

Research article

Greek anaesthesiologists' post-traumatic stress syndrome in the post-COVID-19 era: An observational, multicenter, cross-sectional study from COVID-19 referral, university/tertiary hospitals

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ABSTRACT

Anaesthesiologists actively involved with COVID-19 are at increased risk for post-traumatic stress syndrome (PTSS). We assessed the PTSD and possible determinants of anaesthesiologists in COVID-19 referral hospitals in the post-COVID-19 era with the validated PTSD Checklist for DSM-5 (PCL-5) and the Eysenck Personality Questionnaire (EPQ). A multicenter cross-sectional survey was conducted among anaesthesiologists working in the 7 COVID-19 referral university/tertiary hospitals during November 2022 (post-COVID-19 era) in Greece. PCL-5 is a 20-item, 5-point Likert scale self-report measure, scored in two different ways to ensure a provisional diagnosis of PTSS. Eysenck Personality Questionnaire (EPQ) explores 3 main dimensions of personality, whereas the Lie (L) scale serves as a measure of "dishonesty". Multivariate logistic regression analysis was performed to identify predicting factors of PTSS using the stepwise forward method. One hundred doctors (response rate 85%) from 7 hospitals (72% females, median age 46 [33–51.5] years) participated. The overall Cronbach's alpha for PCL-5 was 0.946. According to each scoring, 18% and 23% of responders were diagnosed with PTSS, respectively, while 7% were classified as suffering from probable PTSD. Interestingly, children (OR=0.17, $p=0.048$) and the satisfaction with job position (OR=0.211, $p=0.024$) exhibited a protective effect against PTSS. On the other hand, family obligations were identified as an aggravating factor (OR=4.274, $p=0.026$). Concerning personality traits, only neuroticism was identified as a statistically significant independent factor predicting PTSS (OR=1.524, $p=0.001$). Finally, job ranking was also a statistically significant independent factor predicting PTSS, with a 3 times risk augmentation for each level in the job hierarchy (from Residents towards Academics) (OR=3.034, $p=0.022$). In the post-COVID-19 era, up to 23% of Greek anaesthesiologists working in referral hospitals suffered from PTSS. Children and job satisfaction exhibited a protective role in contrast to higher ranks of the job hierarchy.

KEYWORDS: Post-traumatic stress disorder syndrome, COVID-19, pandemics, patient safety, quality.

Introduction

The COVID-19 outbreak originated in China (December 2019) and was soon declared an international public health emergency by the World Health Organization (WHO).^{1,2} The first case in Greece was registered in February 2020, when Greek anaesthesiologists were under high stress and considerable pressure due to critical staff shortages and strenuous working hours.³

Anaesthesiology is a specialty with high stress due to various factors such as an increased risk of burnout, irregular working hours, and high occupational stress.² According to current literature, the mental health of anaesthesiologists is often poor compared to other physicians.³ In addition, anaesthesiologists all around the world have been exposed to severe biological and psychological risks during the pandemic and have faced unprecedented physical and psychological challenges.^{2,4,5} According to the current literature, it seems that the COVID-19 epidemic should be considered as a psychological (emotional) trauma that has led to a long-term psychological epidemic, characterized mainly by post-traumatic stress syndrome (PTSS), among healthcare professionals working in operating theaters and frontline, including anaesthesiologists.⁶

PTSS is a mental health problem that some people develop after experiencing or witnessing a life-threatening event. It has been defined as “an anxiety and memory disorder characterized by the person’s inability to “integrate” the traumatic event into consciousness”.^{7,8} It manifests with dramatic symptoms of hyperarousal, intrusive memorial recollections, nightmares, and somatosensory flashbacks.⁸ Overall, the symptoms are summarized in a four-dimensional structure: (i) intrusion/re-experiencing (criterion B), (ii) avoidance (criterion C), (iii) negative alterations in cognition and mood (criterion D), and (iv) alterations in arousal and reactivity (criterion E).⁷ PTSS can cause significant distress and problems in coping with everyday function and can last for more than one month and up to several years. It may also be associated with anxiety, depression, or substance use disorder.⁶ Several studies have shown that healthcare workers suffered from high levels of anxiety, including PTSS, after previous pandemics, such as severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS), as well as during the COVID-19 pandemic.⁹ During the COVID-19 pandemic, PTSS among healthcare workers ranged from 4.4% to 49.38%. Frontline health workers, female gender, long working hours, and low social support were identified as risk factors for PTSS.⁹

Currently, data on the prevalence of PTSS and possible predictors or contributors among anaesthesiologists in Greece are lacking. Hence, we ought to: (1) Assess the PTSS levels of anaesthesiologists working in COVID-19, university/tertiary referral hospitals, one year after the fourth and most severe peak of the pandemic in Greece, (2) Identify possible sociodemographic- and personality-related determinants of PTSS.

Materials and Method

Participants and procedures

Reporting conforms to the STROBE (Strengthening The Reporting of Observational Studies in Epidemiology) statement for observational, cross-sectional studies.¹⁰ This was a voluntary, purely observational, and non-interventional study with anonymized data.

A cross-sectional study was conducted one year after the 4th peak of the COVID-19 pandemic, the most severe peak, in Greece (November 2022). Anaesthesiologists working in COVID-19 referral, university/tertiary hospitals deemed eligible to participate. An anonymous self-reported questionnaire was distributed by pre-specified colleagues in each hospital, after the consent of the heads of the departments. In addition, the invitation letter included a note on the first page of our questionnaire, stating that by continuing to browse and complete the questionnaire, participants were giving their consent to take part in this survey. Colleagues who were not involved in the care of COVID-19 patients (e.g., residents during their first month of training) for certain reasons and those who refused to participate were excluded from participation. All colleagues were informed that their participation was voluntary and anonymous and that all information provided would be treated confidentially. Permission to conduct the study was also obtained from each hospital director.

Measures

The survey consisted of 4 parts. The first part consisted of 9 questions regarding basic sociodemographic, medical, and occupational information, including gender, age, marital status, number of children, smoking and alcohol use, cardiovascular, malignant, or autoimmune comorbidities, and current working rank (resident, locum consultant, junior consultant, senior consultant, director consultant, coordinating director, and academic consultant).

The second part consisted of questions about satisfaction and how family interferes with job demands and vice versa.

The third part was the Post-Traumatic Stress Disorder Checklist for DSM-5 (PCL-5) validated for the Greek population.⁷ The PCL-5 is a 20-item self-reported psychometric instrument, scored on a 5-point Likert scale that measures and assesses PTSS symptoms.⁶ Responses are categorized as 0 (not at all), 1 (a little), 2 (moderately), 3 (quite), and 4 (extremely), concerning traumatic life experiences.⁷ The scale consists of the following factors: Intrusion/re-experiencing, avoidance, negative changes in cognition and mood, and arousal and reactivity. The PCL-5 can be scored and determine a PTSS diagnosis in different ways. Firstly, by summing all 20 items (range 0–80), implementing a total symptom severity score (range 0–80), and using a cut-point score of 31–33. Moreover, by treating each item rated as 2 (“moderately”) or higher as a symptom endorsed, then following the DSM-5 diagnostic rule, which requires at least a score of one or more in the categories of criteria B (items 1–5) and C (items 6–7) and two or more in categories D (items 8–14) and E (items 15–20). Of note, if the score for each item is 2 or more (range 0 to 4) a provisional PTSS diagnosis can be made.⁷

For the fourth part of the study, the Eysenck Personality Questionnaire (EPQ) validated for the Greek population was used.^{11,12} The EPQ explores three main aspects of personality: neuroticism, psychoticism, and extraversion. It consists of 84 statements to be answered with “yes” or “no”. Each participant is assigned a different score for each personality, as there are no cut-off points.^{11–13}

Following the study by Che et al² that examined the extent of PTSD and burnout in Chinese anaesthesiologists, we further categorized participants based on their working rank into the following 4 groups for our analysis: residents, junior consultants (specialists with less than 8 years of clinical experience), senior consultants (specialists with more than 8 years of clinical experience), and academic staff. Nevertheless, all coordinating directors are academic staff in our study sample.

Statistical analysis

The Shapiro-Wilk test was performed to test the normal distribution of the continuous variables. Results for all quantitative variables are presented as mean and standard deviation (SD) or median and interquartile range [IQR], according to the normal distribution. All qualitative variables are reported as absolute and/or relative frequencies. For comparison of continuous variables with two or more degrees of freedom T-test and one factor ANOVA, or their nonparametric equivalents, Mann-Whitney U and Kruskal-Wallis tests, were used. Fisher’s exact test was used for the comparison of cate-

gorical variables. The integral reliability for all questionnaires was examined by Cronbach’s alpha calculation. Spearman’s rank correlation coefficients were estimated to examine relationships between continuous variables. The Bonferroni correction was applied for multiple comparisons.

Finally, a multivariate logistic regression analysis was conducted to identify predictive factors of PTSS. The multivariate logistic regression model was created using the forward stepwise method. The assumptions for the application of multivariate logistic regression were met. In particular, model validation was performed by applying the Hosmer-Lemeshow test (goodness of fit, $p > 0.05$). In addition, after applying Spearman’s correlation test between the independent variables, no correlation exceeded 0.5, thus no multicollinearity was recognized. All tests were two-tailed and statistical significance was set at 5% ($p < 0.05$). Data were analyzed using Stata™ (Version 10.1 MP, Stata Corporation, College Station, TX 77845, USA).

Results

A total of 100 anaesthesiologists working in the 7 COVID-19 referral, university/tertiary hospitals participated in the study (response rate 85%). The majority were female (72%), and the median age of all participants was 46 years, with an IQR of 33 to 51.5 years. The detailed characteristics of the participants are shown in table 1. The groups were similar in terms of demographics and medical history, except for age and marital status/children, which differed between groups as expected (table 2).

The satisfaction levels according to job ranking showed no statistically significant differences (table 3). However, differences were found when comparisons were made by gender (table 4). In particular, when participants were asked, “Do the demands of your job negatively affect the time and energy you devote to your family?” women gave higher percentages on the 5-item Likert scale (worse response) compared to men ($p = 0.016$, table 4).

For the PCL-5, the overall Cronbach’s alpha was 0.946, and the integral reliability was considered good and was > 0.8 . The PTSS diagnosis was based on two different interpretations of the PCL-5 as described in the methods. After the two evaluations, 18% and 23% of respondents were diagnosed with PTSS, respectively, while 7% were classified as probably suffering from PTSS.

Table 5 summarizes the results of the multivariate logistic regression analysis. PTSS was converted to a binary variable and served as the dependent variable, while gender, age, job ranking, marital status, children,

Table 1. Cohort description.

Age (ys)	46 [32–51.5]
Marital status	
Single	36 (36%)
Married/Cohabitation	57 (57%)
Divorced	6 (6%)
Widowed	
Children (yes/no)	28 (28%)/72 (72%)
Number of children	1 [0–1]
Smoking (yes/no)	35 (35%)/65 (65%)
Alcohol	
None/rarely	53 (53%)
Once or twice weekly	34 (34%)
Three to four times weekly	9 (9%)
More than four times weekly	4 (4%)
History of cardiac disease or cancer (yes/no)	7 (7%)/93 (93%)
History of cancer (yes/no)	5 (5%)/95 (95%)
History of autoimmune disease (yes/no)	9 (9%)/91 (91%)
Job characteristics - Rank	
Resident	27 (27%)
Locum consultant	2 (2%)
Consultant B	17 (17%)
Consultant A	16 (16%)
Director consultant	26 (26%)
Coordinating Director*	4 (4%)
Academic consultant	7 (7%)

Results are presented as median [IQR] and as absolute and relative frequencies accordingly.

* All coordinating directors are academics (as all participating hospitals are University Hospitals).

habits (smoking, alcohol consumption), medical history (history of cardiac disease, cancer, autoimmune disease), satisfaction level (as depicted in tables 3 and 4) and all four dimensions of the EPQ served as independent variables in the forward stepwise procedure. The 5-point Likert scales on satisfaction level and “job ranking”, were treated as continuous variables in the model construction. Concerning the dimensions of the EPQ, only neuroticism was identified as a statistically significant independent factor predicting PTSS (OR=1.524, p=0.001). Interestingly, children exhibited a protective effect against PTSS (OR=0.17, p=0.048), as did “satisfaction with job position”. For the latter, there was a risk reduction of almost 80% for each level on the Likert scale in the direction of “best answer/very satisfied”. On the other hand, the statement “Family obligations are negatively affecting the time and energy you devote to your work” was identified as an aggravating factor, with a more than 4-fold increase in risk for each level of

Table 2. Baseline participant characteristics by job rankin.

	Resident (n=27)	Junior Consultant (n=19)	Senior consultant (n=42)	Academic staff (n=11)	p value
Gender (m/f)	9 (33.33%)/18 (66.67%)	5 (26.32%)/14 (73.68%)	12 (28.57%)/30 (71.43%)	1 (9.09%)/10 (90.91%)	0.534
Age (ys)	28 [26–30]	44 [40.5–49]	51 [47–56]	49 [46–52]	0.0001
Marital status (married/cohabitation vs single/divorced)	6 (22.22%)/21 (77.78%)	12 (63.16%)/7 (36.84%)	30 (71.43%)/12 (28.57%)	9 (81.82%)/2 (18.18%)	<0.001
Children (yes/no)	3 (11.11%)/24 (88.89%)	12 (66.67%)/6 (33.33%)	31 (77.5%)/9 (22.5%)	9 (81.82%)/2 (18.18%)	<0.001
Number of children	1 [1–1]	1.5 [1–2]	2 [1–2]	2 [1–2]	0.27
Smoking (yes/no)	6 (22.22%)/21 (77.78%)	6 (31.58%)/13 (68.42%)	18 (42.86%)/24 (57.14%)	4 (36.36%)/7 (63.64%)	0.363
Alcohol (none to twice weekly vs more than 3 times weekly)	22 (81.48%)/5 (18.52%)	19 (100%)/-	37 (88.1%)/5 (11.9%)	9 (81.82%)/2 (18.18%)	0.197
History of cardiac disease (yes/no)	1 (3.7%)/26 (96.3%)	1 (5.26%)/18 (94.74%)	4 (9.52%)/38 (90.48%)	-/11 (100%)	0.817
History of cancer (yes/no)	1 (3.7%)/26 (96.3%)	1 (5.26%)/18 (94.74%)	1 (2.38%)/41 (97.62%)	1 (9.09%)/10 (90.91%)	0.578
History of autoimmune disease (yes/no)	-/27 (100%)	3 (15.79%)/16 (84.21%)	3 (7.14%)/39 (92.86%)	2 (18.18%)/9 (81.82%)	0.067

Results are presented as median [IQR] and as absolute and relative frequencies, accordingly

Table 3. Satisfaction levels by job ranking

	Total (n=100)	Resident (n=27)	Junior Consultant (n=19)	Senior Consultant (n=42)	Academic staff (n=11)	p value
Are you satisfied with your job?						
Not at all	2 (2%)	-	1 (5.26%)	-	-	
Partly satisfied	-	-	-	-	-	
Satisfied	14 (14%)	3 (11.11%)	1 (5.26%)	10 (23.81%)	-	0.089
More than satisfied	31 (31%)	8 (29.63%)	3 (15.79%)	15 (35.71%)	5 (45.45%)	
Very satisfied	53 (53%)	16 (59.26%)	14 (73.68%)	17 (40.48%)	6 (54.55%)	
Are you satisfied with your position?						
Not at all	5 (5%)	1 (3.7%)	2 (10.53%)	1 (2.38%)	-	
Partly satisfied	4 (4%)	2 (7.41%)	1 (5.26%)	-	1 (9.09%)	
Satisfied	15 (15%)	3 (11.11%)	-	11 (26.19%)	1 (9.09%)	0.079
More than satisfied	42 (42%)	13 (48.15%)	6 (31.58%)	19 (45.24%)	4 (36.36%)	
Very satisfied	34 (34%)	8 (29.63%)	10 (52.63%)	11 (26.19%)	5 (45.45%)	
You feel that the demands of your job are negatively affecting the time and energy you devote to yourself.						
Not at all	8 (8%)	1 (3.7%)	1 (5.26%)	6 (14.63%)	-	
Partly	6 (6%)	4 (14.81%)	1 (5.26%)	1 (2.44%)	-	
Neither affects nor does not affect	21 (21%)	7 (25.93%)	5 (26.32%)	6 (14.63%)	3 (27.27%)	0.2
Somewhat	31 (31%)	9 (33.33%)	5 (26.32%)	16 (39.02%)	1 (9.09%)	
Very	33 (33%)	6 (22.22%)	7 (36.84%)	12 (29.27%)	7 (63.64%)	
You feel that the demands of your job are negatively affecting the time and energy you devote to your family.						
Not at all	8 (8%)	2 (7.41%)	3 (15.79%)	3 (7.14%)	-	
Partly	17 (17%)	5 (18.52%)	3 (15.79%)	8 (19.05%)	1 (9.09%)	
Neither affects nor does not affect	21 (21%)	11 (40.74%)	3 (15.79%)	5 (11.9%)	2 (18.18%)	0.108
Somewhat	24 (24%)	6 (22.22%)	4 (21.05%)	13 (30.95%)	1 (9.09%)	
Very	30 (30%)	3 (11.11%)	6 (31.58%)	13 (30.95%)	7 (63.64%)	
You feel that your family obligations are negatively affecting the time and energy you devote to work.						
Not at all	50 (50%)	17 (62.96%)	9 (47.37%)	19 (45.24%)	4 (36.36%)	
Partly	24 (24%)	6 (22.22%)	6 (31.58%)	9 (21.43%)	3 (27.27%)	
Neither affects nor does not affect	14 (14%)	2 (7.41%)	2 (10.53%)	8 (19.05%)	2 (18.18%)	0.537
Somewhat	8 (8%)	2 (7.41%)	-	5 (11.9%)	1 (9.09%)	
Very	4 (4%)	-	2 (10.53%)	1 (2.38%)	1 (9.09%)	
Family loss (yes/no)	55 (55%)/44 (44%)	12 (44.44%)/15 (55.56%)	11 (57.89%)/8 (42.11%)	25 (60.98%)/16 (39.02%)	6 (54.55%)/5 (45.45%)	0.62

Results are presented as absolute and relative frequencies

Table 4. Satisfaction levels by sex.

	Males (n=28)	Females (n=72)	p value
Are you satisfied with your job?			
Not at all	2 (7.14%)	–	0.069
Partly satisfied	–	–	
Satisfied	6 (21.43%)	8 (11.11%)	
More than satisfied	8 (28.57%)	23 (31.94%)	
Very satisfied	12 (42.86%)	41 (56.94%)	
Are you satisfied with your position?			
Not at all	3 (10.71%)	2 (2.78%)	0.456
Partly satisfied	1 (3.57%)	3 (4.17%)	
Satisfied	3 (10.71%)	12 (16.67%)	
More than satisfied	10 (35.71%)	32 (44.44%)	
Very satisfied	11 (39.29%)	23 (31.94%)	
You feel that the demands of your job are negatively affecting the time and energy you devote to yourself.			
Not at all	5 (18.52%)	3 (4.17%)	0.055
Partly	3 (11.11%)	3 (4.17%)	
Neither affects nor does not affect	5 (18.52%)	16 (22.22%)	
Somewhat	9 (33.33%)	22 (30.56%)	
Very	5 (18.52%)	28 (38.89%)	
You feel that the demands of your job are negatively affecting the time and energy you devote to your family.			
Not at all	3 (10.71%)	5 (6.94%)	0.016
Partly	8 (28.57%)	9 (12.5%)	
Neither affects nor does not affect	4 (14.29%)	17 (23.61%)	
Somewhat	10 (35.71%)	14 (19.44%)	
Very	3 (10.71%)	27 (37.5%)	
You feel that your family obligations are negatively affecting the time and energy you devote to work.			
Not at all	17 (60.71%)	33 (45.83%)	0.252
Partly	8 (28.57%)	16 (22.22%)	
Neither affects nor does not affect	1 (3.57%)	13 (18.06%)	
Somewhat	1 (3.57%)	7 (9.72%)	
Very	1 (3.57%)	3 (4.17%)	
Family loss (yes/no)	17 (60.71%)/11 (39.29%)	38 (53.52%)/33 (46.48%)	0.654

Results are presented as absolute and relative frequencies.

the 5-point Likert scale towards the “worst answer/very” (OR=4.274, $p=0.026$). Finally, job ranking was also identified as a statistically significant independent factor predicting PTSS, with a 3-fold increase in risk for each level in the job hierarchy (from residents to academics) (OR=3.034, $p=0.022$).

Discussion

To our knowledge, this is the first study to examine the PTSS level of Greek anaesthesiologists in the post-pandemic period. According to our results, 18–23% of Greek

anaesthesiologists suffer from PTSS one year after the most severe COVID-19 wave in Greece, while 7% of them suffer from probable PTSS. PTSS scores did not differ between male and female anaesthesiologists, however, most women reported that “the demands of their job negatively impact the time and energy they devote to their family”. Interestingly, children and “job satisfaction” were identified as protective factors against PTSS, while working rank (from residents to academics) and neuroticism were identified as independent risk factors for the occurrence of PTSS.

Table 5. Multivariate logistic regression model of factors predicting PTSD.

Independent variables	OR	SE	p value	95% CI
Children (yes vs no)	0.171	0.152	0.048	0.029–0.981
History of autoimmune disease (yes vs no)	0.061	0.096	0.076	0.0028–1.335
Are you satisfied with your job position?	0.211	0.146	0.024	0.055–0.819
You feel that your family obligations are negatively affecting the time and energy you devote to your work.	4.274	2.785	0.026	1.192–15.33
Job ranking	3.034	1.475	0.022	1.169–7.868
Neuroticism	1.524	0.198	0.001	1.181–1.968

PTSD: Post Traumatic Stress Disorder (diagnosis based on the 2nd interpretation of the PCL-5, see text)

Guo et al⁴ investigated the extent of PTSD in the post-COVID era among Chinese anaesthesiologists and came to very similar results as we did (PTSD 19.9%). According to this study, longer working hours, chronic comorbidities, and COVID-19 exposure were risk factors for PTSD development, while vaccination, older age, and married status were protective factors.⁴ In our study, children and job satisfaction were the most important protective factors against PTSD, while neuroticism was found to be an independent risk factor for the occurrence of PTSD. Several in-hospital and out-of-hospital studies have found that neuroticism may be a precipitating factor for PTSD.¹⁴

According to 14 selected studies, rates of PTSS during the pandemic, among healthcare workers dealing with COVID-19, ranged from 2.1% to 73.4%.^{15–28} However, a pooled analysis of nine studies found that moderate rates of PTSD were found in 21.5% (95% CI, 10.5–34.9%) of healthcare workers during the pandemic.²⁹ Piacentini et al³⁰ found that the rate of PTSD among anaesthesiologists was 22.35% within two months of the declaration of the pandemic in Italy. Thus, it appears that the prevalence of PTSD among anaesthesiologists in the post-COVID-19 era was almost as high as during the COVID pandemic and that anaesthesiologists were still under increasing pressure of psychological symptoms in the post-COVID era.

PTSD can cause significant distress and problems functioning in daily life and can last for more than a month to many years.⁶ It can often coexist with several other psychological disorders, such as anxiety, depression, or substance abuse disorder.⁶ Experts point out that the experience of a global pandemic such as COVID-19 has the potential to be considered a mass traumatic event leading to an unprecedented global psychological impact, including PTSD, burnout syndrome, severe depression, and anxiety.⁶ However, not all individuals will experience PTSD in the same way;

this will vary across hospitals depending on the degree of exposure.⁶ Furthermore, different individuals have different psychological baselines and a distinct preventive function based on the mental health tools developed.⁶ Social and peer support are recognized to be important protective factors against the development of trauma.⁶ Routine support processes, such as adequate preparation for the expected psychological impact and other forms of psychoeducational seminars, are of paramount importance.⁶

On the other hand, it should be emphasized that PTSD has a clear and identifiable onset and a well-defined symptom profile, which makes it amenable to early diagnosis and intervention.³¹ Cognitive behavioral therapy is a well-described therapeutic option for PTSD. Other therapeutic options that have also been shown to be successful for PTSD include mindfulness, gratitude practices, imagination and trauma work, eclectic therapy, and reading.⁵ Hospitals should provide onsite psychological support to healthcare workers in a comfortable environment and offer trauma-informed care to try to prevent and/or treat PTSD.

Our study has certain limitations. To begin with, the lack of data on the pre-pandemic PTSS levels in our sample is an important limitation. However, the role of the pandemic in the exacerbating challenges inside and outside of the hospital, in addition to the prolonged shortage of critical workers, should not be overlooked. Although we used validated questionnaires for the Greek population, these were self-reported instruments. A more thorough psychological assessment therefore seems essential. However, to the best of our knowledge, this is the first study that attempts to investigate the PTSS among anaesthesiologists in the post-pandemic period in Greece, and therefore it should be considered as one of the first steps in the development of a strategy to mitigate PTSS in anaesthesiology.

In summary, our study found that the Greek anaesthesiologists' PTSS levels in the post-COVID-19 era were within the highest reported levels and were not significantly different from those reported during the

pandemic. With the advent of the post-pandemic era, the prevention of PTSS and the creation of a culture of well-being in the workplace seem to be imperative to reverse this trend in the speciality of anaesthesiology.

References

- Torrente M, Sousa PA, Sánchez-Ramos A, Pimentao J, Royuela FF, Collazo-Lorduy A et al. To burn-out or not to burn-out: a cross-sectional study in healthcare professionals in Spain during COVID-19 pandemic. *BMJ Open* 2021, 11:e044945, doi: 10.1136/bmjopen-2020-044945
- Che L, Ma S, Zhang YL, Huang Y. Burnout Among Chinese Anesthesiologists After the COVID-19 Pandemic Peak: A National Survey. *Anesth Analg* 2023, 137:392–398, doi: 10.1213/ANE.0000000000006298
- Zheng P, Du S, Mao Y, Yin L, Zhong Y, Yin X. Study on the mental health status of anesthesiologists and its influencing factors. *Am J Transl Res* 2021, 13:1862–1869, PMID: 33841712
- Ntalouka MP, Karakosta A, Aretha D, Papaioannou A, Nyktari V, Chloropoulou P et al. Greek Anaesthesiologists's Burnout Epidemic within the COVID-19 pandemic (GRABEP study); a multicenter study on burn out prevalence among Greek anesthesiologists and association with personality traits. *Psychiatriki* 2023, 34:193–203, doi: 10.22365/jpsych.2023.010
- Guo F, Han R, Luo T, Jin S, Yan Y, Wang J et al. Psychological Distress Was Still Serious Among Anesthesiologists Under the Post COVID-19 Era. *Psychol Res Behav Manag* 2022, 15:777–784, doi: 10.2147/PRBM.S357566
- Raudenská J, Steinerová V, Javůrková A, Urits I, Kaye AD, Viswanath O et al. Occupational burnout syndrome and post-traumatic stress among healthcare professionals during the novel coronavirus disease 2019 (COVID-19) pandemic. *Best Pract Res Clin Anaesthesiol* 2020, 34:553–560, doi: 10.1016/j.bpa.2020.07.008
- Orovou E, Theodoropoulou IM, Antoniou E. Psychometric properties of the Post Traumatic Stress Disorder Checklist for DSM-5 (PCL-5) in Greek women after cesarean section. *PLoS One* 2021, 16:e0255689, doi: 10.1371/journal.pone.0255689
- Giotakos O. Neurobiology of emotional trauma. *Psychiatriki* 2020, 31:162–171, doi: 10.22365/jpsych.2020.312.162
- Chamaa F, Bahmad HF, Darwish B, Kobeissi JM, Hoballah M, Nassif SB et al. PTSD in the COVID-19 Era. *Curr Neuropharmacol* 2021, 19:2164–2179, doi: 10.2174/1570159X19666210113152954
- von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol* 2008, 61:344–349, doi: 10.1016/j.jclinepi.2007.11.008
- Milenović M, Matejić B, Vasić V, Frost E, Petrović N, Simić D. High rate of burnout among anaesthesiologists in Belgrade teaching hospitals: Results of a cross-sectional survey. *Eur J Anaesthesiol* 2016, 33:187–94, doi: 10.1097/EJA.0000000000000383
- Dimitriou E. EPQ Personality questionnaire: Greek validation in the Greek population. *Engelalos* 1986; 23:41–54
- Ntantana A, Matamis D, Savvidou S, Giannakou M, Gouva M, Nakos G et al. Burnout and job satisfaction of intensive care personnel and the relationship with personality and religious traits: An observational, multicenter, cross-sectional study. *Intensive Crit Care Nurs* 2017, 41:11–17, doi: 10.1016/j.iccn.2017.02.009
- Ettore E, Müller P, Hinze J, Riemenschneider M, Benoit M, Giordana B et al. Digital Phenotyping for Differential Diagnosis of Major Depressive Episode: Narrative Review. *JMIR Ment Health* 2023, 10:e37225, doi: 10.2196/37225
- Ying Y, Ruan L, Kong F, Zhu B, Ji Y, Lou Z. Mental health status among family members of health care workers in Ningbo, China, during the coronavirus disease 2019 (COVID-19) outbreak: A cross-sectional study. *BMC Psychiatry* 2020, 20:1–10, doi: 10.1186/s12888-020-02784-w
- Arnetz JE, Goetz CM, Sudan S, Arble E, Janisse J, Arnetz BB. Personal Protective Equipment and Mental Health Symptoms Among Nurses During the COVID-19 Pandemic. *J Occup Environ Med* 2020, 62:892–897, doi: 10.1097/JOM.0000000000001999
- RamiÁñez LPG, Arriaga RJM, Hernaández-Gonzalez MA, De la Roca-Chiapas JM. Psychological Distress and Signs of Post-Traumatic Stress in Response to the COVID-19 Health Emergency in a Mexican Sample. *Psychol Res Behav Manag* 2020, 13:589–597, doi: 10.2147/PRBM.S259563
- Chew NWS, Ngiam JN, Tan BY, Tham SM, Tan CY, Jing M et al. Asian-Pacific perspective on the psychological well-being of healthcare workers during the evolution of the COVID-19 pandemic. *BJPsych Open* 2020, 6:e116, doi: 10.1192/bjo.2020.98
- Tan BYQ, Chew NWS, Lee GKH, Jing M, Goh Y, Yeo LLL et al. Psychological Impact of the COVID-19 Pandemic on Health Care Workers in Singapore. *Ann Intern Med* 2020, 173:317–320. doi: 10.7326/M20-1083
- Khasne RW, Dhakulkar BS, Mahajan HC, Kulkarni AP. Burnout among Healthcare Workers during COVID-19 Pandemic in India: Results of a Questionnaire-based Survey. *Indian J Crit Care Med* 2020, 24:664–671. doi: 10.5005/jp-journals-10071-23518
- Song X, Fu W, Liu X, Luo Z, Wang R, Zhou N et al. Mental health status of medical staff in emergency departments during the Coronavirus disease 2019 epidemic in China. *Brain Behav Immun* 2020, 88:60–65. doi: 10.1016/j.bbi.2020.06.002
- Wang YX, Guo HT, Du XW, Song W, Lu C, Hao WN. Factors associated with post-traumatic stress disorder of nurses exposed to coronavirus disease 2019 in China. *Medicine (Baltimore)* 2020, 26:e20965. doi: 10.1097/MD.00000000000020965
- Si MY, Su XY, Jiang Y, Wang WJ, Gu XF, Ma L et al. Psychological impact of COVID-19 on medical care workers in China. *Infect Dis Poverty* 2020, 12:113. doi: 10.1186/s40249-020-00724-0
- Wang, Y.; Ma, S.; Yang, C.; Cai, Z.; Hu, S.; Zhang, B.; et al. Acute psychological effects of Coronavirus Disease 2019 outbreak among healthcare workers in China: A cross-sectional study. *Transl Psychiatry* 2020, 13, 348
- Wang Y, Ma S, Yang C, Cai Z, Hu S, Zhang B et al. Acute psychological effects of Coronavirus Disease 2019 outbreak among healthcare workers in China: a cross-sectional study. *Transl Psychiatry* 2020, 10:348. doi: 10.1038/s41398-020-01031-w

26. González-Sanguino C, Ausín B, Castellanos MÁ, Saiz J, López-Gómez A, Ugidos C et al. Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain Behav Immun* 2020, 87:172–176. doi: 10.1016/j.bbi.2020.05.040
27. Luceño-Moreno L, Talavera-Velasco B, García-Albuerne Y, Martín-García J. Symptoms of Posttraumatic Stress, Anxiety, Depression, Levels of Resilience and Burnout in Spanish Health Personnel during the COVID-19 Pandemic. *Int J Environ Res Public Health* 2020, 17:5514. doi: 10.3390/ijerph17155514
28. Caillet A, Coste C, Sanchez R, Allaouchiche B. Psychological Impact of COVID-19 on ICU Caregivers. *Anaesth Crit Care Pain Med* 2020, 39:717–722. doi: 10.1016/j.accpm.2020.08.006
29. Li Y, Scherer N, Felix L, Kuper H. Prevalence of depression, anxiety and post-traumatic stress disorder in health care workers during the COVID-19 pandemic: A systematic review and meta-analysis. *PLoS One* 2021, 16:e0246454, doi: 10.1371/journal.pone.0246454
30. Piacentini SH, Tramacere I, Prioni S. The risk of post-traumatic stress disorder (PTSD) in Italian Highly Specialized Research Hospitals staff within two months of the pandemic declaration: an on-line survey. *Ann Ist Super Sanita* 2022, 58:154–161, doi: 10.4415/ANN_22_03_02
31. Chang J, Ray JM, Joseph D, Evans LV, Joseph M. Burnout and Post-traumatic Stress Disorder Symptoms Among Emergency Medicine Resident Physicians During the COVID-19 Pandemic. *West J Emerg Med* 2022, 23:251–257, doi: 10.5811/westjem.2021.11.53186

Ερευνητική εργασία

Σύνδρομο μετατραυματικού άγχους στους Έλληνες αναισθησιολόγους στη μετά COVID-19 εποχή: Μία πολυκεντρική, συγχρονική μελέτη παρατήρησης από τα πανεπιστημιακά/τριτοβάθμια νοσοκομεία αναφοράς

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ΠΕΡΙΛΗΨΗ

Οι αναισθησιολόγοι που συμμετείχαν ενεργά στη φροντίδα των ασθενών με COVID-19 παρουσιάζουν αυξημένο κίνδυνο για σύνδρομο μετατραυματικού άγχους (PTSS). Στην παρούσα μελέτη αξιολογήθηκαν το σύνδρομο μετατραυματικού άγχους και οι πιθανοί προδιαθεσικοί παράγοντες των αναισθησιολόγων των Πανεπιστημιακών/Τριτοβάθμιων νοσοκομείων αναφοράς για τον COVID-19 στην Ελλάδα, στην εποχή μετά την πανδημία με τα σταθμισμένα ερωτηματολόγια PTSD Checklist for DSM-5 (PCL-5) και Eysenck Personality Questionnaire (EPQ). Πρόκειται για μία πολυπαραγοντική, συγχρονική μελέτη στην οποία συμπεριλήφθηκαν οι αναισθησιολόγοι που συμμετείχαν στη φροντίδα των ασθενών με λοίμωξη COVID-19 στα 7 νοσοκομεία αναφοράς της Ελλάδας το Νοέμβριο του 2022 (εποχή μετά την πανδημία). Το PCL-5 είναι ένα εργαλείο αυτοαξιολόγησης, 20 ερωτήσεων και 5-βαθμών στην κλίμακα Likert, η βαθμολογία του οποίου γίνεται με δύο διαφορετικούς τρόπους με σκοπό να διασφαλίσει τη διάγνωση του PTSD. Το ερωτηματολόγιο EPQ αξιολογεί τις τρεις βασικές διαστάσεις της προσωπικότητας, ενώ η κλίμακα ψεύδους (Lie scale) χρησιμεύει για την μέτρηση της απάτης. Για την αναγνώριση προδιαθεσικών παραγόντων ανάπτυξης PTSS εφαρμόστηκε μοντέλο πολυπαραγοντικής λογιστικής παλινδρόμησης με τη μέθοδο stepwise forward. Συνολικά 100 ιατροί (ποσοστό απόκρισης 85%) από 7 νοσοκομεία (72% γυναίκες, μέση ηλικία 46 [33-51,1] έτη) συμμετείχαν. Ο συντελεστής Cronbach's alpha για το PCL-5 υπολογίστηκε στο 0,946. Σύμφωνα με τους δύο προτεινόμενους τρόπους βαθμολόγησης του PCL-5 18% και 23% των συμμετεχόντων διαγνώστηκαν με PTSS, αντίστοιχα, ενώ 7% διαγνώστηκαν με πιθανό PTSD. Ενδιαφέρον αποτελεί το γεγονός ότι τα παιδιά (OR=0,17, p=0,048) και η ικανοποίηση με τη θέση εργασίας (OR=0,211, p=0,024) φαίνεται να λειτουργούν προστατευτικά έναντι του PTSD. Αντίθετα, οι οικογενειακές υποχρεώσεις αναγνωρίστηκαν σαν επιβαρυντικός παράγοντας (OR=4,274, p=0,026). Όσον αφορά τα χαρακτηριστικά της προσωπικότητας μόνο ο νευρωτισμός αναγνωρίστηκε σαν στατιστικά σημαντικός ανεξάρτητος παράγοντας για PTSS (OR=1,524, p=0,001). Τέλος, η εργασιακή κατάσταση αναγνωρίστηκε επίσης σαν ανεξάρτητος προγνωστικός παράγοντας για PTSS, με τριπλάσιο κίνδυνο για κάθε επίπεδο της εργασιακής ιεραρχίας (ειδικευόμενοι προς ακαδημαϊκοί) (OR=3,034, p=0,022). Στην εποχή μετά την πανδημία COVID-19 έως και 23% των Ελλήνων αναισθησιολόγων που εργάζονται στα νοσοκομεία αναφοράς εμφάνισαν PTSS. Τα παιδιά και η ικανοποίηση με τη θέση εργασίας φαίνεται να λειτουργούν προστατευτικά, σε αντίθεση με τους ανώτερους βαθμούς στην εργασιακή ιεραρχία.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Σύνδρομο διαταραχής μετατραυματικού στρες COVID-19, πανδημία, ασφάλεια ασθενών, ποιότητα.