Burnout Syndrome in Personnel of an Infectious Diseases Hospital, One Year after the Outbreak of the COVID-19 Pandemic

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Abstract: *Healthcare workers (HCWs) are important players in the COVID-19 pandemic management and are inescapably in the first line to be exposed to the SARS CoV-2 virus. They were at risk of losing their lives while caring for their duty for COVID patients. This pandemic has substantial psychological impact on HCWs. This study describes the prevalence of burnout between HCWs handle with COVID-19 pandemic. The study explored the level of burnout in this population and examined factors involved in development of this psychological consequence. This cross-sectional survey was conducted on personnel from an Infectious Diseases monospecialty Hospital, which provides care for COVID-19 patients. The study was attended at 12 months after the outbreak. A questionnaire- based survey using Maslach Burnout Inventory (MBI) was conducted for all personnel. Participation was voluntary and anonymous. Age, gender, job category and the level of burnout in each subscale was measured. 186 persons completed the questionnaire (79%from employees). 61.86% experienced medium and high levels of burnout comparable with other country studies. The mean score and SD in emotional exhaustion, depersonalization and lack of personal accomplishment were 23.26+8.45, 11.11+4.05, and 22.62+6.83, respectively. The prevalence of burnout in the hospital`s personnel was 38.179% in low rates, 46.77% had medium level and 15.05% high level. Doctors and administrative staff were more affected than others. Nevertheless, there are no significant statistical differences in the level of the three domains of burnout studied regarding the age and job profile. In conclusion, in our hospital, designated to treat moderate and severe COVID-19 patients burnout is equally present among HCWs.*

Keywords: *COVID-19, burnout, healthcare workers, SARS-CoV-2, professional emotional exhaustion.*

1. Main text

1.1. Introduction

Epidemics of infectious diseases: 1918 influenza pandemic (Spanish flu) (Luca et al., 2021), Zika, Ebola and now Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has marked the history of humanity (Cambrea et al., 2014). Due to globalization, an infectious disease can be spread in hours from one continent to another.

The World Health Organization (WHO) declared the COVID-19 pandemic a global public health emergency, in March 2020. A high rate of infection and mortality for SARS-CoV-2 infection has a tremendous impact on the healthcare system (Baroiu et al., 2021). The pandemic resulted in high levels of anxiety and panic worldwide (Puscasu et al., 2019).

Healthcare workers (HCWs) are important players in the COVID-19 pandemic management and are inescapably in the first line to be exposed to the SARS CoV-2 virus or other infectious diseases. They were at risk of losing their lives, while caring for their duty for COVID-19 patients, in the setting of significantly decreased social support (Luca et al., 2020). In this pandemic, the staff has been subjected to huge stress through fear of illness, to train the infection of their families and to work under difficult conditions. It was an enormous emotional burden for healthcare providers who were on the first line against this disease, like our hospital. Sometimes, medical staff has become sick with COVID treating infected patients. In our hospital, more than 30% of personnel contracted the virus in one year with mild and medium forms COVID-19 and no death (Baroiu et al. 2018; Lupu et al., 2017; Padureanu et al., 2020).

High mortality and uncontrollable character of this disease, with relatively raised rates of infection and mortality among staff, can provoke stress and anxiety in HCWs. Factors such as heavy workload, difficult working wearing special protective equipment, social stigmatization on the staff may aggravate this emotional change. Recent survey-noted worries of HCWs on being placed in the situation to take care of critically ill patients with comorbidities, sometimes exceeding the specialty competencies, with limited information about the diseases, at less at the beginning, limited therapeutically options, with limited access to up-to-date medical information. Many strategically workers had problems at home, where it was necessary to find a solution to take care of their children, as the schools and kindergartens have closed down. The problem increases for HCWs with single parent family or when both parents are essential staff (Shanafelt et al.,

2020; Valcea et al., 2016). Many healthcare providers isolate themselves within their home, due to risk of transmitting the disease to their families. Therefore, this pandemic has substantial psychological impact on HCWs.

To determine the effects on sleep quality of social support, a Chinese researcher (Xiao et al., 2020), studied the structural equation model (SEM) on medical staff working with patients COVID-19. They found that respondents to the questionnaire had high levels of anxiety, stress and relatively low sleep quality.

Burnout, described by Maslach & Jackson (1981), represent a state of emotional, psychological and physical stress among professionals, in response to exposure to occupational stress as long-term involvement in work situations that are emotionally requiring. It includes multidimensional factors: feelings of emotional exhaustion (depletion of emotional resources), depersonalization (developing cynical attitudes about patients) and reduced professional accomplishment (a sense of negative evaluation of oneself) (Maslach, 1998). Physician's burnout has serious consequences, not only to the individual physician, but also to patients and to employees' institutions (Grigoras & Ciubara, 2021). Apart from being harmful for personal, burnout can lead to suboptimal care (Shanafelt et al., 2015).

1.2. Aim

The study explored the level of burnout among HCWs taking care of patients with COVID-19 pandemic and evaluated factors associated with the development of this psychological sequel.

1.3. Material and Method

Maslach Burnout Inventory (MBI) is an internationally recognized, self-report, validated questionnaire for evaluating the severity of occupational burnout (Maslach & Jackson, 1981). There are three dimensions assessed: emotional exhaustion, personal accomplishment and depersonalization. There are 22 items in this questionnaire and each is answered on a Likert scale five-point.

We performed a cross-sectional prospective survey, to evaluate the burnout's prevalence on employees, in an infectious diseases hospital dealing with COVID-19 patients. It`s a teaching mono specialty hospital, with an intensive care unit department, situated in the largest city in the eastern part of the country, since the beginning of the pandemic in the battle against COVID-19 (in March 2020 was the COVID-19 first case in our hospital). The study took place after 12 months from the beginning of the outbreak.

Hospital Ethics Committee granted approval for survey. Answering the survey instrument was recognized as implied consent, so written informed consent was not required. Participation was voluntary and anonymous. Researchers have analyzed only non personal data; no personal identification data was required.

The study used a simple recruitment method. An invitation through professional networks to participate in the study was made. The hospital psychologists' and head nurses invited the entire staff to complete the questionnaire explaining the purpose and principal investigator name of the study. They instructed participants to respond to items in the tool related to COVID-19 outbreak. Several questionnaires were administered to the employees. The investigators didn't know the identity of the respondents. All questionnaires were interpreted and analyzed by the same psychologist.

A questionnaire-based survey using adapted Maslach Burnout Inventory (MBI) was carried out for all personnel. We invited all hospital employees: medical staff (doctors, nurses, and healthcare assistants', i.e) and administrative staff. The questionnaire consists of 29 questions. The questionnaire comprises general questions and specific questions in the three areas of burnout. General questions were age, gender, job profile and working department. The first domain, emotional exhaustion, based on personal burnout, had 9 items. The second domain, which evaluated depersonalization, had 6 items. The third domain evaluated the reduced sense of personnel accomplishment and consists in 10 items.

Burnout is calculated by scores of each of the MBI subscales, with a high score corresponding to a high level of burnout. All specific items had five response categories each, on a five-point Likert scale (very rarely, rarely, occasionally, frequently, very frequently). Each subscale score is calculated by combining all items scores in that subscale, with the notification that some specific domain items are reversely scored (Maslach et al., 1986; Maslach & Jackson, 1984).

Scores range between 9 to 46 for emotional exhaustion, 10 to 50 for personal accomplishment and range from 6 to 30 for depersonalization subscale. The sum of the points for each domain is calculated, obtaining a score, which is related to the values below. The standard threshold values were used to define levels in each dimension as low, moderate and high. The sum of those three domains provides the final burnout score: 25-50 is low level, 51-75 medium level and values > 76 high level burnout (Table 1).

Table 1 The cut-off values for each domain of burnout

Risk level	LOW	MEDIUM	HIGH
Domain			
Emotional exhaustion	9-18	19-27	28-45
Depersonalization	6-12	13-18	19-30
Personal accomplishment	10-20	21-30	31-50
BURNOUT SCALE	25-50	51-75	76-125

Source: Authors' own conception

1.4. Statistical Analysis

Data obtained from the questionnaire were analyzed using IBM SPSS Statistics 23.0. Variables measured on nominal scale were represented using proportions (%). The responses (n, %) were determined separately for each domain. Each domain mean scores were compared using ANOVA test between domain and job profile or group age. Kolmogorov-Smirnov Test was used for normality. Categorical variables were analyzed using chi-square test for association. A p value of <0.05 was taken to indicate statistical significance.

1.5. Results

We received responses from 186 HCWs (the overall response rate was 65.28%). Most of them, 179 (96.24%), were women, as in many hospitals in our country. Participants` demographic characteristics are shown in Table 2.

Table 2. Demographic characteristics of responders

Criteria	Number	%
Age		
21-30 years	19	10.22
31-40 years	39	20.97
41-50 years	76	40.86
51-60 years	50	26.88
≥61years	2	1.08
Job profile		
Doctor	26	13.98
Nurse	88	47.31
Healthcare assistant	52	27.96
Administration staff	20	10.75

Sex		
Male	7	3.76
Female	179	96.24

Source: Authors' own conception

To maintain the anonymity of the participants, the age was completed as decades of age.

Regarding emotional exhaustion, the responses on 9 items are represented in Table 3. The mean score for all respondents was 23.26+8.45, corresponding to a medium level.

Table 3. Personal burnout and distribution of responses

Questions	Very rarely	Rarely	Occasionally	Frequently	Very frequently	Mean score
I feel emotionally drained	50	23	62	42	9	2.66+1.22
Toward the end of the working hours I feel like a squeezed lemon	32	17	57	57	23	3.11+1.25
I feel tired when I wake up in the morning and have to go to work	35	22	67	53	9	2.88+1.15
I feel full of energy and enthusiasm*	25	49	64	34	14	2.80+1.11
I have a state of depression and apathy	68	39	59	18	2	2.17+1.06
I feel indifferent to things I have shown interest in before	60	43	54	25	3	2.28+1.10
I become tense and upset when I think about my current concerns	63	42	51	23	7	2.29+1.16
I want to isolate myself from everyone and rest	57	31	59	23	16	2.51+1.27
I feel at the limit of my powers	58	28	57	28	16	2.53+1.29
Average score						23.26+8.45

* pointed reverse Source: Authors' own conception

Personal burnout rates for respondents were similar for all levels: low 32.22%, medium 34.40% and high 33.33%. The prevalence of emotional exhaustion among doctors (reported to mean value) is much higher than for other personnel categories, probably because they were directly involved, with many challenges, in attending COVID-19 patients, with limited information about this disease, with no internationally treatment recommendations at the beginning and many changes in national protocols. Nurses, healthcare assistant and administrative staff have had similar mean values. (Table 4)

Table 4. Personal burnout and distribution by job type

Emotional exhaustion level			
Scale	LOW	MEDIUM	HIGH	AVERAGE
Job profile	n, %	n, %	n, %	RANGE
Doctor	6, 23.07%	6, 23.07%	14, 56%	26.07 ± 8.85
Nurse	29, 32.95%	31, 35.22%	28, 32.55%	22.95 ± 8.30
Healthcare assistant	18, 34.61%	21, 40.38%	13, 25%	22.13 ± 8.33
Administration staff	7, 35%	6, 30%	7, 35%	22.13 ± 8.33
%	32.22	34.40	33.33	23.26 ± 8.45

Source: Authors' own conception

There is no significant association between personal burnout scale and job profile $\chi^2_{calc}=7.453$, df=6, p=0.281>α=0.05.

Table 5. Personal burnout and distribution by age groups

Emotional exhaustion level			
Scale	LOW	MEDIUM	HIGH	AVERAGE
Age group				RANGE
21-30 years	5	9	5	22.84 ± 5.94
31-40 years	15	11	13	23.33 ± 8.63
41-50 years	25	26	25	22.71 ± 8.33
51-60 years	14	17	19	24.4 ± 9.31
$\geq$61years	1	1	0	19 ± 9.89
Number	60	64	62	23.26 ± 8.45

Source: Authors' own conception

In comparison between age categories, respondents aged between 51-60 years demonstrated higher mean score for personal burnout and those over 65 (in limited number) lower score (Table 5) with no significant

association between emotional exhaustion scale and age group: χ^2_{calc}=2.938, df =6, p=0.817>α=0.05.

Regarding depersonalization, the responses on 6 items are represented in Table 6. The mean score for all respondents was 11.11±4.05, corresponding to a low level.

Table 6: Domain 2: Depersonalization and distribution of responses

Questions	Very rarely	Rarely	Occasionally	Frequently	Very frequently	Mean score
I communicate with some colleagues how I would communicate with objects	83	47	49	7	0	1.89±0.93
Lately I have become tougher in my relationships with colleagues or subordinates	93	34	43	16	0	1.90±1.03
The people I work with are uninteresting and boring	107	40	32	6	1	1.67±0.90
Sometimes I don't care what happens to my colleagues or subordinates	102	42	30	10	2	1.75±0.98
I communicate easily with people regardless of their social status and character*	58	87	34	7	0	1.94±0.80
My subordinates and colleagues put the burden of their problems and duties on my shoulders	94	31	44	11	6	1.94±1.12
Average score						11.11±4.05

* pointed reverse Source: Authors' own conception

Regarding depersonalization 73.11% had low level, 24.73% had medium level and a small proportion 7.5% high level. Doctors and nurses seem to be more affected than others (mean values represented in Table 7) but there is no significant association between depersonalization scale and job profile (χ^2_{calc}=4.27, df=6, p=0.64>α=0.05).

Table 7. Depersonalization level and distribution by job type

Depersonalization Scale Job profile	LOW	MEDIUM	HIGH	AVERAGE RANGE
Doctor	17	8	1	11.19 ± 3.40
Nurse	67	21	10	11.53 ± 4.43
Healthcare assistant	37	13	2	10.46 ± 3.87
Administration staff	15	4	1	10.75 ± 3.66
Average range	136	46	14	11.11 ± 4.05

Source: Authors' own conception

In comparison between the age categories (Table 8) respondents aged 21-30 years and those over 65 had a low mean value score, but without a significant association between depersonalization scale and age: $\chi^2_{calc}=5.013$, df =6, p=0.542 >α=0.05.

Table 8. Depersonalization scale and distribution by the age group

Depersonalization level Scale Age group	LOW	MEDIUM	HIGH	AVERAGE RANGE
21-30 years	15	4	0	10.10 ± 2.90
31-40 years	27	7	5	11.25 ± 4.78
41-50 years	51	20	5	11.15 ± 4.12
51-60 years	31	15	4	11.34 ± 3.86
≥61 years	2	0	0	9.5 ± 2.12
Number	60	64	62	11.11 ± 4.05

Source: Authors' own conception

Regarding a reduced sense of personal accomplishment, the responses on the 10 items are represented in Table 9. The mean score for all respondents was 22.62 ± 6.83, corresponding to a medium level.

Table 9 Domain 3: reduced sense of personal accomplishment and distribution of responses

Questions	Very rarely	Rarely	Occasi onally	Frequ ently	Very frequen tly	Mean score
I have periods when I feel overwhelmed by the situation	44	37	61	36	8	2.60 ± 1.16

Nothing happens the way I want it to	52	51	68	15	0	2.24±0.95
I can find the right solution in conflict situations*	34	74	67	9	1	2.45±0.78
I can positively influence the productivity of the work of my subordinates and colleagues*.	27	70	70	10	9	2.48±0.97
I have many plans for the future and I believe in their realization*	53	70	47	13	3	2.15±0.97
I have professional disappointments	66	42	58	17	3	2.18±1.07
I can easily create a kind and cooperative atmosphere in a group*	42	78	48	14	4	2.24±0.96
I manage to do many things*	44	77	53	8	4	2.19±0.92
I think I will be able to achieve many things in life*	48	84	42	9	3	2.11±0.90
I feel like one who went bankrupt	85	34	39	19	9	2.10±1.22
Average score						22.62±6.83

* pointed reverse Source: Authors' own conception

For the third domain, reduced sense of personal accomplishment, 37.09% of personnel had low rates, 50% had medium level and a small proportion 12.9% high level. Doctors and administrative staff had higher mean values (represented in Table 10), but no statistically significant association between reduced sense of personal scale and job profile χ^2_{calc}=2.555, df =6, p=0.862 > α=0.05.

Table 10 Reduced sense of personal accomplishment and distribution by job type

The reduced sense of personal accomplishment level				
Scale	LOW	MEDIUM	HIGH	AVERAGE
Job profile	n	n	n	RANGE
Doctor	9	12	5	23.96±6.87
Nurse	33	44	11	22.27±6.61
Healthcare assistant	20	25	7	22±7.19
Administration staff	7	12	1	23.05±5.75
Number	69	93	24	22.62±6.83

Source: Authors' own conception

In comparison between age categories, respondents between 51-60 years demonstrated higher mean values score for reduced sense of personal accomplishment (as in personal burnout) an those over 65 (in limited number) lower scores (Table 11) with no statistically significance $\chi^2_{calc}=3.664$, df =6, p=0.722 >α=0.05.

Table 11. Reduced sense of personal accomplishment and distribution by age group

The reduced sense of personal accomplishment level				
Scale	LOW	MEDIUM	HIGH	AVERAGE RANGE
Age group				
21-30 years	8	9	2	22.26$\pm$6.49
31-40 years	15	21	3	22$\pm$6.32
41-50 years	30	36	10	22.28$\pm$7.00
51-60 years	14	27	9	23.52$\pm$6.81
$\geq$ 61years	2	0	0	18.5$\pm$2.12
Number	69	93	24	22.62$\pm$6.83

Source: Authors' own conception

Summarizing the hospital personnel data, the prevalence of low level burnout is 38.17% of the participating employees, 46.77% had medium level of burnout and 15.05% high level of burnout.

Doctors and administrative staff had higher mean values of burnout score (seems to be more affected than the others), but no significantly statistical association between total burnout scale and job profile $\chi^2_{calc}=5.926$, df=6, p=432> α=0.05 (Table 12).

Table 12. Burnout level and distribution by job type

Burnout scale				
Scale	LOW	MEDIUM	HIGH	AVERAGE RANGE
Job profile	n	n	n	
Doctor	8	14	4	61.23$\pm$17.14
Nurse	36	36	16	56.98$\pm$18.12
Healthcare assistant	22	24	6	54.65$\pm$17.78
Administration staff	5	13	2	58.57$\pm$15.67
Number	71	87	28	57.01$\pm$17.62

Source: Authors' own conception

For each category, the scores from each domain are normally distributed (p>α=0.05 Kolmogorov–Smirnov Test for Normality) as in Table 13. There are no significant differences between mean score values for each domain corresponding to job category (p=0.374>α=0.05)

Table 13 ANOVA test for scores of each domain depending on job profile.

ANOVA

	F	Sig.
Score Emotional Exhaustion	1.775	.154
Score Depersonalization	.830	.479
Score Personal Accomplishment	.706	.550
Total Score	1.044	.374

Source: Authors' own conception

Table 14. Burnout level and distribution by age groups

The reduced sense of personal accomplishment level			
Scale Age group	LOW	MEDIUM	HIGH	AVERAGE RANGE
21-30 years	7	11	1	55.21$\pm$13.41
31-40 years	16	16	7	56.58$\pm$18.23
41-50 years	31	34	11	56.28$\pm$18.08
51-60 years	16	25	9	59.52$\pm$18.23
>61years	1	1	0	47$\pm$14.14
Number	71	87	28	57.01$\pm$17.62

Source: Authors' own conception

Even though the age 51-60 years group had higher mean values for total score burnout (Table 14) there is no significant association between burnout level scale and age group χ^2_{calc}=3.397, df=6, p=0.758 > α=0.05.

In the case of age group for each burnout domain, the scores are normally distributed (p>α=0.05 Kolmogorov–Smirnov Test for Normality). There are no significant differences between mean score values for each domain corresponding to age group (p=0.721>α=0.05 Table 15).

Table 15 ANOVA test for scores of each domain depending the on the age group**.**

ANOVA

	F	Sig.
Score Emotional Exhaustion	.419	.739
Score Depersonalization	.452	.716
Score Personal Accomplishment	.478	.698
Total Score	.445	.721

Source: Authors' own conception

2. Discussions

This study reveals that 15.38% of doctors, 18.18% of nurses, 11.53% healthcare assistant and 10% of administrative staff have met the criteria for high level of burnout. A percentage of 61.82% of personnel have medium and high level, being a warning signal for psychological reaction of HCWs in this pandemic (Kowalska et al., 2021; Man et al., 2020, Silistraru et al., 2021). Older people, with age between 51 and 60 have higher scores of burnout, probably linked to higher risk of being ill with severe forms of COVID-19, less adaptation to working conditions with special equipment (Anghel et al., 2011; Stanculescu, 2021;). However, those with age over 65 demonstrated lower prevalence of personal and work related burnout, maybe because they were trained in combat other infectious diseases like HIV/AIDS (Cambrea et al., 2019), viral hepatitis (Halichidis et al. 2013), flu, West Nile, Clostridium difficile (Halichidis et al., 2015), i.e.

This study has some limits. It was held in a single monospecialty hospital with departments providing care or services to patients with medium and severe forms COVID-19. This can explain high percentage of burnout and no statistically significant differences between personal categories, all of them are tired and stressed. The results of this study, by the particular nature of the hospital and the disease COVID-19, cannot be generalized for other regions or countries. We didn't determine the level of burnout before the pandemic, so we cannot match the changes in prevalence. Further studies to identify the burnout and findings solutions for first line HCWs are needed to prevent burnout and reduce it.

3. Conclusions

In this study, there are no significant differences between age and job category in personal dealing with COVID 19 patients. The explanation is that all of them were exposed at the same conditions. Leadership, clear

communication regarding health care directives, management of diseases and guidelines, will reduce HCWs burnout. Health care professionals must be safe and healthy. Daily screening of vital signs, possible symptoms of infection should be assessed, but also signs of burnout should be monitored by hospital psychologist.

Some of the factors that contributed to the burnout are lack of control in the conduct of procedures, inadequate personal protective equipment (PPE), malfunctioning infection control measures, the false concept of safety precautions, defective communication and directives, lack of emotional support and preparedness, perceived fatality.

Acknowledgments

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