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Post-Traumatic Stress Disorder (PTSD) and the COVID-19 pandemic

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Summary

Health crisis, such as that occurred during the COVID-19 pandemic, generally shows a significant impact on individual mental health, setting the stage for the development of a condition of significant mental distress that could lead to the development of a psychiatric disorder or could exacerbate the symptoms of an already diagnosed psychiatric disorder too. In the specific case of our work, we have focused our attention on the COVID-19 and PTSD pandemic relationship. We reviewed the available evidence and examined the aforementioned relationship in the general population and also in COVID-19 survivors, in family members of COVID-positive patients, in healthcare workers and in psychiatric patients. We have also considered the development of PTSD in the same categories of subjects also during previous pandemic crises, in order to have a broader view of what are the factors that, in conditions of an infectious disease pandemic, can induce the development of PTSD. Finally, we focused on how to treat the aforementioned disorder in a context in which mental health services have had to reorganize and reorganize their standard models of care delivery.

PTSD and health crisis

Post-Traumatic Stress Disorder (PTSD) is a psychiatric disorder that can develop following exposure to traumatic events. The term trauma derives from the Greek word τραῦμα (wound) which in turn derives from τιτρωσχω (to pierce). Trauma can be defined both in physical terms and in psychological ones. From a physical point of view, a common definition of trauma is that of a severe physical injury or injury experienced as painful. In psychological terms, a useful definition is that of an overwhelming stimulus, stressor, or event that is so excessive in its psychological upheaval that it significantly compromises psychological functioning itself. Traumatic events can include sexual violence, wars, natural disasters or other types of threats to a person's life. The effects of this events on the person do not depend exclusively on the trauma itself, but also on the subject's ability to adapt to stress and to cope with adversity. The aforementioned ability is what is typically named resilience. This latter can be considered a progressive process of psychological and physiological adjustments that can be implemented to better enable the traumatic experience to be dealt with. Resilient individuals would then develop techniques and strategies that allow them to more effectively deal with adversity and even crises. They would be also characterized by a certain amount of optimism that would help to effectively balance negative emotions. To date, a series of factors have been identified that would favor individual resilience and which have therefore taken on the name of resilience factors. These include: an optimistic but realistic outlook, seeking and accepting social support, solid role models as an inner compass, religious or spiritual practices, acceptance of what cannot be changed, mental acuity, emotional strength, the ability to actively solve problems by seeking their meaning and opportunity, and even humor. Finally, resil-

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ient people tend to take responsibility for their emotional well-being and use the traumatic experience as the basis for personal growth [1].

Specifically, PTSD is characterized by the development of negative symptoms after exposure to one or more traumatic events [2]. According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), an essential condition for the existence of this pathology is "exposure to actual death or threat of death, serious injury or sexual violence" (criterion A). Intrusive symptoms of the stressful event (criterion B), symptoms of avoidance of stimuli associated with the traumatic event (criterion C), negative distortions of persistent and exaggerated thoughts and emotions with respect to oneself and the world (criterion D) and symptoms of hyperactivation (criterion E) can be objectified (DSM-5) [3]. Symptoms of PTSD typically include distressing and intrusive memories, trauma-related nightmares, irritability, hypervigilance, difficulty sleeping, poor concentration, isolation and avoidance of places and/or activities that could remind the subject of the trauma. These symptoms, in patients with PTSD, have a duration greater than 1 month. The severity of the disturb can be worsened by the concomitant presence of substance abuse, depressed mood, anxiety disorders, self-harm, impulsive, dangerous, or suicidal behaviors. PTSD is also associated with significant medical comorbidities, including chronic inflammation and pain, cardiometabolic disorders, and increased risk of dementia. Thus, the total burden of the disease, in terms of disability and premature mortality, is extremely high.

Although exposure to trauma is the precipitating event for the development of PTSD, numerous endogenous and environmental risk factors appear to be related to the development of the disorder as well as to the onset, the severity and the possible chronicity of the symptoms. Regarding to endogenous risk factors, it is necessary to consider the genetic predisposition to the development of the disorder, as well as the dysfunctions in the main systems involved in its pathogenesis such as the hypothalamic-pituitary-adrenal axis (HPA), the noradrenergic immune, that of pro-inflammatory cytokines, that of endocannabinoids and that of glucocorticoids. Furthermore, neuroimaging studies conducted on patients with PTSD have shown alterations in the cerebral circuits involving the hippocampus, amygdala, medial prefrontal cortex, cingulate gyrus and insula [4]. Considering the environmental risk factors, the psychosocial variables associated with this disturb include personality traits (particularly neuroticism), a low socioeconomic and educational level, and female sex. Finally, several studies have shown that fear represents, the risk factor mainly related to the development of PTSD, among the numerous risk factors of the disorder [5,6].

During a health crisis such as the one that is occurring during the COVID-19 pandemic, declared by the WHO Director-General on March 11, 2020, the degree of fear can be influenced by the likelihood of contracting the disease from the new Coronavirus SARS-CoV-2, as well as the consequences that it could derive from it [7]. On the basis of the available evidence, it is well known that exposure to epidemics of infectious diseases can cause a particular type of psychological trauma which can be traced back to the direct symptoms of the disease and their traumatic treatment (dyspnoea, respiratory insufficiency, altered state of consciousness, threat of death, tracheostomy, etc. are the main traumas of patients with severe COVID-19 disease). This same type of trauma can also be associated with the experience of assisting patients who suffer, struggle and die from infectious disease and that of the realistic or unrealistic fear of infection, social isolation, exclusion and stigmatization [8].

The above is confirmed by the fact that several epidemiological studies, conducted after an epidemic of infectious diseases such as SARS, MERS, Ebola, H1N1 flu and HIV/AIDS, have shown a high prevalence of mental health disorders among survivors, victims' families, health workers involved in emergency and in the general population. Specifically, a study of long-term psychiatric morbidity among SARS survivors revealed that PTSD was the most prevalent disorder. The cumulative proportion of patients with PTSD was 47.8%, and 25.5% of patients continued to meet the diagnostic criteria of PTSD [9] with sleep disturbance and recall of traumatic memories [10], 30 months later [9]. Similarly, a systematic review of the psychological consequences of the 2003 SARS epidemic, the 2009 H1N1 epidemic and occupational exposure to HIV indicated that the average prevalence of PTSD among healthcare workers was approximately 21% (from 10 to 33%), with 40% of the same presenting persistent symptoms 3 years after exposure [11]. It is interesting, in this regard, to consider in this category the complications of PTSD arising in the long term and, above all, the correlation between the persistence of PTSD symptoms and the development of alcohol dependence in health care workers who had been exposed to the SARS epidemic 3 years previously [12]. The characteristic and the level of exposure to psychological trauma appear to be the most reliable predictor of PTSD after an infectious disease epidemic. Most epidemiological studies indicate that survivors have a higher prevalence of the disorder, followed by the families of the victims and medical professionals who provide care to affected patients [9].

PTSD in the general population

During the COVID-19 pandemic, multiple online surveys were conducted to assess the impact of this sanitary emergency on the mental health of general population. Several studies conducted in Italy [2,13-15] Spain [16], China [17-19], India [20], Ireland [21] and Israel [22] have evaluated the presence of PTSD symptoms in general population. The results of these studies demonstrated that the pandemic can be considered a traumatic event [13], with an incidence of PTSD ranging from 7 to 53.8% [23]. This disorder would mainly affect subjects under the age of 50, those of female sex (presumably also due to an overload related to the

role of caregiver to be balanced with work and household chores), those with a psychiatric or neurological background, infected subjects and those who are faced with situations of uncertainty about the risk of contagion. Of all the risk factors, the main predictors of PTSD in general population appear to be loneliness and discrimination, while the greatest protective factor should be a condition of spiritual well-being [14-16]. As previously explained, female sex represents one of the main risk factors for the development of PTSD. In particular, health crises and natural disasters represent traumatic events capable of increasing stress in the perinatal period and making pregnant women particularly vulnerable to the development of the disorder. During the COVID-19 pandemic, conditions of isolation and of freedom's loss together with the impact of the virus on pregnancy, the possible vertical transmission of the infection and unfavorable obstetric outcomes, can lead to psychological distress for the pregnant. In this sense, a recent study conducted in Italy shows that the prevalence of PTSD symptoms among women who gave birth during the pandemic was higher than that reported in studies prior to the pandemic itself. Specifically, 42.9% of women who reported the presence of mild symptoms and 29.4% reported the presence of moderate symptoms. The psychological impact of the pandemic on pregnancy could explain the increase in PTSD during the postpartum period, in association with avoidant and anxious attachment. These psychiatric conditions are characterized by a combination of avoidant and anxious tendencies, low self-esteem and an active search for intimate relationships and emotional closeness, with an inability to trust others. COVID-19 stress during the perinatal period could also trigger a reactivation of traumatic memories, thus favoring the development of PTSD, in a general climate of alarm and concern [24].

PTSD in disease survivors

Based on information relating to previous human Coronavirus outbreaks (especially SARS and MERS), a high incidence of PTSD in COVID-19 survivors can certainly be hypothesized. Indeed, 42% of MERS survivors passed the PTSD cut-off one year after the outbreak [25] and, likewise, nearly 26% of SARS survivors met full diagnostic criteria for PTSD 30 months after the outbreak beginning [26,27]. In particular, the SARS epidemic of 2002-2003 highlighted that the media coverage of high death rates together with the stigma against survivors and their families for spreading the disease, the guilt of the survivors, the fear of infecting loved ones and the death of close family members are stressors that can have important implications for psychological outcomes in COVID-19 survivors [28].

Based on the evidence currently available, it is estimated that 96% of COVID-19 survivors experience the symptoms of PTSD with the possibility to develop cognitive impairment and suicidal ideation as complications of these symptoms [29]. From the onset of the pandemic, about 1 in 5 infected people were hospitalized and 1 in 10 people were hospitalized in an intensive care unit (ICU). Most of the latter experienced acute respiratory distress syndrome (ARDS) which required mechanical ventilation. Up to 80% of patients who survive acute respiratory failure, after receiving mechanical ventilation in the ICU, experience new disorders or worsening of pre-existing disorders of an internal, cognitive and/or psychic nature. These may persist beyond hospital discharge and develop into the clinical picture of post-ICU syndrome [26]. Among patients requiring mechanical ventilation in the ICU, the most common psychiatric symptoms include guilt, mood swings, sleep disturbances and memories of panic and suffocation [26,30], with PTSD estimated to occur in between 15 and 51% of intubated and mechanically ventilated patients. In addition, 79% of ARDS patients treated in an ICU recalled vivid nightmares and hallucinations [26]. Although older age, pre-existing physical frailty, psychological symptoms such as anxiety, depression, and cognitive impairment (e.g., dementia) are risk factors, even those without these can experience long-lasting sequelae. In fact, one quarter to one third of ICU survivors can develop psychiatric disorders, including PTSD, whose symptoms can persist 5 years after the onset. Changes in the hospital environment, such as reduced access to family members and pleasant activities and isolation from contact, can lead to a greater risk of negative psychological symptoms. In addition to these already mentioned causes, in the current pandemic, those of PTSD in survivors include the experience of being about to die, delirium and trauma related to ICU treatments. The threat of actual or potential death, as a fundamental criterion for the traumatic experience associated with PTSD, is evident in the words of affected patients and survivors: "you seem to be drowning ... you think you are going to die" and "I am not going to sleep for three days because I was afraid ... I would not wake up" [26]. Another potential cause of PTSD in COVID-19 survivors is delirium, which can occur due to a confluence of factors related to both virus and hospitalization/intensive treatment [31,32]. In elderly and mechanically ventilated populations, delirium can occur in 80% of cases [33], suggesting that survivors of severe COVID-19 infection, often elderly and ventilated [34], may be particularly at risk of delirium itself. In particular, prolonged duration of delirium (> 40 days) has been associated with a higher risk of PTSD [35]. More specifically, further studies have demonstrated that, not delirium in the strict sense, but rather painful memories in the ICU, would contribute to the development of PTSD in survivors [36-38]. Among the other possible mechanisms involved in the development of PTSD in survivors of the disease, we can consider the brain lesions on a hypoxic-ischemic basis with the consequent neuro-psycho-cognitive deficits [39]. Further contributing causes could be the alterations of the circadian rhythm related to intensive treatments [40,41], which may also persist even after discharge [42,43].

Consistent with the foregoing, an online survey conducted in China revealed a high incidence of PTSD in COVID-19

survivors. Specifically, out of a total of 126 subjects included, the mean PTSD self-rating scale (PTSD-SS) scores were found to be 45.5 ± 18.9; 9 (31.0%) survivors also met the minimum score for clinically significant stress response symptoms. Infected family members, social support, retirement, and female gender had significant associations with the PTSD-SS score. In particular, being a woman, having infected family members and having poor social support were associated with hyperactivation, intrusive thoughts and avoidance; retirees, that is survivors aged 60 and over, experienced less severe symptoms than younger [44]. Another study conducted in Korea confirmed the high incidence of PTSD in COVID-19 survivors one month after hospital discharge. In particular, 10% of subjects reported symptoms of PTSD and, of these, the most severe ones were associated with a high perceived stigmatization. In fact, 40% of the participants were worried about infecting others and being discriminated against by neighbors because of their COVID-19 history [45]. A study conducted in Italy, on 402 surviving patients, after one month of follow-up revealed an incidence of PTSD of 28%, underlining that patients with a psychiatric background showed higher scores in the various psychopathological spheres investigated, including PTSD anxiety and depression. To demonstrate the results of the aforementioned study, the testimony of one of the patients is interesting: "After three weeks of treatments, I was recovering from COVID, at home, I had no fever, just a little cough. But sometimes at night, my breath could suddenly disappear, making me feel like I was going to die. I knew what it was because I had suffered from panic attacks in the past. I stood out there on the balcony, for hours, trying to get fresh air into my lungs. It was terrible. The panic made me suffer more from COVID". A patient's report at follow-up [46].

PTSD in family members of COVID-19 patients

During the COVID-19 pandemic, family members of patients affected by the disease and especially those of patients admitted to the ICU, are conventionally subjected to considerable psychological pressure. Because of this reason they have a considerable risk to develop symptoms of PTSD [47-49]. The same are forced to face further hardships, with the moment of end of life which is certainly the most traumatic of all. The main difficulties they face are represented by the insecurity that their family members can be adequately cared for and at the same time treated with affection, by understanding their health conditions in order to be able to make appropriate decisions on their behalf by telephone and by the acceptance of the death of loved ones. The psychological impact of COVID-19-related separation on the families of ICU patients could therefore presumably lead to the development of PTSD symptoms in the long term [50].

PTSD in healthcare workers

Being a healthcare worker during the COVID-19 pandemic comes with enormous pressure, especially with regards to exposure to a risky environment, resulting in concerns about contracting the virus and passing it on to others [51]. This claim is primarily supported by the fact that during epidemics, a high percentage of health workers (up to 1 in 6 of those who provide care to affected patients) develops significant stress symptoms [52]. It is worth considering that in epidemic contexts health workers are the first to face the clinical challenges intrinsically linked to the course of the disease, under the constant personal threat of being infected or representing a source of infection. In this sense, health workers put their health at risk, as well as their life, to fulfill their professional duty [53]. Those who work in emergency structures are, among all, particularly at risk of PTSD due to highly stressful work situations to which they are exposed. These include management of critical medical situations, assistance to severely traumatized people, frequent reports of death and trauma and altered circadian rhythms due to shift work [54,55]. Under these conditions and due to the need to confront an unprecedented number of critically ill patients, with an often unpredictable disease course, with high mortality rates and with the lack of effective treatment or treatment guidelines [17,56] the same operators are at significant risk of developing PTSD. Looking at previous outbreaks of infectious diseases, several studies have shown that PTSD rates in healthcare workers ranged from 10 to 20% [57-59], with the highest rates (8 to 30%) among ICU staff [60-63]. In this regard, a systematic review of the literature, which highlighted in health workers involved in the SARS and MERS epidemics, an incidence of PTSD ranging from 9.6 to 51%, with higher rates in operators engaged in emergency units. Furthermore, the symptoms of PTSD continued to be present in 2-19% of healthcare workers 1-3 years after the outbreak of the epidemics [64]. Based on the above evidence, it is presumed that working in emergency departments is associated with higher levels of PTSD, as confirmed by the comparison, relative to the SARS epidemic of 2003, of the levels of PTSD in emergency department operators (21.7%) compared to those who practiced their profession in the other operating units (13%). Regarding marital status, some studies point out that not being married would correlate with a higher risk of PTSD [65] while others would conclude that being married, separated or widowed would be associated with a higher risk of PTSD [66]. It also appears that healthcare professionals who [25,52,67,68] were quarantined those who felt stigmatized or rejected because of their work [68] and those with prior mood disorders [69,70] were found to be most at risk of developing PTSD. The resilience factors were, on the other hand, the presence of social and family support (in particular the support of supervisors and colleagues), a good work organization and the use of positive cooping strategies such as the use of humor, the planning of activities, the acceptance of the

risks associated with them and the presence of religious beliefs [63]. Although most individuals prove resilient after being exposed to a traumatic event [71] different risk factors can compromise the effectiveness of the adaptation, including a previous psychiatric history, female sex, lack of social support [72,73] having young children [4,74], experiencing feelings of helplessness during trauma and experiencing negative emotions such as anger and peritraumatic distress [75,76]. On the other hand, resilience plays a key role in mitigating the impact of traumatic events and thus reducing PTSD [77,78].

During the current pandemic, several studies have investigated the presence and risk of PTSD among healthcare professionals. Specifically, a literature review conducted from December 2019 to June 2020, which included 44 studies out of a total of 69,499 healthcare professionals, found an incidence of PTSD that ranged from 7.4 to 37.4% [79]. Among the included studies, three of these identified that direct exposure to positive patients would be the main risk factor. First, frontline workers have the greatest risk of exposure and, having seen firsthand the effects of SARS-CoV-2, they experience fear of being infected and passing the infection on to colleagues, friends and family members, as well as other patients [79]. Secondly, the use of Personal Protective Equipment (PPE) for many hours is associated with excessive sweating, dehydration and discomfort, while the lack of PPE leads to a greater risk of contracting infection. Finally, given the nature of the infection, health professionals experience a strong sense of helplessness [80,81]. Two studies in the aforementioned review identified nursing as a major risk factor, highlighting higher scores for acute stress and PTSD among nurses [51,82]. A further study also found a strong association between low-moderate social support and symptoms of depression and PTSD [83]. Other presumably associated factors appear to be working in isolation wards for more than 12 hours a day, quarantine, family and/or friends with SARS-CoV-2 and poor sleep quality. It seems that up to 10 years of work experience represents an additional risk factor for PTSD among health professionals [79]. Another review of the literature, in line with the previous one, identified in health workers, and in particular those in first line, a category at high risk of developing PTSD and other psychic symptoms [84]. In particular, some studies have pointed out that the professional category of migrants was more at risk, due to the double negative effect of the adverse work scenario and the COVID-19 pandemic [85,86]. In the same sense, several online surveys have been conducted in China to assess the impact of the pandemic on the mental health of healthcare workers. A survey conducted in the first period found an incidence of PTSD of 9.8%. Being a nurse, having an intermediate technical qualification, working on the front line with little confidence in protective measures were risk factors for the disorder [87]. Another survey compared the symptoms of PTSD in health care workers that work in hospitals directly involved in the emergency compared to healthcare personnel not directly involved and, also in this case, the first group was found to be at greater risk of PTSD [88]. These data were confirmed by a further study which highlighted the presence of symptoms in 40.2% of health workers, with a higher incidence among nurses [89]. Finally, a large survey of a total of 14,825 doctors and nurses in 31 mainland China provinces showed an incidence of PTSD of 9.1%. Male subjects, middle-aged subjects, those with less work experience, and those with longer working hours and lower levels of social support were most at risk of developing PTSD. Again, being a nurse was associated with a higher risk [83]. Studies on the impact of COVID-19 on health workers have also been conducted in other Asian countries and it was found that the prevalence of PTSD among health workers was relatively low in India (2.1%), Malaysia (6.3%), Indonesia (11.6%), Singapore (12.3%) and Vietnam (15.0%) 91. As for Europe, a survey conducted in Norway on 1773 healthcare workers showed an incidence of PTSD of 28.9% and also in this case the operators who worked directly with COVID-19 patients reported more severe symptoms [91]. In Spain, on the other hand, the number of healthcare workers infected with COVID-19 was among the highest in the world and, analyzing cross-sectional data on 1422 healthcare workers, 56.6% of them presented symptoms of PTSD. The typical profile of a health worker with symptoms is represented by a person who works in a hospital in the Autonomous Community of Madrid, is a woman, thinks that it is very likely to become infected and therefore fears that a person with whom she lives could be infected in turn [92]. As for the United States, an online survey conducted among healthcare professionals from 25 hospitals showed an incidence of PTSD of 23.1% [93]. Another survey, conducted exclusively among nurses, to try to determine the association between access to adequate PPE and mental health outcomes, found that those of staff who did not have access to adequate PPE were more likely to report symptoms of PTSD [94]. Confirming that nurses are particularly vulnerable to stress during the COVID-19 pandemic, an online survey of a total of 448 Jordanian nurses (73% women) found that the majority (64%) were at risk of developing PTSD [95]. In general, among all emergency operating units, ICUs have had to face the most rapid reorganization both in terms of bed capacity and in terms of staff management and training. In a situation of this type, associated with the conditions of confinement and isolation imposed since the emergency, the personnel of these units were exposed to a greater risk of PTSD [96,97]. In this regard, the presence of PTSD was highlighted in between 7.4 and 27% of ICU operators, especially in women, among nurses, in case of inadequate preparation and where there were previous anamnestic episodes of burn-out [98,99].

In the category of health workers, it seemed important to emphasize the role of stigma, as well as trauma, in affecting their mental health. Emblematic, in this regard, seem to be the words of Dr. Wei and Dr. Roy Perlis respectively. “I feel like it’s something that has been incredibly traumatizing to our frontline workers - this desperation” says Dr. Wei. “I think part of the battle is recognizing that healthcare workers may be less comfortable seeking care. Al-

though we are better educated about mental health, we are not immune from worrying about stigma and what our colleagues will think of us", adds Dr Perlis [100]. In addition, among health professionals in direct contact with infected patients, a clinically significant association between levels of PTSD and perceived stigma, particularly with respect to the hypervigilance, avoidance and intrusion subscales [101]. Can access to care be undermined by concern about stigma? "I think part of the battle is recognizing that healthcare professionals may be less comfortable seeking care. Even though we are more educated about mental health, we are not immune from worrying about stigma and what our colleagues will think of us" [100].

PTSD in psychiatric patients

The consequences of the COVID-19 pandemic could have a worsening effect on the symptoms of patients with psychiatric disorders [102] and, being the pandemic itself a traumatic event, it could lead to the development of PTSD symptoms. What we want to underline is that, at the current state of knowledge, the evaluation of the COVID-19/PTSD correlation in patients with psychiatric disorders has been poorly studied, as in the past, in the case of previous pandemics/epidemics of infectious diseases. On the basis of the available evidence, in psychiatric patients the risk of PTSD is positively correlated to female sex, to a low level of education, to the presence of sleep disorders in anamnesis [34], to isolation [102] as well as to concerns about the health status of loved ones [103]. To these risk factors, which also occur in the other categories of subjects previously considered, in psychiatric patients are added the greater susceptibility to stressful events and difficulties in accessing mental health services [29,104]. During this period, in fact, psychiatric patients underwent a quantitative and qualitative reduction in care services, as most of the services were not organized to carry out consultations through telepsychiatry, for the home delivery of psychotropic drugs and to screen the patients by performing rapid tests for the diagnosis of COVID-19. In comparing the aforementioned category of patients with the general population, a Chinese study showed that the former had higher scores on the psychometric scales for the evaluation of PTSD, anxiety, depression and insomnia. In the same study, more than a quarter of the patients evaluated reported symptoms of PTSD, as well as moderate to severe insomnia. Psychiatric patients were, among other things, significantly more likely to report concerns about their health, anger, impulsivity and suicidal ideation [106]. Particularly susceptible to developing PTSD, among all, appear to be those patients who may be more vulnerable to the stressful effects of social isolation measures, on the basis of their pre-existing psychopathological characteristics [105,107,108]. In this regard, a category exposed to significant risk seems to be that of patients with Eating Disorder (ED). In this sense, a study conducted in Italy is particularly interesting to evaluate the effects of the pandemic on the aforementioned category of patients. The study compared, in terms of psychopathology, a group of patients with ED and a group of healthy control subjects, further investigating the possibility that the recovery process was deeply affected by the effects of the lockdown. It was also assessed whether a remission obtained before lockdown had a protective role on the psychopathological effects of the pandemic and whether a history of childhood trauma or a particular attachment style were associated with the development of PTSD symptoms. The results of the study showed that, although the lockdown had a lower impact on patients with Anorexia Nervosa than those with Bulimia Nervosa, there was an exacerbation of eating and pathological compensatory behaviors in both categories. As regards the symptoms of PTSD, however, there was an increase in the same, probably due to recurrent exposure to interpersonal and family conflicts during the period of isolation, especially in patients with a history of childhood abuse and with an avoidant and insecure attachment style [109].

Treatment of PTSD during COVID-19 pandemic

During epidemics of infectious diseases, it is essential to reorganize mental health services, in order to be able to provide adequate assistance to all those who suffer from mental illness. In this regard, in 2007, the Inter-Agency Standing Committee (IASC) defined the guidelines for mental health and psychosocial support to be followed in emergency health contexts. The aforementioned guidelines provide for the restoration of basic services and for the safety of the affected populations, the strengthening of family and community networks and the implementation of psychosocial support measures as well as specialized mental health interventions.

However, to date, there are no specific interventions for the prevention of the development of PTSD in all those who are exposed to an emergency condition, such as the health one currently underway [8].

Most of the guidelines for the treatment of PTSD include psychopharmacological interventions with anxiolytic and antidepressant drugs (SSRIs are the most used) and psychotherapy interventions. Among the numerous psychotherapeutic techniques, the most effective and therefore most used seem to be Cognitive Processing Therapy (CPT) and Eye Movement Desensitization and Reprocessing (EMDR) [110].

During the COVID-19 pandemic, the field of providing psychotherapy services has undergone profound changes, resulting in a shift from face-to-face sessions to sessions performed virtually remotely. Telemedicine had until now represented an optional therapeutic approach, valid for those patients who were in geographically isolated contexts and therefore did not have access to personal assistance. During the context of pandemic telemedicine itself has assumed the dimensions of a vital therapeutic tool. Through this tool, professionals working of mental health

have been able to continue to guarantee assistance to their patients in safety, respecting the social distancing protocols currently in force [111-113]. On the basis of the evidence currently available, it seems that telemedicine represents a safe and effective therapeutic option during the pandemic [114,115], as well as substantially comparable to face to face psychotherapy in the treatment of anxious, depressive and PTSD symptoms [112,116,117]. Therapists should therefore encourage patients not to let social distancing measures hinder their relationships. Through telemedicine it is possible to use traditional phones, smartphones, apps and online video calls performed through compliant platforms the rules of the Health Insurance Portability and the Accountability Act (eg Zoom) [111,113] compliant platforms the rules of the Health Insurance Portability and the Accountability.

Considering the psychotherapeutic options for the treatment of PTSD, CPT is a form of cognitive behavioral psychotherapy (CBT) with a focus on trauma [113]. First of all, treatment involves psychoeducation of the patient regarding both exposure to trauma and consequently developed PTSD. Then we proceed with the identification of the so-called "blocked points" of the traumatic experience and of the "declaration of impact", or rather of the ways in which the traumatic experience affects the patient's thoughts. Subsequently, through the Socratic dialogue and the use of a progressive series of worksheets, "the blocked points" are challenged, and cognitive strategies are used to elaborate issues related to the traumatic experience. The treatment ends with a review of the patient's progress, with the elaboration of a conclusive "impact statement" which is used to compare pre- and post-treatment thinking and with a discussion on future goals.

During the pandemic, the symptoms of PTSD develop more frequently among individuals affected by traumatic events related to COVID-19 [17,118]. Among these we can consider, for example, having witnessed the death of patients or co-workers, having been subjected to involuntary quarantine, having worked in high-risk environments without adequate PPE and having been forced to make important and difficult decisions regarding the treatment of positive patients. For events of this type, the "blocked points" can lead to the development of prejudices on the ways in which the index event could be prevented, or to that of feelings of guilt towards oneself and/or towards others. Through the Socratic dialogue these beliefs would be addressed at the beginning of the CPT, in the same way in which other index traumas are faced or taking into consideration the context and the probable options and information that the individual had available at the time of the trauma [113]. The evidence currently available have fortunately been shown that CPT, performed through telemedicine, has an efficacy essentially comparable to that of the same performed in person [113,119-121]. In order for the treatment via telemedicine to be equally effective, it would be important that patients are adequately informed about the psychotherapy procedure, through documentation that can be sent by ordinary mail or via secure messaging systems. At the same time, patients should be educated to assume, towards the sessions and the psychotherapist, a commitment and behavior comparable to what they would assume if the sessions were in person. Equally important, is the monitoring phase of any progress made by the patient. In this regard, during the last session, it would be useful to take advantage of the shared screen mode to display a graph that highlights the aforementioned progress [113].

EMDR, on the other hand, is a form of psychotherapy which aims to reduce the recall of intrusive traumatic memories characteristic of PTSD [122]. This type of psychotherapy has proven to be particularly effective in the treatment of PTSD itself [123]. EMDR lays the foundations in the fact that, by focusing on traumatic memories and by simultaneously moving the eyes (for example by following the movements of the therapists' fingers), the intensity and emotionality of traumatic memories is reduced [122].

In the specific case of COVID-19 pandemic, this psychotherapeutic technique could represent a useful tool for the treatment of all those who have developed symptoms of PTSD. Interesting, in this historical context, particular efforts have been made to evaluate its feasibility and its effectiveness electronically. It seems essential that the therapist has sufficient experience and expertise in EMDR therapy before considering proposing sessions through telemedicine. In this regard, a French study in which the telematic application of the URG-EMDR [124] protocol was evaluated in the treatment of a group of health workers operating on the front line during the COVID-19 pandemic, is interesting. In a single session, the treatment resulted in a reduction in anxious and depressive symptoms, as well as in mental distress reported by health professionals. The latter, although generally perceiving a certain lack of intimacy and concentration, have expressed a good acceptance towards this type of therapeutic approach [125].

Conclusions

In conclusion, the evidence on the high incidence of PTSD in previous MERS and SARS outbreaks as well as in the current SARS-CoV-2 pandemic suggests the need for early recognition of risk and protective factors for its possible development. Furthermore, the need for proper treatment of the disorder itself is emphasized in order to avoid possible comorbidities and complications such as depression, anxiety, substance abuse and suicide.

In particular, although PTSD was found in all investigated groups, including the general population, caregivers and psychiatric patients, the groups most at risk are health care workers and survivors of the disease. In the first group, the subjects most at risk of developing PTSD are mainly those who work on the front line in ICUs and nurses due to direct exposure to the trauma represented by direct contact with COVID-19 positive patients and the resulting deaths. This population also suffers from the powerlessness of managing the pandemic and above all the fear of being infected and of infecting patients, family and friends in turn. In this

sense, the concept of stigmatization and its close relationship with the possibility of developing PTSD are inserted. Despite being health workers, these subjects can in fact experience a "double stigmatization", that linked to their profession, that is to be really removed from the rest of the community or perceive that they are, and that linked to the difficulty of accepting recourse to psychiatric treatment. In this direction, psychiatry is called upon not only to provide tools for treatment, but also to provide tools to accept and request initial access to care through a profound work of unhinging the stigmatization that culturally accompanies it, in order to make it usable for all. The other group at high risk of developing PTSD, primarily due to direct contact with the risk of death, is represented by survivors of the disease. These people also experience quarantine, isolation, mechanical ventilation, delirium, the fear of being able to infect other people and, often, important physical and psychological sequelae even after overcoming the disease. COVID-19 therefore appears to be not only a physical disease but also a disease that affects the psyche and, in this sense, the challenge for psychiatry is to be able to intervene early during the treatment process in order to avoid the onset of important psychic sequelae, including PTSD.

In a context such as the current one, psychiatric services also find themselves operating in conditions of profound emergency. In fact, they had to reorganize the typical methods of providing their performances in compliance with the social distancing regulations in order to continue to guarantee adequate assistance to patients already in care. At the same time, this reorganization is necessary to make the psychiatric services able to accommodate all those who are experiencing symptoms typical of psychiatric disorders. In this sense, the fundamental tool is that of telemedicine. This makes it possible to provide an alternative, but still valid and effective psychotherapy support. In the specific case of all those who experience symptoms of PTSD, psychotherapy via telemedicine allows us to intervene promptly and adequately, allowing us to process the traumatic experience of COVID-19. At the same time, this therapeutic instrument makes everyone feel less alone in a moment in which isolation and distancing are essential paradigms for the protection of health.

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