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Articles

Female gender and psychological profile of outpatients attending Post-COVID-19 follow-up: some preliminary results

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Abstract

Background: The Post-COVID syndrome, characterized by persistence of psychological, neurologic, and physical symptoms, affects a large proportion of COVID-19 survivors. Specifically, females seem at increased risk of experiencing more psychological manifestations of Post-COVID Syndrome.

Methods: A sample of 60 PCR (Polymerase Chain Reaction) confirmed COVID-19 outpatients (48.3% female; age mean = 56.1; SD = 10.8) attending an outpatient clinic dedicated to Post-COVID-19 follow-up was enrolled for this study. Each participant completed the Psychosocial Index to assess stress, well-being, psychological distress, and illness behavior, the Impact of Event Scale – Revised to evaluate post-traumatic stress symptoms and, the Hospital Anxiety and Depression Scale to assess anxiety and depression; the Connor-Davidson Resilience Scale to assess resilience; and N scale of NEO Five Factor to assess “Neuroticism”.

Results: More than half of patients showed clinical or subclinical anxiety and depressive symptoms. Post-traumatic stress symptoms were found in 58.3% of sample. Resilience levels were in a medium range (71.0 ± 15.2). Statistical analysis found a predominance of depressive symptomatology ($p = 0.0453$), hyperarousal manifestations ($p = 0.0049$), perception of stress ($p = 0.0001$) and trait of neuroticism in women ($p < 0.0001$). Our results show psychological distress, post-traumatic symptoms, poor psychological well-being, depression and anxiety symptoms for several weeks after infection in patients who had COVID-19. Moreover, female outpatients had a higher perception of distress, hyperarousal manifestations and depressive symptomatology than the male counterpart.

Conclusions: As a novelty, this study gives us a deeper understanding of the psychological Post-COVID-19 profile in a clinical sample of pneumological outpatients. Moreover, it focused on gender differences identifying the female gender as a risk factor with respect to psychological illness. Our findings suggest the relevance of planning personalized interventions and assessment aimed at higher psychopathological risk groups, such as females.

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1. Introduction

The World Health Organization (WHO), on 11th March 2020, declared a global pandemic, due to the rapid spread of Coronavirus Disease SARS-CoV-2 (Coronavirus Disease-19, COVID-19) during the early 2020s. Italy was the first European country affected by the Coronavirus and, with more than 24.260.660 confirmed cases from January 2020 to December 2022 (WHO, 2022) also one of the most afflicted in the world. As a result of the COVID-19 pandemic several issues have complicated the access and management of patients with chronic organic conditions (Rahnea-Nita et al., 2021; Pokrajac-Bulian et al., 2022) or psychopathologies, leading to exacerbation of symptoms and increased rates of relapse (Nooraeen et al., 2023). In the pandemic era, individuals experienced loneliness caused by restrictions, fear of the stigma of infection, anxiety about their safety, death of loved ones, as well as rebellion against rules, non-adherence to safety measures, suspicion, distrust of scientific authorities, and fear of contamination (Settineri & Merlo, 2020). During the pandemic a negative effect on psychological health was observed (Cénat et al., 2021; Lopez et al., 2021; Spano et al., 2021; Procaccia et al., 2022). Some studies have related the presence of suicidal ideation (Ammerman et al., 2021) and episodes of nonsuicidal self-harm to COVID-19, linking them to traits of emotional dysregulation and poor psychological well-being, especially in the first pandemic wave (Benedetto et al., 2022). Contagion prevention measures have resulted in separation and isolation among people, with a significant impact on mental health. Indeed, from the early stages of the pandemic, the literature suggested the importance of identifying the unintended and long-term mental health consequences of these measures (Di Giacomo, 2020). A large body of literature highlights the psychological effects of pandemic and isolation on the mental health of the general population (Passavanti et al., 2021; Rossi et al., 2020), bringing to light the exacerbation of anxiety disorders, insomnia, depression, pain (Morin et al., 2021; Akbarpour et al., 2022) and post-traumatic stress symptoms (Zhang et al., 2021), especially in the quarantine

condition (Casagrande et al., 2020; Lin & Fu, 2022). The female gender and young adults seem to represent the target group most vulnerable to psychological reactions caused by pandemic COVID-19 (Prete et al., 2020). A review conducted by Cielo et al. (2021) suggests that the pandemic and its containment measures in the youth population are associated with various emotional manifestations, such as anxiety, stress, depression, sleep disturbances, and poor psychological well-being. These findings are partly due to economic problems, concerns about their study paths, social restrictions, and loneliness caused by the heavy use of e-learning and online relationships. Although on the latter issue, other authors suggest that the use of online technologies in the context of COVID-19 is not only a risk to well-being, but also a resource that might offset traditional social interactions and promote adaptation to the challenges of the pandemic (Venuleo et al., 2022). Recently, Guidotti et al. (2022) analyzed the emotional distress of college students in the pandemic era. Compared with college students assessed before the pandemic, increased levels of anxiety and depression and somatic complaints were found. In addition, the authors pointed out a complex interaction between levels of somatic distress, emotional instability, openness to change, symptoms of anxiety and depression, irritability and tendency to somatization, while also identifying relationships between certain personality traits such as introversion and shyness and the development of depression. Other studies have focused on the population affected by COVID-19. In a study of 28 patients with COVID-19 disease, 85.4% of participants developed psychopathology, especially when quarantined at home without continuous support from health care providers and in the presence of intense sensory disturbances (Moroianu et al., 2021). Moreover, a meta-analysis showed that more than 40% of patients affected by COVID-19 had depression or anxiety, and a third had sleep disorders (Deng et al., 2021). Specifically, people who experience SARS-CoV-2 infection and COVID-19 disease symptoms face stressful situations that may increase their emotional vulnerability and the onset of psychological illness and psychiatric syndromes (Sun et al., 2021), particularly in patients who experienced hospitalization in Intensive Care Units (ICU) (Dong et al., 2021). As a matter of fact, usually ICU patients have a higher risk of psychopathology, as they may have experienced the invasive medical procedures as traumatic (Davydow et al., 2008; Righy et al., 2019). Consistent with this observation, a recent study by Craparo et al. (2022) indicates that people hospitalized for COVID-19 illness were at higher risk of developing typical symptoms of posttraumatic stress, such as intrusiveness and hyperarousal, than affected patients for whom hospitalization was not required. Another longitudinal study by Serra et al. (2022) of patients previously hospitalized for COVID-19 showed that post-traumatic stress disorder (PTSD) in

this population is a frequent consequence. In their study, the 1-year prevalence of PTSD was 23.9%. Associated variables were employment status, perceived threat to one's life, obesity, pulmonary disease, and lack of social support. On the other hand, older age and male gender were protective factors. Patients recovering from the acute period of COVID-19 are subject to continued problems of extreme fatigue, psychological illness, and cognitive impairment (Amdal et al., 2021). Survivors have a high prevalence of psychological and psychiatric disorders, for example post-traumatic stress symptoms, major depression, and anxiety (Sher, 2021). Mazza and colleagues (2020) showed that 1 month after inpatient treatment a large number of patients reported clinically significant symptoms, specifically 28% for Post-Traumatic Stress Disorder (PTSD), 31% for depression, 42% for anxiety, 20% for obsessive-compulsive symptoms, and 40% for insomnia. Other symptoms frequently reported after discharge are headache, muscle myalgia, articular pains, loss of concentration (Orrù et al., 2021). The conditions described above have been called Post-COVID syndrome, long COVID, or post-acute COVID-19 (Sher, 2021). The National Institute for Health and Care Excellence (NICE, 2020) describes long COVID as suffering from symptoms that persist or develop following acute COVID-19 infection and could not be justified by other diagnosis. Specifically, when symptoms persist from 4 to 12 weeks it is referred to as long COVID, and if symptoms persist beyond 12 weeks after infection it is referred to as Post-COVID syndrome (Orrù et al., 2021; NICE, 2020). Long COVID is not only limited to survivors of hospital care and ICU admissions, but also a manifestation evident in those who were not hospitalized or did not immediately seek medical care (Crispo et al., 2021). These findings suggest that isolation, hospitalization, and the drama of health emergency could be extremely stressful experiences decisive in the onset of these symptoms, partly because of persistent fear for one's survival (Bonazza et al., 2020). Compared to long COVID, the Post-COVID syndrome appears to be more pervasive and to be characterized by stabilization (or development) and persistence of the psychiatric, neurologic, and physical symptom clusters described above, beyond 12 weeks post-infection. Post-COVID Syndrome seems to affect approximately 60% of hospitalized COVID-19 survivors eight months after infection (Fernández-de-Las-Peñas et al., 2022). Specifically, females were at increased risk of experiencing physical and neurologic manifestations reported to date include encephalopathy, stroke, anosmia, ageusia, vertigo, headache, Guillen-Barre syndrome, and musculoskeletal myalgia (Sher, 2021). Psychological and psychiatric conditions include anxiety and depression symptoms, posttraumatic distress, and sleep disorder (Sher, 2021; Orrù et al., 2021). Sher (2021) hypothesizes that there is a high likelihood that psychiatric, neurological, and physical

symptoms, along with inflammatory brain damage in individuals with Post-COVID syndrome may increase suicidal ideation and behavior. Some studies have identified significant associations between Post COVID-19 symptoms and some protective and risk factors. Recent literature suggests that female gender, hypertension and longer hospitalization were associated with higher risk of new or persistent symptoms and development of Post-COVID syndrome (Tleyjeh et al., 2021). In an Italian sample Bai and colleagues (Bai et al., 2022) reported that long COVID was diagnosed more frequently in women, in older patients and in active smokers. A multicenter study by Fernández-de-las-Peñas and colleagues (2022), carried out on 1969 patients, found that females were at increased risk of experiencing long-term Post-COVID symptoms including depression, anxiety, or low sleep quality compared to males, in the absence of gender differences at hospitalization. A meta-analysis of risk factors for long COVID confirmed the association between female gender and long COVID risk, also in longitudinal studies (Michelen et al., 2021). Taken together, the burden of the Post COVID-19 syndrome should be viewed as a long-term potential cause of a major impact on the public health. Focusing on gender differences in the management of Post-COVID-19 patients, is important to identify those most at risk of developing chronic or enduring symptoms. In fact, although mortality rates are higher for men due to life-threatening chronic diseases, health statistics show higher morbidity and health service utilization rates for women who have a nearly higher rate of disabling chronic conditions (Bertakis et al., 2000; Denton et al., 2004; Cherepanov et al., 2010; Cherepanov et al., 2011).

To the best of our knowledge, no study has specifically investigated on Post-COVID-19 patients in a medical setting, also in Italy. In particular, it might be of interest to delineate the psychological profiles of Post-COVID 19 among patients followed in an outpatient clinic dedicated to Post-COVID-19. Moreover, nobody has investigated on gender differences. Further, it could be interesting a knowledge about marital status as a protective factor, considering that marital status represents one of the most important social factors that might influence mental health and coping challenges (Bulloch et al., 2009; Lawal et al., 2022).

1.1 Objectives and Hypothesis

The aim of this study was to assess psychological health and to define the psychological profile of a sample of patients who were followed by Pneumologists in an outpatient clinic dedicated to Post-COVID-19 follow-up. Specifically, we focused on gender differences regarding the presence of anxiety-depressive and posttraumatic stress symptoms and regarding the possible presence of any protective or risk factors (e.g., resilience levels, having a partner or being single).

We hypothesized to find a psychological profile of Post-COVID-19 patients characterized by high levels of anxiety, depression, and symptoms of posttraumatic stress and sleep disturbance; moreover, we hypothesized that these characteristics were more pronounced in women and in single individuals.

2. Methods

2.1 Participant and Procedure

A sample of 60 PCR-confirmed COVID-19 outpatients was enrolled for this study (48.3% female; age mean= 56.1; ds= 10.8). COVID-19 outpatients were involved in the study if: a) they were hospitalized at the Policlinico University Hospital “Riuniti” of Foggia and at Policlinico University Hospital of Bari between 2020 and 2021 or they received home care treatment followed by the aforementioned hospitals; b) they attend an outpatient clinic dedicated to Post-COVID-19 follow-up; c) they completed the whole questionnaires. Patients who had a psychiatric diagnosis were excluded. Once they were discharged, patients were interviewed by pneumologists who investigated the functioning level of patients in daily life. In addition, participants completed the questionnaires online in order to assess the following under the psychologist’s supervision: Post Traumatic Stress symptoms; depression; anxiety; resilience; disposition to experience negative emotions (neuroticism). All participants filled out the informed consent. The ethical committee of University Hospitals approved the general study protocol (n. 145/CE/2020). The study was conducted following the Helsinki Declaration.

2.2 Materials

In order to carry out this study the following standardized questionnaires were employed: a) the Psychosocial Index (Sonino & Fava, 1998), a 55 – item self- rating scale exploring sociodemographic data (e.g., age, sex, education, civil status, and occupation) and clinical data (e.g., stress, well-being, psychological distress; abnormal illness behavior and Quality of life. The PSI is not designed to calculate a total score. The reliability coefficients were 0.88 for rating stress, 0.94 for well-being, 0.89 for psychological distress, and 0.90 for illness behaviour (Sonino & Fava, 1998); b) the Impact of Event Scale – Revised (IES-R) (Weiss et al., 1997; Craparo et al., 2013). It was a self-report measure of subjective distress after a specific event (e.g., COVID-19 illness). It was composed of three subscales (i.e., avoidance, hyperarousal, intrusiveness) and 22 items. The internal consistency of the IES-R scales was good for all three subscales: intrusion, alpha=0.78; avoidance, alpha=0.72; hyperarousal, alpha=0.83 (Craparo et al., 2013); c) The Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983; Costantini et al.,

1999). It was a self-report measure useful to assess anxiety and depression in outpatients. It was composed of two subscale (i.e., anxiety and depression) and 14 items. The Cronbach's alpha for the subscales ranged between 0.80 and 0.85 (Costantini et al., 1999); d) The Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003), a self-report instrument to assess resilience. It was composed of five subscales (i.e., personal competence, self-confidence, positive acceptance, control, spirituality) and 24 items. The internal consistency for the whole scales was 0.89 (Connor & Davidson, 2003); e) N scale of NEO Five Factor Inventory (McCrae & Costa, 2004). It was a self-report measure to assess "Neuroticism"; individual differences to feel negative emotions such as sadness, anxiety and mood swings. It was composed of 12 items, internal consistency ranges from 0.68 to 0.86 (McCrae & Costa, 2004).

2.3 Statistical Analyses

Analysis was conducted using the statistical software Grand Prism 5 (San Diego, CA, USA). Means and standard deviation (SD) were calculated for each characteristic and parameter, and findings were considered statistically significant with $p < 0.05$. The differences in psychometric dimensions across the groups were compared using nonparametric Kruskal–Wallis test with Dunn's multiple comparison post-hoc testing.

3. Results

Table 1 reports Socio-demographic and clinical characteristics of the study sample. 60 patients with COVID-19 were recruited from hospitals in the city of Foggia and the city of Bari (31 female, 29 male, mean age 53.1 ± 12.20 and 57.7 ± 8.81 , respectively). Out of the total sample, 38 patients (63.33%) needed hospitalization for treatment. Among these, 19 were male (65.52%) and 19 (61.29%) were female. The duration of hospitalization was on average 16.8 days for women and 17.7 days for men. Most of them had a partner (70%). The average years of education was 11.9 ± 3.81 . In our sample, more than half of the patients had anxiety and depressive symptoms of clinical ($HADS \geq 11$) or subclinical ($HADS \geq 8$) significance. Specifically, regarding anxiety symptoms 22 patients (36.67%) exceeded the clinical cut-off of HADS and 12 (20%) reached sub-clinical levels. Regarding depressive symptoms, 22 patients (36.67%) exceeded the clinical cut-off and 9 (15%) reached subclinical levels. Moreover, 35 patients (58.33% of total; 44.83% male and 73.33% female) of our sample reported clinical post-traumatic stress symptoms ($IES-R \geq 33$).

Table 1. Socio-demographic and clinical characteristics of the study sample

Variable	Male n=29	Female n=31	Total Sample n=60
Age (M \pm DS)	57.79 \pm 8.81	53.11 \pm 12.20	56.13 \pm 10.77
Hospitalized Patients	19 (65.52%)	19 (61.29%)	38 (63.33%)
Marital status			
Single	5 (17.24%)	13 (41.94%)	18 (30%)
With a partner	23 (82.76%)	18 (58.06%)	42 (70%)
Years of education (M \pm DS)	10.89 \pm 3.4	12.84 \pm 3.97	11.9 \pm 3.81
Post-traumatic stress symptoms (IES-R \geq 33)	13 (44.83%)	22 (73.33%)	35 (58.33%)
HADS Anxiety \geq 11	8 (27.59%)	14 (45.16 %)	22 (36.67%)
HADS Anxiety \geq 8	7 (24.14%)	5 (16.13%)	12 (20%)
HADS Depression \geq 11	6 (20.69%)	16 (51.61%)	22 (36.67%)
HADS Depression \geq 8	6 (20.69%)	3 (9.68%)	9 (15%)

IES-R=Impact of Event Scale - Revised; HADS=Hospital Anxiety Depression Scale.

The mean scores on psychological variables of the total sample are presented in Table 2. Regarding psychopathological symptoms in the whole sample, the average symptoms of depression (8.52 ± 5.41) and anxiety (9.06 ± 5.71) were at the subclinical level. Furthermore, the mean values of post-traumatic stress symptoms assessed by the IES-R were clinically significant ($39.1 \pm 22.c$). Student's t-statistical analysis conducted to compare the female group with the male group showed a significant effect of female gender on the perception of stress evaluated by PSI ($p = 0.0001$), with statistically significant higher levels of stress in the female group. Specifically, comparison on the distress subscale of PSI showed that emotional distress (e.g., symptoms of anxiety and depression) were significantly stronger in females ($p = 0.0053$). In addition, the manifestations of hyperarousal typical of post-traumatic stress (IES-R Iperarousal) were significantly higher in the female gender ($p = 0.0049$). We also found a predominance of depressive symptomatology in the female population ($p = 0.0453$) and significantly more pronounced traits of neuroticism in women ($p < 0.0001$) (Table 2). Likewise, we found that the levels of resilience (CD-RISC) expressed by men were significantly higher

than those of women ($p = 0.0346$) and that levels of well-being assessed by the PSI were significantly higher in the male gender ($p = 0.0196$) (Table 2).

Table 2. Psychological and clinical characteristics in our sample considering gender

Variable	M n=29 (M ± SD)	F n=31 (M ± SD)	<i>p</i>	Total Sample n=60
PSI Stress	2.13 ± 0.37	4.51 ± 0.43	0.0001	3.36 ± 2.50
PSI Well-being	4.51 ± 0.21	3.67 ± 0.27	0.0196	4.08 ± 1.41
PSI Distress	18.8 ± 1.71	25.5 ± 1.57	0.0053	22.3 ± 9.55
PSI Distress Sleep Disorders	6.41 ± 0.64	7.58 ± 0.60	0.1906	7.01 ± 3.42
PSI Abnormal Illness Behavior	1.72 ± 0.31	1.87 ± 0.29	0.7362	15.6 ± 7.08
IES-R Avoidance	1.24 ± 0.20	1.87 ± 0.28	0.0818	1.57 ± 1.44
IES-R Intrusiveness	1.72 ± 0.21	2.26 ± 0.21	0.0806	2.00 ± 1.23
IES-R Iperarousal	1.46 ± 0.21	2.35 ± 0.21	0.0049	1.89 ± 1.24
TOT IES-R	33.4 ± 4.46	44.4 ± 3.47	0.0563	39.1 ± 22.2
TOT CD-RISK	75.2 ± 2.33	67.0 ± 2.98	0.0346	71.0 ± 15.2
HADS Depression	7.06 ± 1.05	9.87 ± 0.87	0.0453	8.52 ± 5.41
HADS Anxiety	7.72 ± 0.99	10.3 ± 1.04	0.0775	9.06 ± 5.71
NEO-N	15.3 ± 1.57	24.7 ± 1.46	< 0.0001	20.1 ± 9.51
IPQ-R Chronic Acute Duration	15.1 ± 1.12	16.5 ± 1.00	0.3544	15.8 ± 5.83
IPQ-R Cyclic Duration	10.7 ± 0.70	11.0 ± 0.85	0.8526	10.9 ± 4.29
IPQ-R Consequences	15.6 ± 1.02	17.7 ± 1.03	0.1494	16.72 ± 5.68
IPQ-R Personal Control	19.4 ± 0.77	19.01 ± 0.81	0.7552	19.2 ± 4.32

IPQ-R Treatment Control	18.1 ± 0.74	17.5 ± 0.77	0.5860	17.8 ± 4.15
IPQ-R Disease Consistency	16.7 ± 0.69	15.7 ± 0.91	0.4120	16.2 ± 4.48
IPQ-R Emotional Representation	16.5 ± 1.11	18.0 ± 1.02	0.3375	17.2 ± 5.75

PSI=Psychosocial Index; IES-R=Impact of Event Scale - Revised; CD-RISC=Connor-Davidson Resilience Scale; HADS=Hospital Anxiety Depression Scale; NEO-N=Neo Five Factor Inventory, Neuroticism Subscale; IPQ-R=Illness Perception Questionnaire-Revised.

Our analyses included a second phase in which the sample was divided considering the marital status of the participants. We compared a group of 42 individuals with a partner and a group of 18 single individuals. The comparison showed no statistically significant differences in relation to the psychological-clinical variables measured. Within our sample, the psychological profile of single and partnered patients did not appear to differ (Table 3).

Table 3. Psychological and clinical characteristics in our sample considering marital status

Variable	With a Partner n=42 (M ± DS)	Single n=18 (M ± DS)	<i>p</i>
PSI Stress	3.00 ± 0.36	4.11 ± 0.65	0.1861
PSI Well-being	4.26 ± 0.21	3.61 ± 0.34	0.1161
PSI Distress	21.98 ± 1.38	23.61 ± 2.62	0.5867
PSI Distress Sleep Disorders	7.00 ± 0.5	7.11 ± 0.91	0.9712
PSI Abnormal Illness Behaviour	1.82 ± 0.26	1.83 ± 0.39	0.9932
IES-R Avoidance	1.47 ± 0.16	1.87 ± 0.47	0.4438
IES-R Intrusiveness	1.92 ± 0.17	2.16 ± 0.33	0.5359
IES-R Iperarousal	1.84 ± 0.17	2.17 ± 0.36	0.43
TOT IES-R	39.41 ± 3.55	39.11 ± 5.24	0.9621
TOT CD-RISK	70.68 ± 2.13	70.67 ± 4.35	0.9974

HADS Depression	8.36 ± 0.85	9.33 ± 1.21	0.5193
HADS Anxiety	9.36 ± 0.84	8.77 ± 1.51	0.7379
NEO	19.61 ± 1.41	22.61 ± 2.2	0.2614
IPQ-R Chronic Acute Duration	15.8 ± 0.95	16.17 ± 1.24	0.819
IPQ-R Cyclic Duration	10.59 ± 0.68	11.89 ± 0.23	0.2677
IPQ-R Consequences	16.9 ± 0.92	16.89 ± 1.14	0.9927
IPQ-R Personal Control	19.46 ± 0.62	18.94 ± 1.2	0.7
IPQ-R Treatment Control	18.15 ± 0.64	17 ± 1.00	0.3715
IPQ-R Disease Consistency	16.41 ± 0.74	15.72 ± 0.93	0.5657
IPQ-R Emotional Representation	16.97 ± 0.95	17.72 ± 1.26	0.64

PSI=Psychosocial Index; IES-R=Impact of Event Scale - Revised; CD-RISC=Connor-Davidson Resilience Scale; HADS=Hospital Anxiety Depression Scale; NEO-N=Neo Five Factor Inventory, Neuroticism Subscale; IPQ-R= Illness Perception Questionnaire-Revised.

4. Discussion

The purpose of the present study was to determine the psychological profile in a sample of Post-COVID-19 outpatients. In our first hypothesis, we expected that patients who had COVID-19 infection would exhibit more features of psychological distress such as post-traumatic symptoms, poor psychological well-being, depression, and anxiety symptoms. Consistent with the literature, this hypothesis was confirmed. On IES-R evaluation we found a significant state of hyperarousal characterized by agitation, irritability, nervousness, and physiological activation; no relevant symptoms related to avoidance and intrusion of the COVID-19 experience emerged. About psychological functioning evaluated with PSI we found a low perception of well-being and high levels of psychological distress, as well the presence of objective stress. There was also a tendency to express negative emotions and difficulty managing them in response to stressful events. Moreover, the presence of a clinically significant depressive symptomatology was detected. Lastly, overall resilience levels were average. Our findings are consistent with a growing body of recent literature that pointed out high rates of depression,

anxiety, sleep disorders (Deng et al., 2021) and post-traumatic stress symptoms (Sher, 2021) in patients recovered from COVID-19 (Mazza et al., 2020; Orrù et al., 2021). A substantial body of evidence indicates that several months after infection, post-COVID symptoms seem to affect most people who have experienced the disease (Tleyjeh et al., 2021; Fernández-de-Las-Peñas et al., 2022). Consistent with our findings, several longitudinal studies have described the psychological dimension of post-COVID symptomatology as the presence of new or persistent symptoms of anxiety and depression, sleep disturbances, and post-traumatic manifestations, especially in younger patients and women (Bonazza, 2022; Fernández-de-Las-Peñas et al., 2022; Serra et al., 2022). Notably, Mazza et al. (2020) investigated the linkage between COVID-19 and psychiatric implications. It was revealed that the 55% of the total sample exhibited clinical score indicating mental health disorders. Our findings supported this evidence, as showed similar patterns of clinical score among patients who were affected by COVID-19. Additionally, some studies have showed that one of the most common psychological issues for COVID-19 outpatients requiring treatment was acute stress (Rossi Ferrario et al., 2021). In our sample stress score were also high, confirming the aforementioned evidence. Our results are also supported by a large literature on the persistence of psychological symptoms among patients who have overcome COVID-19 disease. A longitudinal study by Van Wambeke et al. (2023) found that despite physical and psychological rehabilitation, one-third of patients continued to experience psychophysical symptoms that prevented them from returning to work up to 22 months after COVID-19 infection. In accordance with these findings, other authors have pointed out the persistence of neuropathic pain, anxiety, depression, sleep disturbances (Bastola et al., 2021; Irisson-Mora et al., 2022), perceived stress, and loneliness in follow-ups after COVID-19 illness (Wang et al., 2022). Interestingly, disease severity was not found to be a decisive factor in influencing the risk of developing psychopathology. Rather, it appears that female gender, the presence of anxiety and depression 4 months after infection, and physical symptoms play an important role in influencing the development of depression and anxiety 12 months after COVID-19 illness (Gramaglia et al., 2022). On the other hand, a 2-year retrospective study of 1.284.437 patients showed that the risk of developing psychiatric disorders returned to normal after 1-2 months, but also that the risks of cognitive impairment, dementia, psychotic disorders, and epilepsy were still increased at a 2-year evaluation (Taquet et al., 2022). Overall, previous studies indicate that post-traumatic stress symptoms are a part of post-intensive care unit syndrome that can be due to various factors such as fear of death, invasive procedure, pain, impossibility to communicate, fatigue, weakness, sensorimotor deficit, and sleep privation (Wade et al., 2013; Righy et al., 2019). Previously, the post-disease symptoms and poor quality

of life a year after infection were reported in other coronavirus outbreaks such as the severe acute respiratory syndrome (SARS) of 2002 and the Middle East respiratory syndrome (MERS) of 2012 (Ahmed et al., 2020). In our second hypothesis, we investigated gender differences in anxiety-depressive and post-traumatic stress symptoms taking account of protective and risk factors (e.g., resilience levels, gender, having a partner or being single). Our findings showed the role of female gender as a risk factor with respect to psychological profile in the Post-COVID-19 outpatients. In particular, the female Post-COVID-19 outpatients had a higher perception of distress, hyperarousal manifestations and depressive symptomatology than the male group in our sample. Indeed, recent literature suggests that female gender was related with higher risk of persistent symptoms of Post-COVID syndrome (Tleyjeh et al., 2021), with more frequent diagnosis of long COVID (Bai et al., 2022) and with increased risk of long-term psychological Post-COVID-19 symptoms (Fernández-de-Las-Peñas et al., 2022), also in longitudinal studies (Michelen et al., 2021). Furthermore, previous studies have observed a female versus male disadvantage among healthcare workers during the first wave of COVID-19, noting greater emotional distress and post-traumatic stress symptoms in women (Petito et al., 2022). Our findings may be supported by the trait of neuroticism that appeared more pronounced in the women group in our sample. These data are consistent with other studies in which females had higher scores on the neuroticism scale (Jorm, 1987; Mac Giolla & Kajonius, 2019). It was suggested that higher neuroticism levels were associated with low stress tolerance, high emotional responsiveness and persistent negative feelings (Lahey, 2009). In addition, the higher levels of resilience and well-being in the male gender in our sample confirmed that women had an increased risk to develop psychological illness. According to social role theory, gender differences in personality result from men's and women's assigned roles, not from innate psychological differences between the sexes (Mac Giolla & Kajonius, 2019). Gender differences could result from the different roles assigned to men and women in all societies in which, for example, men are more often assigned to income-producing work, while women to childcare and tending the home (Lowe et al., 2021). Consistent with this observation, Benassi and colleagues (Benassi et al., 2020) found that during lockdown due to COVID-19, working women with children had greater anxiety symptoms than working women without children, given the same socioeconomic conditions. The Authors suggested that these differences may be due to working mothers' greater difficulty in reconciling and managing personal life roles, such as the responsibility of the maternal role, and the work role. Another explanation may be related to hormonal factors that play a role in female recovery (Mohamed et al., 2021; Bienvenu et al., 2020), but also to low household and emotional help that could affect women's mental health

(Thibaut & Van Wijngaarden-Cremers, 2020). Finally, we investigated the role of marital status (having a partner VS being single). Unlike our assumptions, we didn't find any significance about this. In contrast to several studies (Williams et al., 2016; Lawal et al., 2022), our findings did not show being single as a risk factor for the psychological well-being of our outpatients. These results could not be generalized due to the small size of our sample.

5. Conclusion

The present study highlights that patients who had COVID-19 exhibited psychological distress such as post-traumatic symptoms, poor psychological well-being, depression and anxiety symptoms for several weeks after infection. Moreover, our findings suggested that female outpatients had a higher perception of distress, hyperarousal manifestations and depressive symptomatology than the male counterpart. The findings of the present study suggest some consideration that may be useful in clinical practice. First of all, the relevance of planning personalized interventions and assessment aimed at higher psychopathological risk groups, such as females. In this way it would be possible to operate from a prevention perspective, rather than acting when a form of psychological distress is already evident. Secondly, psychological functioning affects the organism and the brain; there is an effect on the neurobiology of patients. As a chain reaction, this process could impair a patient's immune system. Indeed, De Almondes and colleagues (2021) pointed out that during the pandemic from COVID-19 healthcare workers were at high risk of psychophysiological and neuroimmunoendocrine impairment. In Author's opinion, stress is related to the immune system functioning and emotion regulation, affecting sleep disturbances, emotional problems, and the onset of immunological vulnerability. Psychological distress and anxious, depressive and posttraumatic stress symptoms could alter the immune system through neurobiological and chronic inflammatory mechanisms (De Almondes et al., 2021). Moreover, Sher (2021) suggests that psychiatric, neurological, and physical symptoms, in addition to inflammatory brain injury in Post-COVID syndrome could intensify the risk of suicidal ideation and behavior. Finally, the relevance to plan systematic follow up; this would allow us to observe the course of the organic pathology of these patients.

6. Limitations & Strengths

Some important limitations should be noted. First, limitations of this study include the small number of patients involved and enrolled. Moreover, a consecutive non-probabilistic sampling method was used. Thus, representativeness of the sample cannot be taken for granted. Use of self-report scales did not allow for diagnoses of anxiety disorders, depression, or PTSD. In this

study, the multiple- role engagement for a woman (as taking care of children, managing the house and work roles) was not taken into account as variable. For a woman the conciliation between family and career could be a relevant aspect because this condition might influence women's health status having an impact on psychological stress and quality of life (Sumra & Schillaci, 2015). It could be interesting for future studies to observe how these variables relate in order to better understand female vulnerability. Finally, future studies could be expanded to include more outpatient clinics that provide follow-up care for Post-COVID-19 patients. Our study also has some strengths. A wide body of literature carried out studies on the impact of COVID-19 on general population, on healthcare workers and on patients, including at longitudinal time points. Although it is a preliminary study, to our knowledge, our study involved a specific target of patients recovered from COVID-19 and attending an outpatient clinic dedicated to Post-COVID-19 follow-up. As a novelty, this study gives us a deeper understanding of the psychological Post-COVID-19 profile in a clinical sample of pneumological outpatients. Moreover, it focused on gender differences identifying the female gender as a risk factor with respect to psychological illness.

Ethical approval

The ethical committee of University Hospitals approved the general study protocol (n. 145/CE/2020). The study was conducted following the Helsinki Declaration.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The datasets generated and used and/or analysed in the study are available from the corresponding author on reasonable request and with permission of researchers of the study

Conflict of interest statement

The authors declare that the research was conducted in the absence of any potential conflict of interest.

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