Research Article

Ptsd, Depersonalization and Psychosomatic Symptoms in Health Care Workers During the Covid-19 Outbreak

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Abstract

Objective: Coronavirus disease (COVID-19) was first reported in Wuhan, China, in December 2019. Since then, it has been rapidly spreading throughout the world. Healthcare workers serve at the forefront of infectious diseases to provide care to patients. A lack of therapeutic agents and vaccines for COVID-19 has exacerbated the fear and burden experienced by hospital workers.

Methods: The sample consisted of 204 health workers (internists, cardiologists, pneumonologists, oncologists, nurses) 117 male and 87 female: During the initial evaluation, all the participants were assessed with the following psychometric questionnaires: A. The SCL -90 scale B. The Greek version of the Cambridge Depersonalization Scale and C. the Greek version of the Davidson Trauma Scale (DTS).

Results: The scales of CDS (r = 0.509, r=0.456, p<0.001) and DTS (r = 0.482, r=0.408, p<0.001) are highly correlated with the scale of somatization. The SCL-90 scale of obsessive-compulsive is highly correlated with both scales of DTS (r = 0.273, p<0.001 and r=0.184, p<0.001). Depression is highly correlated with both scales of CDS (r = 0.315, r=0.276, p<0.001) and DTS (r = 0.452, r=0.352, p<0.001).

Discussion: Health professionals must deal with possible psychological, work-related consequences during the COVID-19 crisis, such as posttraumatic stress, anxiety, depression or depersonalization. Preventive measures to reduce the psychological effect of pandemia should be implemented for these health workers.

Keywords: CDS; Covid-19; Depression; Depersonalization; Health care workers; Pandemia; PTSD; Somatization

1. Introduction

Health Workers (HWs) in Wuhan were saving lives while encountering an increasing workload and risk of infection. In the early stage of COVID-19 pandemic, it was reported that infected HWs accounted for 29% of all hospitalized COVID-19 patients [1]. Also, quarantined HWs might be facing potential social loneliness, and un quarantined HWs experiencing social prejudice. Therefore, they are vulnerable to multifarious emotional reactions and psychological distress [2]. The mental health problems of HWs would impair their attention, cognitive functioning, and clinical decision-making [3], consequently increase the incidence of medical errors, and ultimately put patients at risk. It was also well known that acute stress in disasters could have a lasting effect on the overall wellbeing. Moreover, acute stress in disasters could lead to resignation thoughts in HWs, further aggravating shortage of health care workforce [4]. The impact of the COVID-19 pandemic is also largely associated with the ongoing economic crisis, the loss of jobs and reduced income [5]. The severe psychological and physical impact on medical staff in terms of mental health outcomes has already been identified during previous epidemics [6]. Emerging evidence also indicates that

medical staff might be particularly vulnerable to the negative effects of the COVID-19 pandemic [7]. Indeed, medical professionals standing on the front lines have direct contact with patients suspected of being infected. As a result, numerous medical professionals became infected and some of them died [8]. In light of the growing mortality related to SARS-CoV-2 infection, long working time, a high level of uncertainty in the management of infected patients, healthcare workers are reporting increasing levels of anxiety associated with numerous clinical activities and present with symptoms of depression [9]. Although it has been observed that psychopathological expressions among medical professionals may differ from those observed in the general population, studies in this field have been performed with small samples and there is still a lack of countrywide studies [10]. Moreover several mechanisms underlying the specificity of psychopathological expressions among medical professionals need to be taken into consideration and especially a variety of individual factors such age, sex, working time, protective measures [11]. During outbreaks, Health Care Workers (HCW) reported post-traumatic stress symptoms, depressive symptoms, insomnia, severe anxiety symptoms, and elevated levels of working pressure. Amongst these psychopathological outcomes, anxious and post-traumatic reactions were the most widely explored, and results pointed to the high prevalence of such areas of symptomatology in HCWs facing epidemic outbreaks [12]. This research aims to investigate the psychological state among the health care workers battling the COVID-19 in Greece and the association between posttraumatic stress disorder (PTSD), depersonalization and primary psychosomatic symptoms.

2. Methods

The present study was conducted during the outset of pandemia in Greece in seven hospitals were patients with suspect COVID-19 were diagnosed and/or hospitalized. There was no vaccine or other appropriate treatment for the covid-19 at that time. These seven hospitals were the'Sotiria' Hospital for Chest Diseases, the "Attikon" University hospital and the "Pammakaristos" hospital, University General Hospital of Alexandroupolis Alexandra General Hospital of Athens, Thriasio General Hospital of Elefsis and Hippocratio General Hospital of Athens; all together they covered more than 60% of the total burden of hospitalized COVID-19 patients during the first wave. The sample consisted of 204 health workers who were working in the front line dealing with the patients (internists, cardiologists, pneumonologists, nurses) 117 male and 87 female: During the initial evaluation, all the participants were assessed with the following psychometric questionnaires: A. The SCL -90 scale . The questionnaire is self-completed and measures 9 psychopathology parameters: (1) somatization; (2) depression; (3) anxiety; (4) phobic anxiety; (5) obsessive compulsive; (6) paranoid ideation; (7) psychoticism; (8) hostility; (9) interpersonal sensitivity. The questionnaire includes 90 questions in total. All entries are rated from 0 to 4, giving a total score of 360. The scale is used to extrapolate 3 aggregate indexes: (a) the general severity index; (b) the positive symptoms distress index; (c) the positive symptoms total. A weighted Greek version is available. [13] B. The Greek version of the Cambridge Depersonalization Scale is a self rating scale questionnaire constructed to capture the frequency and duration of depersonalization symptoms over the last six months. Is a comprehensive instrument containing 29 items addressing the complaints classically associated with the depersonalization syndrome [14]. C.The Greek version of the Davidson Trauma Scale (DTS) was developed to respond to the need of Greek-speaking individuals. The scale has been recognized as one of the several interview-based measures of PTSD for diagnosis, assessment of symptom

severity and treatment effectiveness.1 Its primary purpose is to measure symptoms' frequency and severity and to evaluate treatment, for example measurement of symptom change over time, response prediction, and evaluation of differences between therapy, modalities in a research setting .The scale comprises of 17 items reflecting the DSM-IV criteria for PTSD, supplemented by two measures of survival and behavior guilt [15]. All the participants were informed about the purposes of the study and gave their written consent.

3. Statistical Analysis

Descriptive statistics were performed to calculate the mean and standard deviation of the CDS and DTS scales by gender, age and specialty of the health care workers. Kolmogorov-Smirnov test performed to determine whether the CDS and DTS scales followed the normal distribution. The null hypothesis of the test was rejected and therefore Mann-Whitney test was used to examine the association of the CDS, DTS and SCL-90 scales and the demographic characteristics. Spearman correlation coefficients were used to assess the relation of the CDS and DTS scales with the dimensions of SCL-90. Mann-Whitney test was performed to compare the mean values of SCL90 and DTS scales between the categories of CDS dimensions. Linear regression analysis was used for the prediction of DTS scales from the SCL90 and CDS scales. To avoid collinearity problems that may arise due to high correlations among the SCL90 and CDS scales, we treated both scales of CDS as categorical variables, by converting them into binary using the median. The cut-off point that was used for CDS frequency was the value 9 and for CDS duration was the value 16. The assumptions of linear regression were verified after fitting the linear regression models. The statistical significance level was set at $p<0.05$. IBM SPSS Statistics 24 software was used for the analysis.

4. Results

Table 1 shows the mean values and standard deviations of the CDS and DTS scales by gender, age and specialty. Female health care workers score higher on both CDS scales; however the differences were not found to be statistically significant (CDS frequency: 10.78 ± 7.31 vs. 10.31 ± 5.72, p=0.960) and (CDS duration: 17.92 ± 11.25 vs. 17.60 ± 11.12, p=0.802). On average the frequency of PTSD is higher among females than males (13.53 ± 6.11 vs. 13.26 ± 6.13, p=0.451); whereas the duration of PTSD is lower among females than males (22.34 ± 10.99 vs. 22.45 ± 11.70, p=0.913). The differences were not found to be significant. Specifically, 67 health care workers older than 40 years had on average more frequent depersonalization symptoms (10.84 ± 7.34 vs. 10.48 ± 6.41, p=0.616) and for shorter duration (17.63 ± 9.47 vs. 17.99 ± 12.47, p=0.499) than those who are younger than 40 years old. Participants younger than 40 years old have more frequent (13.78 ± 6.74 vs. 13.08 ± 5.22, p=0.613) and for longer duration post-traumatic stress disorder symptoms (22.69 ± 12.16 vs. 22.06 ± 9.97, p=0.947) than the older ones. However, all the comparisons were not found to be statistically significant. The scales of CDS and DTS were not found to differ significantly among the specialties of the healthcare workers.

		n	CDS frequency	CDS duration	PTSD frequency	PTSD duration
Gender	Female	177	10,78 ± 7,31	17,92 ± 11,25	13,53 ± 6,11	22,34 ± 10,99
	Male	87	10,31 ± 5,72	17,60 ± 11,12	13,26 ± 6,13	22,45 ± 11,70
	P		0,960	0,802	0,451	0,913
Age	≤ 40	145	10,48 ± 6,41	17,99 ± 12,47	13,78 ± 6,74	22,69 ± 12,16
	> 40	118	10,84 ± 7,34	17,63 ± 9,47	13,08 ± 5,22	22,06 ± 9,97
	P		0,616	0,499	0,613	0,947
Specialty	Internist Cardiologist	114	10,36± 5,39	18,01 ± 11,03	13,57 ± 6,34	23,16 ± 11,52
	Nurse	85	10,95 ± 6,89	19,02 ± 13,18	13,64 ± 6,60	22,41 ± 11,89
	Other	65	10,66 ± 6,82	15,88 ± 8,09	12,97 ± 4,97	20,95 ± 9,63
	P		0,748	0,432	0,948	0,642

Table 1: Mean values and standard deviation of CDS and DTS scale by gender, age and specialty

	CDS frequency	CDS duration	PTSD frequency	PTSD duration
Somatization	0.509***	0.456***	0.482***	0.408***
Obsessive-Compulsive	0,043	0,036	0.273***	0.184**
Interpersonal Sensitivity	0,000	0,027	0,017	-0,021
Depression	0.315***	0.276***	0.452***	0.352***
Anxiety	0.498***	0.477***	0.636***	0.613***
Hostility	0.138*	0.164**	0.350***	0.320***
Phobic Anxiety	0.228***	0.218***	0.269***	0.199***
Paranoid Ideation	0.519***	0.490***	0.441***	0.434***
Psychoticism	0.457***	0.475***	0.635***	0.603***
Total score	0.439***	0.419***	0.606***	0.542***
*** p<0.001, ** p<0.01, * p<0.05				

Table 2: Spearman correlation coefficients of CDS and DTS scales with the dimensions of SCL-90.

Table 2 presents the Spearman correlation coefficients of the CDS and DTS scales with the dimension of SCL-90 scale and the SCL-90 total score. Both scales of CDS (r = 0.509, r=0.456, p<0.001) and DTS (r = 0.482, r=0.408, p<0.001) are highly correlated with the scale of somatization with positive correlation coefficients indicating that health care workers with higher scores on CDS and DTS scales have higher scores on somatization. The SCL-90 scale of obsessive-compulsive is highly correlated with both scales of DTS (r = 0.273, p<0.001 and r=0.184, p<0.001). Depression is highly correlated with both scales of CDS (r = 0.315, r=0.276, p<0.001) and DTS (r = 0.452, r=0.352, p<0.001).Health care workers that face more frequent and for longer time depersonalization symptoms score higher on the anxiety scale (r = 0.498, r=0.477, p<0.001). Besides that, health care workers with more intense post-traumatic stress disorder symptoms in duration and in frequency have also more anxiety symptoms (r = 0.636, r=0.613, p<0.001).There is significant positive correlation among the scales of DTS (r = 0.350, r=0.320, p<0.001) with the scale of hostility. Health care workers with more intense depersonalization and

post-traumatic stress disorder symptoms (both in frequency and duration) have also more symptoms on phobic anxiety (r = 0.228, r=0.218, r=0.269, r=0.199, p<0.001), on paranoid ideation (r = 0.519, r=0.490, r=0.441, r=0.434, p<0.001) and psychotism (r = 0.457, r=0.475, r=0.635, r=0.603, p<0.001). Finally, the total score of SCL90 is correlated statistically significant with both scales of CDS (r = 0.439, r=0.419, p<0.001) and DTS (r = 0.606, r=0.542, p<0.001) with positive correlations. Additionally, the association of the SCL90 and DTS scales with the binary versions of CDS scales was examined. Table 3 presents the mean values of the SCL90 subscales, the SCL90 total score, as well as both scales of DTS across the categories of CDS frequency. It turns out that health care workers with more frequent depersonalization symptoms (above the median of the CDS frequency scale) score higher on all the scales of SCL90 and DTS. The difference between the two groups of CDS frequency were found to be significant on somatization (0.90 ± 1.33 vs. 2.06 ± 1.89, p<0.001), depression (6.48 ± 6.94 vs. 10.82 ± 9.11, p<0.001), anxiety (2.96 ± 3.81 vs. 7.01 ± 5.63, p<0.001), phobic anxiety (1.12 ± 1.67 vs. 2.51 ± 3.76, p=0.001), paranoid ideation (1.58 ± 1.65 vs. 4.39 ± 3.77, p<0.001), psychotism (1.38 ± 2.20 vs. 3.69 ± 2.90, p<0.001), total score of SCL90 (23.49 ± 19.64 vs. 42.61 ± 35.31, p<0.001) and PTSD frequency (10.09 ± 3.77 vs. 15.63 ± 6.35, p<0.001) and duration (15.22 ± 8.11 vs. 27.03 ± 10.48, p<0.001).

CDS frequency			
	Below median (n=104)	**above median (n=160)**	**p**
	mean ± s.d.	mean ± s.d.	
Somatization	0.90 ± 1.33	2.06 ± 1.89	<0.001
Obsessive-Compulsive	5.07 ± 4.45	6.23 ± 5.86	0.525
Interpersonal Sensitivity	0.15 ±0.54	0.98 ± 5.41	0.191
Depression	6.48 ± 6.94	10.82 ± 9.11	<0.001
Anxiety	2.96 ± 3.81	7.01 ± 5.63	<0.001
Hostility	3.86 ± 2.22	4.92 ± 4.23	0.346
Phobic Anxiety	1.12 ± 1.67	2.51 ± 3.76	0.001
Paranoid Ideation	1.58 ± 1.65	4.39 ± 3.77	<0.001
Psychoticism	1.38 ± 2.20	3.69 ± 2.90	<0.001
SCL90 total score	23.49 ± 19.64	42.61 ± 35.31	<0.001
PTSD frequency	10.09 ± 3.77	15.63 ± 6.35	<0.001
PTSD duration	15.22 ± 8.11	27.03 ± 10.48	<0.001

Table 3: Mean values of the SCL90 dimensions and DTS scales between the categories of CDS frequency

The mean values of SCL90 and DTS scales across the categories of CDS duration are shown in Table 4. Health care workers with longer time depersonalization symptoms (above the median of the CDS frequency scale) have on average higher scores on the SCL90 and DTS scales. In particular, the mean values of somatization (1.13 ± 1.46 vs. 2.01 ± 1.94, p<0.001), depression (7.46 ± 7.71 vs. 10.55 ± 9.05, p=0.008), anxiety (3.49 ± 3.77 vs. 7.09 ± 5.96, p<0.001), phobic anxiety (1.29 ± 1.95 vs. 2.54 ± 3.86, p=0.003), paranoid ideation (2.00 ± 2.36 vs. 4.40 ± 3.76, p<0.001), psychotism (1.58 ± 2.43 vs. 3.83 ± 2.89, p<0.001), total score of SCL90 (26.33 ± 21.94 vs. 42.71 ± 36.32,

p<0.001) and PTSD frequency (10.68 ± 4.29 vs. 15.85 ± 6.44, p<0.001) and duration (15.64 ± 7.73 vs. 28.25 ± 10.45, p<0.001) are statistically significant higher among those with CDS scores on duration above the median.

	CDS duration		
	below median (n=123)	**above median (n=141)**	**p**
	mean ± s.d.	mean ± s.d.	
Somatization	1.13 ± 1.46	2.01 ± 1.94	<0.001
Obsessive-Compulsive	5.44 ± 4.81	6.06 ± 5.82	0.865
Interpersonal Sensitivity	0.15 ±0.52	1.10 ± 5.75	0.205
Depression	7.46 ± 7.71	10.55 ± 9.05	0.008
Anxiety	3.49 ± 3.77	7.09 ± 5.96	<0.001
Hostility	3.79 ± 2.55	5.12 ± 4.24	0.05
Phobic Anxiety	1.29 ± 1.95	2.54 ± 3.86	0.003
Paranoid Ideation	2.00 ± 2.36	4.40 ± 3.76	<0.001
Psychoticism	1.58 ± 2.43	3.83 ± 2.89	<0.001
SCL90 total score	26.33 ± 21.94	42.71 ± 36.32	<0.001
PTSD frequency	10.68 ± 4.29	15.85 ± 6.44	<0.001
PTSD duration	15.64 ± 7.73	28.25 ± 10.45	<0.001

Table 4: Mean values of the SCL90 dimensions and DTS scales between the categories of CDS duration

Linear regression analysis was performed to predict the scores of DTS scales based on the total score of SCL90 and CDS scales. To avoid collinearity problems, we used only the total score of SCL90 and the binary version of CDS scales.The models are also controlled for age, gender and specialty. The predictors that were found to be statistically significant are given in the Table 5. The fitting of the models was found to be statistically significant, $F_{7,262}$=68.21, p<0.001, $R^2_{adj.}$=0.642 for CDS frequency and $F_{6,262}$=73.54, p<0.001, $R^2_{adj.}$=0.624 for CDS duration. Health care workers with more frequent depersonalization symptoms (scores higher than the median) are expected to have more frequent post-traumatic stress disorder symptoms (beta=2.24, p=0.001) given that the other predictors remain constant. The relation between the DTS frequency scale and the CDS duration depends on the values of the SCL90 total score, due to the significant interaction term (beta=0.06, p=0.001). One unit increase of the total score of SCL90 will correspond to higher increase in the scores on PTSD frequency among the health care workers with longer depersonalization symptoms (above the median); whereas the corresponding increase in the scores on PTSD frequency is expected to be lower among the health care workers who have depersonalization symptoms for shorter time (bellow the median). Health care workers with scores on CDS frequency above the median are expected to have post-traumatic stress disorder symptoms for longer time (beta=2.76, p=0.025), given that all the remaining variables are the same. Health care workers who score on CDS duration above the median are expected to have post-traumatic stress disorder symptoms for longer time (beta=7.43, p<0.001). Health care workers with higher scores on the total score of SCL90 are expected to score higher on DTS duration scale (beta=0.20, p<0.001).

		PTSD frequency		PTSD duration	
Predictors		Beta (Std. Error)	p	Beta (Std. Error)	p
CDS frequency (ref.level below median)	above median(=9)	2.24 (0.66)	0.001	2.76 (1.22)	0.025
CDS duration (ref.level below median)	above median(=16)	-0.27 (0.88)	0.758	7.43 (1.18)	<0.001
SCL90 total score		0.08 (0.02)	<0.001	0.20 (0.01)	<0.001
SCL90 total score * CDS duration (above median)		0.06 (0.02)	0.001		
Model is also controlled for gender, age and specialty					

5. Discussion

With the development of the epidemic, the number of confirmed patients has continued to augment, and work stress of front-line clinical staff to fight the pandemic have also inflamed.Depression, anxiety, sleep disorders, depersonalization and posttraumatic stress disorder are some of the symptoms described in the literature as experiences of the health workers [16]. Both scales of CDS and DTS are highly correlated with the scale of somatization with positive correlation. Healthcare Workers (HCWs) in emergency care settings are particularly at risk for PTSD and burnout syndrome with symptoms of depersonalization because of the highly stressful work-related situations they are exposed to, that include: management of critical medical situations, caring for severely traumatized people, frequent witnessing of death and trauma. The above psychopathological condition can manifest itself with severe physical discomfort and somatization [17]. Medical personnel, especially young medical staff, have less experience in the field and in dealing with difficulties and hardships in life. Therefore, when they suddenly encounter such sudden public health events, they tend to suffer anxiety and phobic anxiety, leading to physical and mental problems. That is why scores of the factors somatization, obsessive-compulsive, anxiety, phobic anxiety, and psychoticism were significantly higher than in the norm group. This result suggests that psychologists and team leaders should pay more attention to the anxiety, phobic anxiety, and psychoticism issues of the medical personnel in a team [18]. The SCL-90 scale of obsessive-compulsive is highly correlated with both scales of PTSD .Health workers experiencing lack of social support leads to much more depression and anxiety especially in high-risk working conditions.In order to prevent cross infection, the social distance between people had to be increased. When others had fevers or cough, people became more sensitive and tended to show some obsessive-compulsive symptoms such as washing hands repeatedly [19]. In a study of 373 health care workers in a analysis of Scl-90, 7.77% had obsessive compulsive symptoms [20]. In our study the results revealed that depression is highly correlated with both scales of CDS and DTS and health care workers with more intense post-traumatic stress disorder symptoms in duration and in frequency have also more anxiety symptoms.Studies reported a high risk for adverse psychological reactions, particularly PTSD among HCWs, suggesting the proximity to "ground zero" as a primary risk factor [21]. HCWs fear of contagion and infection of their family, friends and colleagues, feelings of uncertainty, stigmatization and rejection in their neighborhood because of their hospital work were also reported [22]. Studies also reported the reluctance to work and/or considering quitting their job, as well as high levels of stress, anxiety and depressive symptoms, which could have long-term psychological implications [23]. The most vulnerable professionals to suffer from burnout and depersonalization symptoms are those who develop their work in relation to other people such as health and teaching professionals [24]. Studies on burnout in health professionals

have been conducted on numerous occasions relating symptoms of mood disorders, anxiety, and depression as these syndrome consequences [25]. In Greece in a cross-sectional study whichwas conducted via an online survey from April 10 until April 13, 2020 the results showed that Health care professionals appeared to be moderately stressed from the COVID-19 crisis, with women scoring higher on all clinical scales and the difference between women and men being statistically significant. Criteria for a probable posttraumatic stress disorder diagnosis were met by a total of 16.7% (21.7% of women; 5.1% of men). Negative emotion and threatened or physical tension are positive significant predictors of PTSD [26]. In another study in Greece a sample of 143 Health Care Workers (HCW) respondents was gathered. Overall, 70.4% of HCWs were generally affected by the pandemic. The personal distress factors revealed that the majority (67%) experienced distress due to routine changes. The effects on health behavior (sleep, eating behavior and substance use) were not high. Psychological/psychiatric needs were relatively low, while negative emotions and need of social support were high. 31.4% displayed intense emotional instability. All work-related distress factors were rated high. Worry about contracting COVID-19 in the workplace scored the highest (82.6%). Almost half of the participants felt exposed to COVID-19 infection (47.0%). Anxiety (47.2%) and burn-out (78.4%) symptoms were also revealed [27].

Similarly a total of 464 self-selected HCWsin six reference hospitals completed a questionnaire comprising sociodemographic and work-related information and validated psychometric scales. The proportion of HCWs with symptoms of moderate/severe depression, anxiety and traumatic stress were 30%, 25% and 33%, respectively.Burnout levels were particularly high with 65% of respondents scoring moderate/severe in emotional exhaustion, 92% severe in depersonalization and 51% low/moderate in personal accomplishment. Predictive factors of adverse psychological outcomes included fear, perceived stress, risk of infection, lack of protective equipment and low social support. The psychological burden associated with COVID-19 in healthcare professionals in Greece is considerable, with more than half experiencing at least mild mental health difficulties [28]. Evidence related to psychopathological outcomes also shows that these maladaptive reactions can be long-lasting. In fact, post-traumatic and depressive symptoms, as well as general psychological distress, were reported even after periods ranging from 6 months up to 3 years after the epidemic/ pandemic outbreak [29]. Primary prevention should take place regularly, so that personal factors (e.g., past psychiatric history and difficulties in coping strategies) could be addressed. Such preventive interventions will result in a healthier workforce that will likely show better psychological responses in emergency situations, such as epidemic/pandemic outbreaks. Training programs related to coping and resilience should be a regular part of HCWs' training and continuing education programs [30]. Recommendations for clinicians providing psychological support during and after the COVID-19 Pandemic include: Psychological support for those in front-line roles and affected by the COVID-19 and clinicians should also be aware that persons who develop moral injury-related mental health disorders are often reticent to speak about guilt or shame and may instead focus on more classically traumatic elements of their presentation.

Contribution

Dr. K.Kontoangelos and Prof G.Poulakou have equal authorship contribution

Ethics approval

Ethics approval was obtained from the Institutional Review Board of the General Hospital Sotiria

Acknowledgments

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

KK and GPcollected all the data and wrote the paper. ME, KL,PF,IB,VR,ET,KF,SS KA,also collected the dataand performed the statistical analysis. GL,LP, ST and PP helped supervise the project. .KS, VP, MD, KSand CC conceived the original idea and supervised the project. All authors discussed the results and contributed to the final manuscript.

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