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Investigation of Stress Levels and Lifestyle of A Sample of Greek General Surgeons in Reference and Non-Covid-19 Hospitals

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Abstract

Background: During the COVID-19 pandemic, Greek general surgeons faced a heavy workload and difficult decisions as they were redirected from surgical to COVID-related care. Similar to other pandemics in the past, Greek general surgeons reported experiencing low mood, increased stress, and anxiety, leading to psychological distress.

Aim: This observational cross-sectional study aimed to investigate the stress levels and lifestyle of a sample of Greek general surgeons in relation to their contact with COVID-19.

Methods: All general surgeons were invited to participate in a one-time self-administered online questionnaire, consisting of a 156-item self-reporting questionnaire. The data collected were about socio-demographic information, medical history, place of work, and years of work/experience. Six tools were used, and descriptive analysis was conducted for categorical and numerical variables.

Results: Out of the 179 general surgeons who responded, 87.2% were male and 12.8% were female. The mean age for men was 51.47, and for women, it was 45.70. Men were more likely to be married with children compared to women.

Both genders had a high percentage of their work being in the public sector, especially in a COVID-19 reference hospital. Men reported a higher mean BMI and more frequent consumption of alcohol than women. However, both genders were mostly vaccinated against COVID-19. Women scored higher than men in the Healthy Lifestyle parameters, except for the subscale of organized physical activity where men scored higher. The COVID-19 Anxiety scale was positively correlated with Perceived Stress Scale (PSS) and the internal health locus of control. Vaccinated individuals had a lower score on the COVID-19 Anxiety scale than those who were not vaccinated. The HLPCQ score was negatively correlated with perceived stress and sleep quality scores and positively correlated with the Powerful Others subscale of the Health Locus of Control.

Conclusions: The study's findings suggest that Greek general surgeons experienced increased stress levels and anxiety during the COVID-19 pandemic, even though it was not a surgical case.

Keywords: Anxiety; Covid-19 pandemic; Depression; Greek general surgeons; Life style; Stress

Introduction

A new pandemic, known as the coronavirus pandemic (COVID-19), emerged in early 2020, affecting health systems worldwide. Although the disease primarily attacks the human respiratory system, it has greatly impacted all health personnel, regardless of their specialty, due to the high level of care required by patients. Medical and nursing staff are working tirelessly to treat patients, resulting in physical and psychological exhaustion, which is further compounded by the shortage of medical and nursing staff, lack of protective equipment, increased workload, and longer shifts. In this context, surgeons have also had to contribute to the response efforts, finding themselves in positions where they are not adequately trained to handle patients with a highly aggressive respiratory infection. This has caused greater psychological and physical stress on the surgeons, as their presence in aerosol situations (surgeries, intubation, and placement of central venous catheters) and frequent contact with patients increased the possibility of spreading the disease. This has also caused concern for staff living with the elderly or other vulnerable groups.

In 2003, another respiratory pandemic caused high levels of stress and depression among healthcare workers [1,2]. Studies have shown that healthcare workers have experienced anxiety and depression during the COVID-19 pandemic, particularly in countries where cases have been very high, such as China and Italy [3,4]. The COVID-19 pandemic is spreading rapidly, causing healthcare systems worldwide to work feverishly to respond to the demands of this new disease [5]. Several countries around the world have transformed general hospitals into hospitals exclusively for treating COVID-19 patients as a safety measure to limit the spread of the disease [6,7]. Although the COVID-19 pandemic is not a purely surgical situation, many patients suffering from coronavirus require surgical treatment due to additional infections, conditions, or complications. During surgery, staff is at an increased risk of infection due to their high exposure in a closed space [8]. Additionally, many surgical companies have published guidelines for the prevention and treatment of COVID-19 patients [9-13]. Based on the above, surgeons are in an extremely stressful situation, in which they are at high risk of developing psychosomatic disorders in the future. The question that arises at this point is: Is stress or COVID-19 the real enemy of surgeons?

There are various factors that contribute to the stress experienced by surgeons, such as lack of sleep and disrupted sleep patterns due to multiple shifts, tension in the workplace, intense workload, poor diet, etc. Depending on the stress factors, the stress axis is activated with corresponding effects on their psychosomatic health, including depression, burnout, obesity, cardiovascular, and autoimmune diseases. Despite this, research has yet to examine the psychological stress of surgeons in relation to their quality of life during the COVID-19 pandemic.

Methods

This observational, cross-sectional study was conducted at Amalia Fleming General Hospital in Athens, Greece. During the COVID-19 pandemic, surgeons were reassigned to various departments such as pathology, ICU, and COVID-19 departments within our hospital and in other hospitals across the country. Institutional specific review board approval was obtained prior to the start of the study (protocol no. 4719/08.03.2021). The Greek Surgical Society also approved the research questionnaire to be sent to all its members. All general surgeons, including residents, working in operating rooms, ICUs, pathology departments, and COVID-19 departments were invited to participate in a one-time, self-administered online questionnaire. The sampling period was from January 2021 to March 2021, during which Athens experienced 500 to 600 new COVID-19 cases daily, with a cumulative total exceeding 156,000 cases for a population of approximately 11 million. Participants completed a 156-question self-reporting questionnaire and provided consent to participate at the beginning of the questionnaire. The questionnaire was anonymous and collected data on socio-demographic information, medical history, place of work (public or private sector), and years of work experience. In addition, six tools were used to assess stress levels, anxiety, depression, general surgeons' contact with COVID-19, and lifestyle.

Perceived Stress

The Perceived Stress Scale is a 14-item self-report instrument that assesses subjectively perceived stress levels. Each of the questions is scored on a 5-point Likert-type scale (from 0 = never to 4 = very often). The withdrawal period concerns the last 1 month. The total score is calculated from the sum of the individual values of the questionnaire. Higher values mean more intense stress [14].

Symptoms of Depression, Anxiety and Stress

The DASS-21 was used to assess symptoms of depression, anxiety and stress. The instrument is a 21-question and each of the questions is scored on a 4-point Likert-type scale (from 0 = never to 4 = very often). The total score is calculated from the sum of the individual values of the questionnaire [15].

Anxiety for covid-19

The covid-19 anxiety scale is a specific measurement tool consists of 10 questions rated on a Likert scale with values from 0 (not at all) to 4 (very much). High values reflect high anxiety [16].

Sleep Quality

The Pittsburgh Sleep Quality Scale was used to assess sleep quality over a 1-month period. The instrument consists of 19 individual items, rated on a Likert scale with values from 0 (not at all) to 3 (very, very often). The higher scores indicate worst sleep quality. Total score higher than 5 indicate serious problem with sleep that need medical assistance [17].

Lifestyle Parameters

The healthy life style and personal control questionnaire this instrument consists of 26 items, in which the respondent is asked to indicate the frequency of adopting 26 positively stated lifestyle habits. It is rated on a Likert-type scale (1 = Never or rarely, 2 = Sometimes, 3 = Often, and 4 = Always). This questionnaire has 5 subscales, as follows; Dietary Healthy Choices , Dietary Harm Avoidance , Daily Routine, Organized Physical Activity, Social Support and Mental Control and the sum of all subscales leads to the total HLPCQ score. The main objective of this questionnaire is to quantify lifestyle patterns that reflect health empowerment as evidenced by anxiety levels [18].

Health Locus of Control

The health locus of control consists of three subscales that assess whether the respondent attributes the outcome of their health events to chance, to themselves, or to others. This questionnaire consists of a set of 18 questions with possible responses ranging from (“strongly disagree”) to 6 (“strongly agree”). For each subscale high values mean strong performance on that factor [19].

Statistical analysis

Descriptive analysis was conducted for categorical and numeric variables. Data are presented as N (%) for the categorical variables and as Mean (SD) and Median (IQR) for the numeric variables due to their skewed distribution. For the comparison between categorical variables Pearson’s chi square test was used. The Mann-Whitney non-parametric test was used to evaluate differences in continuous variables between genders. Multiple linear regression analysis was used to evaluate various participant’s characteristics and measures as determinants of the Covid-19 anxiety scale and the HLPCQ. The results of the regression analysis are presented as unstandardized b ± coefficients standard error, p-value). Statistical analysis was performed using IBM SPSS (version 26.0) for Windows and $p<0.05$ was considered to be the level of significance.

Results

Out of 200 invited participants, a total of 179 general surgeons responded. The response rate was 89.5% and 87.2% and 12.8% were male and female, respectively. Table 1 describes participant sociodemographic characteristics and their medical history. The mean age for men was 51.47 and for women 45.70 ($p<0.0001$). As for the family status and parity there were significant differences between men and women. More men were married with children on the contrary to women ($p=0.03$ and $p=0.001$ respectively). Regarding their work, both genders had a high percentage with their work being in the public sector and especially in a covid-19 reference hospital (74.9% and 68.2% in total respectively). As for alcohol consumption there was also a statistically significant difference between genders ($p=0.04$). Men reported more frequent consumption of alcohol than women (78.2% vs 56.5% respectively). Finally, regarding vaccination against Covid-19, both genders were mostly vaccinated (97.4% vs 87% respectively, $p=0.46$).

N=179	**Males**	**Females**	**p-values**	**total**
Gender N (%)	156 (87.2)	23 (12.8)	0.00*	179 (100)
Age in years				
Mean (SD)	51.47 (7.46)	45.70 (9.20)	0.00*	50.73 (7.92)
Median (IQR)	52.00 (11.00)	45.00 (14.00)		51.00 (11.00)
Marital status N (%)				
-married	133 (85.3)	15 (65.2)	0.03*	148 (82.7)
-single/divorced	23 (14.7)	8 (34.8)		31 (17.3)
Parity N (%)				
-yes	132 (84.6)	12 (52.2)	0.00*	144 (80.4)
-no	24 (15.4)	11 (47.8)		35 (19.6)
Residency N (%)				
-Athens	114 (73.1)	15 (65.2)	1	129(72.1)
-Out of Athens	42 (26.9)	8 (34.8)		50(27.9)
Sector of employment N (%)				
-public	114 (73.1)	20 (87.0)	0.24	134 (74.9)
-private	42 (26.9)	3 (13.0)		45 (25.1)
Occupied in C-19 reference hospital N (%)				
-yes				
-no	105 (67.3)	17 (73.9)	0.69	122 (68.2)
	51 (32.7)	6 (26.1)		57 (31.8)
Level of satisfaction with family income N (%)				
-a little				
-merely	21 (13.5)	3 (13.0)	0.09	24 (13.4)
-a lot	98 (62.8)	19 (82.6)		117 (65.4)
	37 (23.7)	1 (4.3)		38 (21.2)
Medical history				
Smoking habit N (%)				
-smoker	52 (33.3)	5 (24.7)	0.5	57 (31.8)
-non smoker	95 (60.9)	16 (69.6)		111 (62.0)
-ex-smoker	9 (5.8)	2 (8.7)		11 (6.1)
Alcohol consumption N (%)				
-yes	122 (78.2)	13 (56.5)	0.04*	135 (75.4)

-no	34 (21.8)	10 (43.5)		44 (24.6)
Contact with covid-19				
-yes	146(93.6)	19(82.6)	0.08	165(92.2)
-no	10(6.4)	4(17.4)		14(7.8)
Infected with covid-19 N (%)				
-yes	11 (7.1)	3 (13.0)	0.56	14 (7.8)
-no	145 (92.9)	20 (87.0)		165 (92.2)
Vaccinated against covid-19 N (%)				
-yes	152 (97.4)	20 (87.0)	0.46	172 (96.1)
-no	4 (2.6)	3 (13.0)		7 (3.9)

Table 1: Sociodemographic characteristics and medical history of the study's sample.

Table 2 describes the psychometric and lifestyle factors of the sample, separately for men and women and at total. Statistically significant differences were observed at the HLPCQ total (p=0.03), the HLPCQ dietary harm avoidance subscale (p=0.017), the HLPCQ dietary healthy choices (p=0.00,) and the HLPCQ organized physical activity (p=0.02). In all these scales women scored higher than men, except the subscale of organized physical activity where men scored higher.

	males **Mean (SD)** **Median (IQR)**	**females** **Mean (SD)** **Median (IQR)**	**p-value**	**total**
Perceived Stress	30.11 (9.11) 37.00 (13.00)	30.95 (5.51) 29.50 (9.25)	0.43	30.24 (8.65) 35.00 (12.00)
Stress symptoms	21.28 (10.86) 24.00 (11.50)	19.04 (9.28) 20.00 (12.00)	0.34	20.99 (10.67) 24.00 (10.00)
Depressive symptoms	12.24 (6.48) 14.00 (8.00)	12.26 (7.09) 14.00 (8.00)	0.6	12.24 (6.54) 14.00 (8.00)
Anxiety symptoms	2.48 (4.32) 0.00 (4.00)	3.47 (4.83) 0.00 (8.00)	0.51	2.61 (4.39) 0.00 (4.00)
HLC Internal	29.46 (6.77) 32.00 (20.00)	29.26 (6.65) 32.00 (10.00)	0.81	29.44 (6.74) 32.00 (10.00)
HLC External/Chance	12.53 (4.14) 12.00 (3.00)	13.56 (5.66) 12.00 (8.00)	0.58	12.67 (4.37) 12.00 (4.00)
HLC Powerful others	17.26 (3.51) 17.00 (2.00)	16.65 (3.77) 17.00 (3.00)	0.27	17.18 (3.55) 17.00 (3.00)
Anxiety for COVID-19	17.51 (10.80) 23.00 (22.00)	14.74 (10.96) 19.00 (22.00)	0.26	17.16 (10.83) 22.00 (22.00)

HLPCQ total score	51.55 (6.87) 51.50 (1.00)	58.63 (13.04) 52.00 (16.00)	0.03*	52.83 (8.69) 52 (1.00)
Dietary Healthy Choices	13.93 (2.54) 14.00 (0.00)	15.47 (3.40) 16.00 (4.00)	0.00*	14.13 (2.70) 14.00 (1.00)
Dietary Harm Avoidance	8.17 (1.91) 8.00 (0.00)	9.08 (2.13) 9.00 (2.00)	0.01*	8.29 (1.96) 8.00 (0.00)
Daily Routine	16.06 (3.55) 16.00 (0.00)	16.65 (4.82) 16.00 (7.00)	0.76	16.14 (3.72) 16.00 (0.00)
Organized Physical Activity	4.10 (1.15) 4.00 (0.00)	3.48 (1.27) 4.00 (2.00)	0.02*	4.02 (1.18) 4.00 (0.00)
Social Support&Mental Control	10.28 (2.25) 10.00 (2.00)	10.35 (2.25) 10.00 (3.00)	0.68	10.29 (2.25) 10.00 (2.00)
Sleep quality	7.04 (2.46) 6.00 (4.00)	8.36 (3.00) 9.00 (5.25)	0.05	7.21 (2.56) 7.00 (4.00)

HLC=Health Locus of Control, IQR=Interquartile Range; *significance level p<0.05

Table 2: Sample's psychometric parameters and lifestyle factors.

Table 3 describes the results from Regression Analysis that evaluated various participants' characteristics and measures as determinants of Covid-19 anxiety score. The results showed that that the vaccinated against Covid-19 virus had lower score than those who were not with statistical significance (p=0.038). Also, the C-19 Anxiety scale was positively correlated with perceived stress score and the HLC internal with statistical significance (p<0.0001 and p=0.00).

	b ± SE, p
Gender(males/females)	2.61 ± 1.81, 0.15
Age in years	-0.06 ± 0.08, 0.48
Sector of employment (public/private)	-2.42 ± 2.47, 0.33
Contact with covid-19 (yes/no)	1.33 ± 2.08, 0.53
Infected with covid-19 (yes/no)	-2.08 ± 2.24, 0.36
Vaccinated against covid-19 (yes/no)	-7.44 ± 3.49, 0.04
Occupied in C-19 reference hospital (yes/no)	0.26 ± 2.23, 0.90
Perceived stress	0.58 ± 0.15, <0.0001
Stress symptoms	0.32 ± 0.20, 0.12
Depressive symptoms	0.12 ± 0.24, 0.63
Anxiety symptoms	-0.07 ± 0.23, 0.71
HLC Internal	0.48 ± 0.16, 0.00
HLC External/Chance	-0.06 ± 0.17, 0.71
HLC Powerful others	-0.22 ± 0.26, 0.41

HLPCQ total score	0.12 ± 0.28, 0.66
Dietary Healthy Choices	-0.10 ± 0.37, 0.78
Dietary Harm Avoidance	-0.78 ± 0.53, 0.15
Daily Routine	0.12 ± 0.28, 0.66
Organized Physical Activity	0.78 ± 0.56, 0.17
Social Support & Mental Control	0.83 ± 0.48, 0.09
Sleep quality	-0.03 ± 0.33, 0.92

Table 3: Results (b, SE) from Regression Analysis that evaluated various participants' characteristics and measures as determinants of Covid-19 anxiety.

Table 4 describes the results from Regression Analysis that evaluated various participants' characteristics and measures as determinants of HLPCQ. The results showed that higher HLPCQ score was negatively correlated with PSS and PSQI scores with statistical significance (p=0.00). Also, HLPCQ score was positively correlated with the score of the HLC's subscale, the Powerful others (p<0.0001).

	b ± SE, p
Gender(males/females)	-0.13 ± 0.11, 0.25
Age in years	-0.47 ± 2.51, 0.85
Sector of employment (public/private)	1.19 ± 3.41, 0.73
Contact with covid-19 (yes/no)	-1.77 ± 2.88, 0.54
Infected with covid-19 (yes/no)	0.15 ± 3.08, 0.96
Vaccinated against covid-19 (yes/no)	1.27 ± 4.99, 0.80
Occupied in C-19 reference hospital (yes/no)	-0.51 ± 2.97, 0.86
Perceived Stress	-0.61 ± 0.22, 0.009
Stress symptoms	0.30 ± 0.29, 0.30
Depressive symptoms	-0.18 ± 0.33, 0.60
Anxiety symptoms	-0.33 ± 0.26, 0.21
HLC Internal	-0.22 ± 0.22, 0.30
HLC External/Chance	-0.27 ± 0.23, 0.24
HLC POWERFUL OTHERS	1.32 ± 0.33, <0.0001
Anxiety for COVID-19	0.12 ± 0.18, 0.50
Sleep quality	-1.26 ± 0.44, 0.00

Table 4: Results (b, SE) from Regression Analysis that evaluated various participants' characteristics and measures as determinants of HLPCQ.

Discussion

The study provides valuable insights into the stress levels and lifestyle factors of Greek general surgeons during the Covid-19 pandemic. The high response rate of 89.5% is a strength of the study. The findings suggest that both male and female general surgeons were mostly vaccinated against Covid-19, which served as a protective factor against anxiety related to the disease. The study also identified gender differences in eating habits and exercise, with men consuming more alcohol and being overweight while exercising

more than women. Similar studies have examined stress levels and lifestyle in general surgeons. For example, a study published in the Journal of the American College of Surgeons in 2019 examined the prevalence of burnout and depression in surgical residents and attending physicians in the United States [20]. Another study published in the Annals of Surgical Oncology in 2021 evaluated the prevalence of burnout among surgical oncologists in the United States and identified risk factors associated with burnout [21]. There are also studies that have examined the impact of the COVID-19 pandemic on the mental health and well-being of healthcare professionals, including general surgeons. For example, a study published in the Journal of Surgical Research in 2021 evaluated the psychological impact of the pandemic on healthcare professionals in China, including surgeons [22].

However, the study has a few limitations, including the fact that it was conducted in only one medical sector and with a majority of male participants. As a result, the findings may not be generalizable to other medical fields or populations. Nonetheless, the study provides a foundation for future research to explore the impact of the pandemic on various work sectors and populations. In addition, our study provides important insights into the stress levels and lifestyle of general surgeons, and can help inform interventions and policies aimed at improving their well-being and job satisfaction.

Conclusions

In conclusion Greek general surgeons of this study experienced increased levels of stress and anxiety during the COVID-19 pandemic, despite not being directly involved in treating COVID-19 patients. The study also found differences in lifestyle habits and health beliefs between male and female surgeons, with women generally reporting healthier behaviors. Additionally, the study found that higher health locus of control and healthier lifestyle habits were associated with lower levels of stress and better sleep quality. Overall, the study highlights the importance of supporting the mental and physical health of general surgeons during times of increased workload and stress.

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