the highest total score was obtained by those having 16-36 years of professional experience (p=0.047) and differed statistically significantly only from those with 1-5 years (p=0.047). (Table 11).

Being sick with COVID was not found to have a statistically significant effect on score of fear scale, of the scale of perceived vulnerability to disease and the scale of trait anxiety (p>0.05). (Table 12).

In terms of a chronic health problem, it was found that those with chronic health issue had a higher score on the dimension of perceived infectability (p=0.005). (Table 13).

From the application of Pearson Correlation statistical test, it was found that years of professional experience had a positive correlation with the dimension of germ aversion (p=0.004). The total fear score was positively correlated with perceived infectability (p=0.001), germ aversion (p=0.007), perceived vulnerability (p=0.001) and the trait anxiety score (p=0.002). Perceived infectability was positively correlated with germ aversion (p<0.001), perceived vulnerability (p<0.001) and the trait anxiety score (p=0.026) while germ aversion was positively correlated with perceived vulnerability (p<0.001) and the trait anxiety score (p=0.043). (Table 14).

Descriptive and statistical tables

Table 1. Distribution of the sample according to their demographic and professional characteristics

DEMOGRAPHIC AND PROFESSIONAL CHARACTERISTICS		n	%
Gender	Man	40	36,0
	Woman	71	64,0
Age (years)	Up to 30 years	27	24,3
	31-50	70	63,1
	51-59	14	12,6
Marital status	Married / Cohabiting	70	63,1
	Unmarried	33	29,7
	Widowed/Divorced	8	7,2

Specialty of health professionals	Doctor	27	24,3
	Nurse	61	79,3
	Nurse assistant	23	20,7
Postgraduate Studies	Master	38	34,2
	Doctorate	11	9,9
	None of the two	62	55,9
Children in family	Yes	47	42,3
	No	64	57,7
Family members who belong to vulnerable groups	Yes	46	41,4
	No	64	99,1
COVID Department	COVID -ICU	59	53.2
	COVID-Clinic	52	46.8
Yeats of Professional experience	1-5 years	33	29,7
	6-15 years	46	41,4
	16-36 years	32	28,8
Have you ever been sick with Covid?	Yes	93	83,8
	No	18	16,2
Do you suffer from a health problem?	Yes	33	29,7
	No	78	70,3

Table 2. Distribution of the sample according to total fear score (FCV-19S), trait anxiety (STAI) and perceived vulnerability (PVDS) and its dimensions

Scales of FCV-19S, PVDS, Trait STAI		$\overline{X}\pm$SD	Range of scores
Total score of FCV-19S		21,5±10,4	7-49
Total score of trait anxiety		49,3±8,1	20-80
Total score of PVDS		65,5±12,7	15-105
PVDS Dimensions	Perceived infectability PVD-Infection	27,2±6,8	1-49
	Perceived germ aversion PVD-Germ	38,2±7,8	1-56

Table 3. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and the gender of the sample

Scales of FCV-19S, PVDS, Trait STAI	GENDER				
	MEN		**WOMEN**		
	n	$\overline{X}\pm$SD	n	$\overline{X}\pm$SD	**p**
Total score of FVC-19S	40	22,9±10,5	71	20,7±10,3	0,291
PVD-Infection	40	27,2±5,9	71	27,2±7,3	0,977
PVD-Germ	40	37±7,7	71	38,9±7,9	0,212
Total Score PVDS	40	64,2±12,9	71	66,2±12,5	0,430
Total Score Trait anxiety	40	48,0±8,4	71	50,0±7,9	0,195

Table 4. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and the age of the sample

Scales of FCV-19S, PVDS, Trait STAI	AGE						
	Up to 30 years		31-50		51-59		p
	N	$\overline{X}$±SD	n	$\overline{X}$±SD	n	$\overline{X}$±SD	
Total score of FVC-19S	40	20,0±8,5	71	22,3±10,8	14	20,1±11,6	0,551
PVD-Infection	40	27±6,1	71	27,3±6,5	14	27,1±9,3	0,972
PVD-Germ	40	36,9±8,5	71	38,8±7,6	14	38,2±7,8	0,581
Total Score PVDS	40	63,9±13,7	71	66,1±11,8	14	65,1±15,4	0,744
Total Score Trait anxiety	40	52,4±8,4	71	48,3±8,1	14	48,3±6,8	0,069

Table 5. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and marital status of the sample

Scales of FCV-19S, PVDS, Trait STAI	MARITAL STATUS						
	Married Cohabiting		Unmarried		Widowed Divorced		p
	N	$\overline{X}$±SD	n	$\overline{X}$±SD	n	$\overline{X}$±SD	
Total score of FVC-19S	70	22,3±10,6	33	19,2±9,9	8	23,3±9,9	0,306
PVD-Infection	70	27,9±6,8	33	26,2±6,8	8	25,9±6,6	0,441
PVD-Germ	70	38,7±7,9	33	37,5±7,8	8	37,6±7,8	0,742
Total Score PVDS	70	66,5±12,5	33	63,7±13,1	8	63,5±12,3	0,509
Total Score Trait anxiety	70	48,3±7,4	33	52,8±8	8	43,3±9,4	0,002

Table 6. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and profession of the sample

Scales of FCV-19S, PVDS, Trait STAI	PROFESSION						
	Doctor		Nurse		Nurse Assistant		p
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	n	$\overline{X}$±SD	
Total score of FVC-19S	27	22,8±9,8	61	18,7±10	23	27,2±9,6	0,002
PVD-Infection	27	27,9±6,3	61	26,7±7,5	23	27,9±6,8	0,642
PVD-Germ	27	37,6±8,0	61	39,0±7,9	23	37,0±7,6	0,523
Total Score PVDS	27	65,5±13,5	61	65,7±12,9	23	64,9±11,4	0,971
Total Score Trait anxiety	27	45,9±7,9	61	49,8±8,2	23	52±7	0,021

Table 7. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and postgraduate studies of the sample

Scales of FCV-19S, PVDS, Trait STAI	POSTGRADUATE STUDIES						
	Master		Doctorate		None of the two		p
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	n	$\overline{X}$±SD	
Total score of FVC-19S	38	20,5±9,7	11	24,5±9,2	62	21,5±11,0	0,526
PVD-Infection	38	27,4±6,9	11	30,1±3,9	62	26,6±7,0	0,281
PVD-Germ	38	38,5±9,2	11	42,8±6,0	62	37,3±7,0	0,093
Total Score PVDS	38	65,9±14,8	11	72,9±7,4	62	63,9±11,6	0,087
Total Score Trait anxiety	38	48,0±8,2	11	44,4±7,4	62	50,9±7,8	0,022

Table 8. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and children in family of the sample

Scales of FCV-19S, PVDS, Trait STAI	CHILDREN IN FAMILY				
	YES		NO		P
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	
Total score of FVC-19S	47	22,6±11,0	64	20,6±9,9	0,315
PVD-Infection	47	27,7±6,2	64	26,9±7,2	0,510
PVD-Germ	47	39,9±7,9	64	37,0±7,6	01061
Total Score PVDS	47	67,6±11,9	64	63,9±13,0	0,130
Total Score Trait anxiety	47	47,4±7,2	64	50,7±8,5	0,036

Table 9. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and family members of the sample who belong to a vulnerable group

Scales of FCV-19S, PVDS, Trait STAI	FAMILY MEMBERS WHO BELONG TO VULNERABLE GROUPS				
	YES		NO		p
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	
Total score of FVC-19S	46	20,1±9,9	65	22,4±10,7	0,235
PVD-Infection	46	27,5±5,5	65	27,0±7,6	0,743
PVD-Germ	46	37,3±8,5	65	38,9±7,3	0,291
Total Score PVDS	46	64,8±12,8	65	66±12,6	0,633
Total Score Trait anxiety	46	48,3±7,8	65	50,0±8,3	0,267

Table 10. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and hospital department of the sample

Scales of FCV-19S, PVDS, Trait STAI	DEPARTMENT OF WORK				
	COVID ICU		COVID CLINIC		p
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	
Total score of FVC-19S	59	19,5±10,7	52	23,6±9,6	0,037
PVD-Infection	59	26,4±7,0	52	28,2±6,5	0,168
PVD-Germ	59	38,1±7,0	52	38,4±8,7	0,880
Total Score PVDS	59	64,5±12,1	52	66,5±13,2	0,405
Total Score Trait anxiety	59	48,1±7,9	52	50,6±8,2	0,114

Table 11. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and years of work experience of the sample

Scales of FCV-19S, PVDS, Trait STAI	YEARS OF PROFESSIONAL EXPERIENCE						
	1-5 Years		6-15 Years		16-36 Years		p
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	n	$\overline{X}$±SD	
Total score of FVC-19S	33	19,5±9,3	46	22,8±9,8	32	21,6±12,1	0.373
PVD-Infection	33	27,5±7,0	46	27,2±6,2	32	26,9±7,5	0,937
PVD-Germ	33	36,2±7,9	46	37,8±7,5	32	40,9±7,8	0,047
Total Score PVDS	33	63,8±13,4	46	65,0±11,9	32	67,9±13,0	0,410
Total Score Trait STAI	33	51,5±8,3	46	48,6±7,3	32	47,9±8,7	0,150

Table 12. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and sickness of sample with COVID-19

Scales of FCV-19S, PVDS, Trait STAI	BEEN EVER SICK WITH COVID-19				
	YES		NO		
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	p
Total score of FVC-19S	93	20,7±10,4	18	25,2±9,8	0,092
PVD-Infection	93	27,3±7,0	18	26,9±6,1	0,820
PVD-Germ	93	38,8±7,7	18	35,6±8,2	0,113
Total Score PVDS	93	66,1±*12,*6	18	62,4±*12,*8	0,270
Total Score Trait anxiety	93	48,8±8,3	18	51,5±6,9	0,205

Table 13. Comparison between mean values of total fear score (FCV-19S), perceived vulnerability (PVDS) and its dimensions, trait anxiety (STAI) and comorbidity of the sample

Scales of FCV-19S, PVDS, Trait STAI	COMORBIDITY				
	YES		NO		
	n	$\overline{X}$±SD	n	$\overline{X}$±SD	p
Total score of FVC-19S	33	23,7±10.3	78	20,5±10,3	0,145
PVD-Infection	33	30,0±5,4	78	26,1±7,0	0,005
PVD-Germ	33	37,9±7,3	78	38,4±**8.**1	0,792
Total Score PVDS	33	67,9±11,8	78	64,4±12,9	0,182
Total Score Trait anxiety	33	49,2±7,1	78	49,3±8,5	0,955

Table 14. Correlations		Age	Time of profession experience	Total score of fear	PVD Infection	PVD Germ	Total Score PVDS	Total Score Trait STAI
Age	r	1	,810**	,080	-,023	,129	,068	-,174
	p		,000	,405	,815	,177	,478	,068
	n	111	111	111	111	111	111	111
Years of professional experience	r	,810**	1	,063	-,002	,268**	,165	-,171
	p	,000		,514	,983	**,004**	,083	,072
	n	111	111	111	111	111	111	111
Total score of fear	r	,080	,063	1	,298**	,255**	,318**	,288**
	p	,405	,514		**,001**	**,007**	**,001**	**,002**
	n	111	111	111	111	111	111	111
PVD-Infection	r	-,023	-,002	,298**	1	,492**	,842**	,211*
	p	,815	,983	,001		**,000**	**,000**	**,026**
	n	111	111	111	111	111	111	111
PVD-Germ	r	,129	,268**	,255**	,492**	1	,884**	,128
	p	,177	,004	,007	,000		**,000**	,181
	n	111	111	111	111	111	111	111

PVDS	r	,068	,165	,318**	,842**	,884**	1	,193*
	p	,478	,083	,001	,000	,000		**,043**
	n	111	111	111	111	111	111	111
Total Score Trait anxiety	r	-,174	-,171	,288**	,211*	,128	,193*	1
	p	,068	,072	,002	,026	,181	,043	
	n	111	111	111	111	111	111	111

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Discussion

Coronavirus disease (COVID-19) is a severe acute respiratory syndrome caused by coronavirus 2 (SARS-CoV-2) that was first described in Wuhan, China, in late 2019.[14,15] Though many countries were confident about their preparedness to encounter with this pandemic, however in many cases this proved an unrealistic expectation. For example, it was revealed inadequate availability of mechanical ventilation equipment and an imbalance between supply and demand for personal protective equipment.[16,17] Healthcare professionals exposed to potentially infected patients were at higher risk of infection. Additionally, psychosocial burden emerged to surface due to great deal of work including increased working hours, separation from family members, fear of transmission to family and wearing uncomfortable but protective clothing while at duty.[18,19]

Descriptive analysis showed that the mean value of total fear score was 21.5±10.4 (range 7-49) and of total trait anxiety score 49.3±8.1 (range 20-80). The mean value of perceived infectability score was 27.2±6.8, of perceived germ aversion 38.2±7.8 and of total perceived vulnerability 65.5±12.7 (range 15-105). Notably, these data were collected in 2024, after the COVID-19 outbreak but levels of each scale are yet not below moderate.

The finding concerning fear score (FCV-19S: 21.5±10.4) seems to be consistent with literature in several periods of pandemic. In the study conducted by Barbosa-Camacho et al.,[20] in a sample of 1216 healthcare and non-healthcare workers during May 2020 the mean FCV-19S score was 16.4±6.1 with significant difference between women and men, as measured by the same instrument. Higher scores were observed in medical students compared to medical personnel as well as in medical and nursing staff compared to staff not working directly with COVID-19 patients. A relevant study conducted by Şımşeklı et al.,[21] in 312 nurses who were providing care to patients during January-April 2021

illustrated a mean FCV-19S score of 19±8.17, indicating moderate fear. Nurses who feared more COVID-19 had higher professional commitment, greater willingness to try, stronger belief in goals and values and were less likely to make communication-related medical errors. The same researchers also showed higher fear scores in women, those who had not experienced COVID-19 and those who provided daily care to over twenty patients. The later finding by Şımşeklı et al.,[21] is in line with the present study that shows higher fear among those in COVID clinics.

A relevant study in 202 surgical nurses providing care of suspected or infected COVID-19 patients in university hospital during November 2020 demonstrated mean FCV-19S score 25.09±7.29, indicating moderate fear. Moreover, nurses who received training related to COVID-19 had lower fear than those who did not. Furthermore, losing a patient because of COVID-19, being older and experienced in nursing was found to affect the fear score.[22] In Philippines Gilo et al.,[23] among 206 frontline nurses (35.5 years±8.17) from June to December 2021 showed mean FCV-19S score 21.76±4.92, indicating an elevated level of fear. Having friends and relatives who were tested positive predicted fear of COVID-19. Additionally, from the study conducted by Gilo et al.,[23] emerged the following qualitative data: a) feelings of fear and moral obligation, b) challenges experienced while providing frontline work, and c) resilience amidst challenges. Liel[24] who explored 260 nurses at COVID-19 hospitals in Palestine from June to August 2020 showed an FCV-19S score of 25.22±5.07, indicating a high level of fear. Higher fear was reported by married nurses, those having children, engaged in rotating shift work, received COVID-19 training and nurses who experienced patient loss due to COVID-19.

The score of trait anxiety in this study was 49.3±8.1, indicating that medical and nursing staff experienced anxiety above to moderate. At period following

the COVID-19 pandemic (April 2023) Wang et al.,[25] showed that a noticeable proportion experienced anxiety (65.07%) in a sample of 2.210 frontline nurses. Research conducted in various countries report high rates of psychological disturbance, such as anxiety and depression, both among health workers and the general population.[26-30] For example, a research including 44 studies with 69.499 healthcare workers showed the following ranges of six mental health outcomes: depression 13.5%-44.7%, anxiety 12.3%-35.6%, acute stress reaction 5.2%-32.9%, post-traumatic stress disorder 7.4%-37.4%, insomnia 33.8%-36.1% and occupational burnout 3.1%-43.0%. Direct exposure to SARS-CoV-2 patients was the most common risk factor identified for all mental health outcomes.[26] Myran et al.,[31] demonstrated high levels of anxiety, depression, burnout, and stress during COVID-19 pandemic among physicians. A multicenter survey of 3.128 physicians from May to October 2020 found that a quarter were anxious, a third were stressed, and almost half reported burnout. Moreover, it is estimated that 37% of clinical nurses reported anxiety during outbreak of COVID-19 and were still troubled by anxiety even in late epidemic phases. These remarkable percentages merit further research as increased levels of anxiety may compromise work efficiency and eliminate professional commitment.[25] Changes in behaviors, thoughts, and feelings may be a normal response to stressful situations. Anxiety is attributed to the perceived inability to control or achieve the desired results when confront with potential threats. Symptoms of anxiety undermine a person's well-being and quality of life and demand mental health support.[32]

In the present study, a high total score of perceived vulnerability was found (PVDS 65.5±12.7), which is in line with the study by Pasay-An[33] who indicated that frontline nurses perceived moderate to high sensitivity to stress in COVID-19, as measured by PVDS scale and Perceived Stress Scale. Yang et al.,[34] support that individuals with higher PVDS score may perceive COVID-19 as a stressful, threatening event, thus experiencing higher anxiety. According to the terror management theory, individuals experience fear and anxiety when facing death threats. On the other end of the spectrum, individuals who perceive themselves as susceptible to disease put more emphasis on COVID-19-related information, tend to adhere to public safety measures, and to rely on government. Furthermore, when government management is effective individuals experience support and protection which promote their resilience to catastrophic events.[34] On the contrary, lack of resources, such as protective equipment, put them on the front line of vulnerability to COVID-19, thus leading to anxiety and uncertainty.

In terms of trait anxiety, higher levels had unmarried participants, those who had no postgraduate studies, had no children and the nurse assistants. In terms of marital status, being in a relationship mitigates the risk of developing symptoms of anxiety or stress during COVID-19 since companionship provides up to some extent means of socializing particularly within restrictions during pandemic. On the other side, the widowed having been through the loss of partner and the subsequent grief, may have already developed resilience which helps them cope with the pandemic.[35] Single individuals are more likely to feel the effects of loneliness and isolation.[35] Isolated individuals become more vulnerable to anxiety, depression, self-harm, and suicide.[35,36] Measures aimed at reducing loneliness and promoting connectedness can be protective against emotional disturbance.[35] The present data may be useful in developing interventions targeted at single individuals with ultimate goal to prevent or mitigate mental health consequences of COVID-19 pandemic or in future crisis situations.

In relation to years of professional experience, a difference was found only in the dimension of germ aversion where the highest score was obtained by those having 16-36 years of professional experience and differed statistically significantly from those with 1-5 years. Pasay-AnE,[33] in a relevant study explored perceived vulnerability to COVID-19 and perceived stress of frontline nurses. More in detail, the findings by the study of Pasay-AnE,[33] agree with the present study, as the high perceived infectability and germ aversion of frontline nurses put them in a moderately stressful state.

In the present study, age and gender of frontline nurses were not determinants of perceived infectability and germ aversion. Females had slightly higher scores on perceived infectability and germ aversion than males, but differences were no statistically significant. A study[37] on perceived vulnerability to disease showed higher scores in females than males. Also, both genders experienced moderate intensity of trait anxiety, with greater intensity in women which is partially explained by a higher susceptibility of women to anxiety. Verma et al.,[38]demonstrated that respond to stress varies between genders both psychologically and biologically.

A larger number of years in nursing experience was

associated with higher germ aversion compared to fewer years. According to Do et al.,[39] germ aversion is more related to disgust or discomfort about certain risk behaviors while perceived infectability is a cognitive factor about fears, beliefs, and subjective perceptions. Possibly, experienced nurses tend to prioritize adherence to social norms when they perceive risks, such as the risk of germ infection. Additionally, more, due to their experience, they tend to think more mature and rational, thus showing courage when confronting with stressful events. Hospital authorities acknowledge that nurses with experience manage to have better control over the workplace or the situation. According to Shanafelt et al.,[40] those with more years of experience may feel closer to key decision-makers and have access to timely or specific data.

There was no significant association between perceived vulnerability to disease and anxiety that experienced frontline nurses. This suggests that perceived vulnerability does not always translate into anxiety. Given that present data were collected after the COVID-19 outbreak when participants had already acquired experience, a plausible explanation of the finding is that they managed to protect themselves from infection, performed their roles with confidence and recognized potential sources of disease exposure, thus experiencing less anxiety. This information, however, contradicts published data showing that individuals with higher perceived vulnerability scores are also vulnerable to anxiety.[8,11] Taylor et al.,[41] found moderate to high correlations of the two PVD subscales with the total score of the COVID Stress Scales which measures the COVID stress syndrome.

It is widely known that health professionals in every clinical environment always faced with many occupational exposures involving serious consequences to their health.[42] Presently, the need for preventive measures, positive health behavior are essential to limit occupational exposures for subsequent disasters.[43] It is important to implement effective strategies to confront with adverse COVID-19 psychological effects of frontline healthcare professionals. Support by colleagues and supervisors along with clear communication of guidelines or preventive measures to reduce psychiatric symptoms are strongly recommended. Identification of high-risk frontline nurses for perceived vulnerability to illness and psychological distress enable meaningful implementations of early intervention. Protecting mental health of nurses always mean better quality of provided healthcare.[4,44,45]

Limitations of the study

The present study was of cross-sectional design and there was no evidence of causal relationship between all dimensions under assessment. The method of convenience sampling was not representative of all medical and nursing staff in COVID-19 departments in Greece, thus limiting the generalizability of the results. Although many significant associations were observed, the sample size might be a small one. Another limitation is that the present data were collected in 2024, a time when the COVID-19 outbreak had receded as well as that participants were only from COVID-19 clinics and ICUs from two central hospitals in Athens, one of which was also a Reference Center for the disease and the workload was heavier.

Conclusions

The present study showed that medical and nursing staff experience low levels of fear, moderate to severe trait anxiety and moderate levels of perceived vulnerability.

Fear of COVID-19, trait anxiety and perceived vulnerability to disease were associated with hospital department, the specialty of the participants and years of professional work. The findings may contribute to good practices for frontline nurses during pandemics.

Furthermore, fear, trait anxiety, and perceived vulnerability may undermine a person's well-being and quality of life and create the need for mental health support.

To effectively address the impact of COVID-19, the general public and healthcare professionals must all be equipped with appropriate tools and knowledge.

ΠΕΡΙΛΗΨΗ

Συναισθηματικές επιπτώσεις του covid-19 στο ιατρονοσηλευτικό προσωπικό Μονάδων Εντατικής Θεραπείας

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Εισαγωγή: *Η πανδημία COVID-19 έχει προκαλέσει, αναμφίβολα, αλλαγές σε πολλές πτυχές της ζωής των ανθρώπων γενικά, συμπεριλαμβανομένων αλλαγών στις συμπεριφορές υγείας, όπως στον ύπνο, στις διατροφικές συνήθειες και στη σωματική άσκηση, αλλά και στις κοινωνικές σχέσεις. Υψηλά ποσοστά ψυχικών διαταραχών, όπως άγχος και κατάθλιψη, παρατηρήθηκαν μεταξύ των επαγγελματιών υγείας, κατά τη διάρκεια της πανδημίας.* **Σκοπός** *αυτής της μελέτης ήταν να διερευνήσει τον φόβο, το μόνιμο άγχος και την αντιληπτή ευαλωτότητα σε νόσο που βιώνει το ιατρονοσηλευτικό προσωπικό που εργάζεται σε κλινικές και ΜΕΘ COVID-19.*

Υλικό και Μέθοδος: *Στην παρούσα συγχρονική μελέτη συμμετείχαν 111 ιατροί και νοσηλευτές που εργάζονταν σε κλινικές και ΜΕΘ COVID-19 σε δημόσια νοσοκομεία της Αθήνας από τον Μάρτιο έως τον Ιούνιο του 2024. Τα δεδομένα συλλέχθηκαν με τη συμπλήρωση της κλίμακας Φόβου για τον COVID-19 (FCV-19S), του ερωτηματολογίου State Trait Anxiety Inventory for adults (STAI) και της κλίμακας αντιληπτής ευαλωτότητας σε λοιμώδη νοσήματα (PVDS) που απαρτίζεται από τη διάσταση της αντιληπτής μολυσματικότητας (PVD-Infection) και τη διάσταση της αποστροφής μικροβίων (PVD-Germ). Το επίπεδο στατιστικής σημαντικότητας ορίστηκε στο 0,05.*

Αποτελέσματα: *Το ιατρονοσηλευτικό προσωπικό βιώνει φόβο χαμηλής έντασης 21,5±10,4 (με εύρος τιμών 7-49), μόνιμο άγχος μέτριας έντασης 49,3±8,1 (με εύρος τιμών 20-80) και μέτρια αντιληπτή ευαλωτότητα σε νόσο 65,5±12,7 (με εύρος τιμών 15-105). Υψηλότερο φόβο για τη νόσο παρουσίασαν οι βοηθοί νοσηλευτών (p=0,002) και όσοι εργάζονταν σε κλινικές COVID (p=0,037). Υψηλότερο μόνιμο άγχος ανέφεραν οι άγαμοι (p=0,002), οι βοηθοί νοσηλευτών (p=0,021), όσοι δεν είχαν παιδιά (p=0,036) και εκείνοι που δεν είχαν μεταπτυχιακές σπουδές (p=0,022). Στη διάσταση της αντιληπτής μολυσματικότητας (PVD-Infection), υψηλότερες βαθμολογίες παρατηρήθηκαν στους συμμετέχοντες με χρόνιο πρόβλημα υγείας (p=0,005) ενώ στη διάσταση της αποστροφής μικροβίων (PVD-Germ), στους συμμετέχοντες με εργασιακή εμπειρία 16-36 ετών (p=0,047).*

Συμπεράσματα: *Το ιατρονοσηλευτικό προσωπικό βιώνει μόνιμο άγχος και αντιληπτή ευαλωτότητα στη νόσο μέτριας έντασης και φόβο χαμηλής έντασης. Δημογραφικοί, επαγγελματικοί και κοινωνικοί παράγοντες συσχετίζονται με τη συνολική βαθμολογία κάθε κλίμακας.*

Λέξεις-κλειδιά: *Φόβος, μόνιμο άγχος, αντιληπτή ευαλωτότητα*

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