Psychopathological profile in COVID-19 patients including healthcare workers: the implications

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Abstract. – **OBJECTIVE:** The effects of COVID-19 seem to extend beyond the physical pain and is showing psychiatric implications as well. Moreover, psychopathological implications seem to last also after patients' discharge. Our goal is to investigate the psychological impact and psychopathological outcome of patients affected by COVID-19.

PATIENTS AND METHODS: We have engaged 34 patients with COVID-19 conditions [eight of them were healthcare workers patients (HCW)] hospitalized at "Policlinico Gemelli Foundation" of Rome, Italy. All patients were evaluated through the Impact of Event Scale-Revised (IES-R) and the Symptom Checklist 90-R (SCL-90-R) first, during their hospitalization (baseline), and then, after 4 months from hospital discharge (follow-up), through phone interviews.

RESULTS: At baseline, 82% of patients revealed from mild to severe psychological impact of COVID-19, according to the IES-R. At follow-up, the mean IES-R total score was significantly decreased ($p<0.001$) even if almost half (46.6%) of our cohort still showed it. HCW patients showed a significantly higher score than other patients at IES-R scale, both at baseline ($p=0.005$) and at follow-up ($p<0.001$). Moreover, at 4 months from discharge, they showed a significantly higher percentage of moderate and severe distress ($p=0.015$). In addition to this, at follow-up, our cohort of patients showed an increase of anxiety symptoms, even if not significant compared to baseline (46.7% *vs.* 35.3% respectively; $p=1.000$), and HCW patients suffered more sleep disorders ($p=0.019$) and anxiety symptoms ($p=0.019$) compared to other patients.

CONCLUSIONS: We indicate the importance of assessing psychopathology of COVID-19 survivors, monitoring their changes over time, and providing psychological support to improve their psychological well-being.

Introduction

World Health Organization (WHO) declared the outbreak of the Coronavirus Disease 2019 (COVID-19) as an international public health emergency on Jan 30th 2020, and, by now, this is affecting more than 200 countries and territories around the world, becoming a pandemic. Italy has been the first-hit European country to face the outbreak of COVID-19 and one of the most affected areas.

Focus on the psychological impact of COVID-19 on affected patients seems to be fundamental in the observation and assessment of the possible long-term effects of this new coronavirus. Indeed, adverse effects of other coronaviruses on patient's mental health has been demonstrated. As an example, it is found that 10 to 35% of patients who survived the SARS, one month after hospital discharge showed signs of anxiety and depression[1]. Three months after hospital discharge, 10% of these patients still presented symptoms of intrusion, 8% symptoms of avoidance, 9% symptoms of hyperarousal, 14% symptoms of anxiety, and 13% symptoms of depression[2]. It was also found that more than 40% of the survivors to the SARS epidemic, both discharged patients and isolated persons in quarantine[3] showed the symptomatology of post-traumatic stress disorder[4], symptoms of intrusion, avoidance, persistence of trauma, emotional numbness, and hyperarousal.

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Also, the effects of COVID-19 seem to extend beyond the physical pain and include psychiatric implications[5]. Preliminary data suggest that patients infected by COVID-19 might experience delirium, depression, anxiety, and insomnia[6]. Moreover, they may experience, along with the symptoms of the disease itself, a variety of stressors and traumatic events that may interact in defining the psychopathological conditions: immunological mechanisms, fear of illness, uncertainty of the future, stigma, traumatic memories of severe illness, social and physical isolation, difficulty in gaining admission to hospital wards, deaths of other patients and/or family members, adverse effects on the mental health of treatment for COVID-19 and of the brain infection[7-10]. In particular, it is noted that during an outbreak, people can be stigmatized due to their disease. Even the public response to the health emergency may lead to an increase of discrimination. The need to maintain social distance and to adhere to certain movement restrictions could favor the social labelling of people affected by COVID-19[11].

Furthermore, psychopathological implications seem to last also in discharged patients. Liu et el[12] indeed reported that almost half of hospital discharged COVID-19 patients showed at least mild levels of depression and anxiety, and few reported clinically significant symptoms of PTSD and/or moderate to severe levels of anxiety and depression. Moreover, he found that the severity of the physical illness and feeling oneself be the target of stigma and discrimination was strongly associated with all three negative outcomes.

Mazza et al[13] showed that COVID-19 survivors presented a high prevalence of emergent psychiatric sequela as well, with 55% of the sample presenting a pathological score for at least one disorder. They expected higher than average incidence of PTSD, major depression, and anxiety in survivors.

During the maximum epidemic peak, several healthcare workers (HCW) were infected. Brooks et al[8] showed that HCW patients quarantined due to the COVID-19 suffered from boredom, exhaustion and loneliness and demonstrated feelings of guilt for leaving job at the time of the greatest emergency, along with fear of infecting their families and difficulty to keep their role as healthcare professionals, as parents, or their careers. In addition, they showed more anxiety and were reluctant to return to work after the quarantine period[17].

The mental health of HCWs seems then more compromised than the general population. For example, from 23 to 47% of HCW in China have manifested depressive phenomena due to the epidemic[15]. Moreover, about 5% of HCW in China have reported medium to high levels of anxiety; 13.47% of them have reported medium to a high level of depression[16]. Furthermore, De Sio et al[17] reported a worrying prevalence of psychological distress and poorly perceived well-being among doctors in the Italian Northern regions.

In the light of scientific data currently available, our aim was to investigate the psychological impact and psychopathological outcome experienced in patients affected by COVID-19. Also, clarify how the psychological impact related to the experience of COVID-19 symptomatology can improve the knowledge and management of this new pathology, tailoring interventions to enhance the psychological well-being of these patients.

Patients and Methods

Patients

Thirty-four patients with COVID-19 (eight of them were HCW patients) were consecutively enrolled from March to August 2020 at "Policlinico Gemelli Foundation" of Rome, Italy. Exclusion criteria in patients' selection were age <18 years and admission to intensive care.

All patients underwent a screening through phone interviews during their hospitalization and, again, after about 4 months from hospital discharge, to identify the symptoms of psychopathological conditions and level of distress experienced following the COVID-19 diagnosis.

Written informed consent from all patients was obtained, and the Institutional Review Board approved the study in accordance with the principles in the Declaration of Helsinki.

Psychological Impact Evaluation

The "Impact of Event Scale-Revised (IES-R)" to evaluate Psychological Impact was adopted. IES-R[18] is a 22-items self-report evaluation to assess current subjective distress for a specific traumatic life event. We asked respondents to identify a specific stressful life event, and then, to indicate how much they were distressed or bothered by it during the past seven days. In our survey, the stressful event to refer to is the COVID-19 pandemic. The IES-R was built with three subscales: intrusions (e.g., repeated thoughts about the trau-

ma), avoidance (e.g., effortful avoidance of situations that serve as reminders of the trauma) and physiological hyperarousal. The average IES-R total score is defined by the sum of the three subscales average. The IES-R total score provides an indication of the level of distress experienced and a higher score indicates a greater psychological impact[19].

Psychopathological Symptoms Evaluation

We adopted the "Symptom Checklist 90-R (SCL-90-R)" to measure Psychopathological Symptoms. The Symptom Checklist 90-R (SCL-90-R)[20]: is a self-reported assessment tool used to determine the number of psychological symptoms in order to define general psychopathology. It includes 90 items subdivided into 10 dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, and global severity index. Each of the 10 subscales of the SCL-90-R includes 6-13 items, and the score of each dimension is calculated as the mean of the scores of all the items included, which refer to symptoms reported during the previous week. Moreover, a global severity index (GSI) is computed as the average score of all 90 items. According to the Italian adaptation of SCL-90-R[21] a GSI score >1 indicates a pathological neuropsychiatric performance. This benchmark value was therefore used for GSI as well as for each subscale to indicate pathological values of single neuropsychiatric dimensions.

Statistical Analysis

All analyses were performed using the SPSS version 21.0 software package (SPSS Inc., Armonk, NY, USA). Descriptive statistics were calculated for quantitative variables [median, interquartile range (IQR), mean, standard deviation (SD)], and qualitative variables (percent frequencies).

A repeated-measure analysis (*t*-tests and McNemar Test) was performed to compare the Psychological Impact measured by IES-R and Psychopathological Symptoms Evaluation measured by SCL-90 at follow-up in comparison to baseline. Furthermore, parametric or non-parametric tests were performed (*t*-tests and Chi-square test), as appropriate, to determine differences between HCW patients and other patients in the IES-R and SCL-90 scores. A two-tailed *p*-value of less than 0.05 was considered statistically indicative.

Results

Demographic Profile of Sample and Adherence to Participation

A total of 34 Italian patients with COVID-19 were enrolled. The majority of patients were male [55.9% (19 nos.)], median age and education of the sample were respectively 54 (IQR 46-67) years and 18 (IQR 13-18) years, and 23.5% (8 nos.) of the sample were HCW.

At follow-up, it was recorded 55.8% (19 nos.) dropout patients. Indeed, only 15 patients out of 34 agreed to complete the same questionnaires, and none of patients that refused to participate was HCW.

Psychological Impact Evaluation

Overall, during their hospitalization, 82.4% (28 nos.) of patients revealed from mild to severe psychological impact of COVID-19, according to the IES-R.

HCW patients showed a significantly higher score than other patients at IES-R total [mean 55.6 (SD 16.2) *vs.* 33.1 (SD 16.9); *p*=0.005], avoidance [mean 2.25 (SD 0.74) *vs.* 1.15 (SD 0.71); *p*=0.004], and hyperarousal scales [mean 2.77 (SD 0.58) *vs.* 1.62 (SD 0.88); *p*=0.002]; and with a trend towards significance at intrusion scale [mean 2.62 (SD 1) *vs.* 1.76 (SD 0.93); *p*=0.055]. Furthermore, they showed, with a trend towards significance, a higher percentage of moderate and severe distress than other patients did [25% (2 nos.) *vs.* 7.7% (2 nos.) and 75% (6 nos.) *vs.* 38.5% (10 nos.) respectively; *p*=0.055].

After about 4 months from discharge, the percentage of overall patients who revealed from mild to severe psychological impact of COVID-19 according to the IES-R, were halved [46.6% (7 nos.)]. Moreover, at follow-up, mean IES-R total [mean 22.8 (SD 14) *vs.* 48.9 (SD 20); *p*<0.001], avoidance [mean 0.93 (SD 0.58) *vs.* 1.99 (SD 0.86); *p*<0.001], intrusion [mean 1.02 (SD 0.72) *vs.* 2.27 (SD 1.14); *p*<0.001] and hyperarousal [mean 1.19 (SD 0.75) *vs.* 2.46 (SD 0.82); *p*<0.001] scores were significantly decreased.

Nevertheless, at 4 months from discharge, HCW patients still showed, compared to the rest of the patients, a significantly higher percentage of moderate and severe distress [both 25% (n=2) *vs.* 0% (n=0); *p*=0.015] and higher scores at IES-R total [mean 32.38 (SD 9.13) *vs.* 10.17 (SD 8.11); *p*<0.001], avoidance [mean 1.28 (SD 0.41) *vs.* 0.48 (SD 0.47); *p*=0.005], intrusion [mean 1.45 (SD 0.63) *vs.* 0.43 (SD 0.33); *p*=0.004] and hyper-

arousal scales [mean 1.45 (SD 0.63) *vs.* 0.44 (SD 0.43); *p<0.001*]. Complete descriptive statistics of IES-R item scales are shown in Table I.

Psychopathological Symptoms Evaluation

Overall, during their hospitalization, 17.6% (6 nos.) of subjects showed a clinically significant intensity of psychic distress perceived according to the Global Severity Index (GSI) of SCL-90.

However, with regard to the individual psychopathological symptoms, most of the patients showed clinically significant scores at sleep disorders [64.7% (22 nos.)], depression [47.1% (16 nos.)], anxiety [35.3% (12 nos.)], somatization [32.4% (11 nos.)] and obsessive compulsion [26.5% (9 nos.)] subscales.

At follow-up, a lower percentage of subjects still showed a clinically significant intensity of psychic distress perceived [13.3% (2 nos.)]. In reference to psychopathological symptoms it was noted a stable percentage of clinically significant scores at depression [46.1% (7 nos.)], somatization [33.3% (5 nos.)] and obsessive compulsion [26.7% (4 nos.)] subscales, a decrease of 18% of pathological scores at sleep disorders subscale [46.7% (7 nos.)], and an increase by 10% of clinically significant scores at anxiety subscale [46.7% (7 nos.)].

Complete descriptive statistics of psychopathological symptoms measured through SCL-90 are shown in Table II.

The SCL-90 items most frequently reported during hospitalization, with more than 50% of moderate-to-extreme answers were: "Nervousness or shakiness inside" and "Feeling blue". Instead, items reported in the 40% to 50% range of moderate-to-extreme answers were: "Unwanted thoughts, words, or ideas that won't go", "Loss of sexual interest or pleasure", "Feeling low in energy or slowed down", "Feeling fearful", "Heart pounding or racing", "Trouble in falling asleep", "Waking up in the early morning" and "The idea that something is seriously wrong with their body".

At 4 months from discharge, they still appear among the most frequently reported items: "Nervousness or shakiness inside", "Feeling blue", "Feeling fearful", "The idea that something is seriously wrong with your body" with more than 50% of moderate-to-extreme. Furthermore, it was still noted 40% to 50% of moderate-to-extreme items regarding "Feeling low in energy or slowed down", "Loss of sexual interest" or "pleasure and Unwanted thoughts, words, or ideas that

won't go". On the other hand, patients added further items among those most reported: "Suddenly scared for no reason", "Feeling afraid to travel on buses, subway and trains" (more than 50% moderate-to-extreme), "Feelings of guilt", "Pains in lower back", "Feeling easily annoyed or irritated", "Worried about sloppiness or carelessness", "Trouble remembering things", "Feeling others are to blame for most of your troubles" (between 40% and 50% moderate-to-extreme).

Furthermore, healthcare workers patients showed a percentage of symptoms similar to the other subjects during their hospitalization, but a higher percentage of clinically significant symptoms of anxiety [75% (6 nos.) *vs.* 14.3% (1 no.); *p=0.019*] and sleep disorder subscales [75% (6 nos.) *vs.* 14.3% (1 no.); *p=0.019*] compared to the rest of patients at 4 months from discharge.

Discussion

The aim of this study was to examine the psychopathological outcome in a group of COVID-19 patients, to deepen the analysis of effects of COVID-19 that seem to go beyond the physical pain and is including psychiatric implications[7].

Our findings show that more than 80% of our cohort of COVID-19 patients, during their hospitalization, suffered from mild to severe psychological distress according to the IES-R scale that measures emotional states in reference to a specific event. Furthermore, although at 4 months from hospital discharge, the percentage of overall patients who revealed a significant psychological impact was halved, almost half of our cohort still showed it.

Moreover, our cohort of patients showed clinically significant symptoms for sleep disorders, depression, anxiety, somatization and obsessive compulsion during their hospitalization. Even if, at 4 months from hospital discharge, sleep disorders seemed to decrease, depression, somatization and obsessive compulsion symptoms seemed to persist considerably, and anxiety symptoms increased.

Results from our group of COVID-19 patients confirm, according to previous evidence[6,12,13], that patients with COVID-19 might experience psychopathological implications and that they seem to last also in discharged patients, to the point that also in a small size sample of patients it can be detected as a significant psychopathological outcome.

Table I. Levels of distress in the study population.

Variables	T0 Total sample, N = 34 % (N)	T1 Total sample, N = 34 % (N)	p	T0 HCW patients, N = 8 % (N)	T0 Not HCW patients, N = 26 % (N)	p	T1 HCW patients, N = 8 % (N)	T1 Not HCW patients, N = 6 % (N)	p
IES-R avoidance subscale	1.41 (0.8)*	0.93 (0.5)*	**< 0.001**	2.25 (0.7)*	1.15 (0.7)*	**0.004**	1.28 (0.4)*	0.48 (0.4)*	**< 0.001**
IES-R intrusion subscale	1.97 (1)*	1.02 (0.7)*	**< 0.001**	2.62 (0.7)*	1.76 (0.7)*	**0.055**	1.45 (0.6)*	0.43 (0.3)*	**0.005**
IES-R hyperarousal subscale	1.89 (0.9)*	1.19 (0.7)*	**< 0.001**	2.77 (0.5)*	1.62 (0.9)*	**0.002**	1.75 (0.2)*	0.44 (0.4)*	**0.004**
IES-R total score	38.4 (19.1)*	22.86 (14.1)*	**< 0.001**	55.6 (16.2)*	33.1 (10.9)*	**0.005**	32.38 (0.1)*	10.17 (8.1)*	**< 0.001**
Average (range 0-23)	17.6 (6)**	46.7 (7)**	**0.031**	0 (0)**	23 (6)**	0.055	12.5 (1)**	100 (6)**	**0.015**
Mild (range 24-32)	23.5 (8)**	20 (3)**		0 (0)**	30.8 (8)**		37.5 (3)**	0 (0)**	
Moderate (range 33-36)	11.8 (4)**	13.3 (2)**		25 (2)**	7.7 (2)**		25 (2)**	0 (0)**	
Severe (> 37)	47 (15)**	13.3 (2)**		75 (6)**	38.5 (10)**		25 (2)**	0 (0)**	

Bold values represent statistically significant p-values, *M (SD), **% (N). N number, M mean score, SD standard deviation, IES-R Impact of Event Scale-Revised, T0 baseline, T1 Follow up, HCW Health care workers.

Table II. Description of psychopathological symptoms in the study population.

Variables	T0 Total sample, N = 34 % (N)	T1 Total sample, N = 34 % (N)	p	T0 HCW patients, N = 8 % (N)	T0 Not HCW patients, N = 26 % (N)	p	T1 HCW patients, N = 8 % (N)	T1 Not HCW patients, N = 6 % (N)	p
SCL-90 somatization	32.4 (11)	33.3 (5)	1.000	37.5 (3)	30.8 (8)	0.722	25 (2)	42.9 (3)	0.464
SCL-90 obsessive-compulsive	26.5 (9)	26.7 (4)	0.250	50 (4)	19.2 (25)	0.085	12.5 (1)	42.9 (3)	0.185
SCL-90 interpersonal sensitivity	0 (0)	6.7 (1)	–	0 (0)	0 (0)	–	0 (0)	14.3 (1)	0.268
SCL-90 depression	47 (16)	46.7 (7)	1.000	62.5 (5)	42.3 (11)	0.317	62.5 (5)	28.6 (2)	0.189
SCL-90 anxiety	35.3 (12)	46.7 (7)	1.000	62.5 (5)	26.9 (7)	0.066	75 (6)	14.3 (1)	**0.019**
SCL-90 hostility	0 (0)	0 (0)	–	0 (0)	0 (0)	–	0 (0)	0 (0)	–
SCL-90 phobic anxiety	0 (0)	6.7 (1)	–	0 (0)	0 (0)	–	0 (0)	14.3 (1)	0.268
SCL-90 paranoid ideation	8.8 (3)	0 (0)	–	0 (0)	11.5 (3)	0.314	0 (0)	0 (0)	–
SCL-90 psychoticism	0 (0)	0 (0)	–	0 (0)	0 (0)	–	0 (0)	0 (0)	–
SCL-90 sleep disorder	64.7 (22)	46.7 (7)	1.000	75 (6)	61.5 (16)	0.486	75 (6)	14.3 (1)	**0.019**
SCL-90 GSI	17.6 (6)	13.3 (2)	1.000	37.5 (3)	11.5 (3)	0.092	25 (2)	0 (0)	0.155

Bold values represent statistically significant p-values. N number, SCL-90-R Symptom Checklist 90-R, T0 baseline, T1 Follow up, HCW Health care workers, GSI global severity index.

Furthermore, our findings show that HCW patients revealed a higher intensity of the psychological impact compared to the rest of the patients, both during hospitalization and after discharge, and that they suffered from a larger percentage of sleep disorders and anxiety symptoms at 4 months from hospital discharge.

These results indicate that HCW might be at a higher risk of developing psychological issues, such as anxiety, depressive symptoms and sleep quality, and might be a fragile population of patients needing a particular care[22-24]. Indeed, they are experiencing very stressful challenges, and they might perceive more clearly risks and chronicity of the disease.

Another interesting finding highlighted by our study is the patients' firm reluctance to talk about their disease at 4 months from hospital discharge that led to more than 50% of drop out patients at follow-up. It is likely that this reluctance was due to psychopathological issues that we could not analyze further. It is also worth highlighting that none of the subjects that refused to participate were HCW patients. This could suggest that, if on the one hand HCW patients experience greater impact or higher intensity of psychological symptoms, on the other hand the rest of the patients may tend to want to remove the experience.

Our study has some limitations. First of all, the small size sample, which makes necessary further studies with a larger number of subjects to confirm our results. Secondly, the large number of dropout patients at follow-up that may have caused an underestimation of psychopathological issues in the patients. Moreover, since none of our patients was admitted to intensive care, our findings are applicable only to patients with mild conditions. Therefore, further investigations, including most critically ill patients, are needed.

Conclusions

These findings point out that almost half of the hospital discharged COVID-19 patients showed significant psychological distress, a consistent persistence of symptoms, such as depression, somatization and obsessive compulsion and even an increase of anxiety symptoms, especially in HCW patients. We, therefore, indicate the importance of assessing psychopathology of COVID-19 survivors, monitoring their changes over time and adopting psychological treatment to improve their psychological well-being. "Policlinico Ge-

melli Foundation" of Rome, Italy, was among the first Italian hospitals to become "COVID-19 Hospital" in March 2020, receiving and taking care specifically of patients with COVID-19. During their hospitalization, patients were provided with psychological support by a group of psychologists, who also screened patients for psychopathological features.

Recently, right at "Policlinico Gemelli Foundation", Rome, Italy, a "Psych traumatology Clinic" was inaugurated where patients with post-traumatic disorder (PSTD) are taken care of with several treatments including EMDR (Eye Movement Desensitization and Reprocessing). Based on previous studies carried out to date, and indicated by our findings, we believe that it could be helpful if this Clinic could receive COVID-19 patients with the aim of reducing the disease burden and distress. Further studies are needed to confirm the effectiveness of treatments.

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