

## Rassegna

# Mental health outcomes of the CoViD-19 pandemic

## *Gli esiti di salute mentale della pandemia di CoViD-19*

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**SUMMARY.** The coronavirus disease 2019 (CoViD-19) caused by the novel Coronavirus strain SARS-CoV-2 is currently a pandemic. On January 30, 2020, the World Health Organization declared that the CoViD-19 outbreak is a public health emergency of international concern. The virus has already had a direct impact on the physical health of million people, and besides, it is supposed to pose a mental health threat of great magnitude globally. This review aims at synthesizing mounting evidence concerning the immediate psychological responses during the initial stage of the CoViD-19 pandemic among the general population, the health-care workers, and clinical populations. Experts point out the need to pay specific attention to other groups at risk of further distress that may need tailored interventions. Providing psychological first aid is an essential care component for populations that have been victims of emergencies and disasters, before, during and after the event. With the aim of dealing better with the urgent psychological problems of people involved in the CoViD-19 pandemic, a new psychological crisis intervention model is needed. Given the recommendation to minimize face-to-face interaction, online mental health services have been widely adopted in China and are urged in other countries.

**KEY WORDS:** CoViD-19, pandemic, mental health, psychological impact, stress, anxiety, depression.

**RIASSUNTO.** La malattia da coronavirus 2019 (CoViD-19) causata dal nuovo ceppo di coronavirus SARS-CoV-2 è attualmente una pandemia. Il 30 gennaio 2020, l'Organizzazione Mondiale della Sanità ha dichiarato che l'epidemia di CoViD-19 è un'emergenza di sanità pubblica di interesse internazionale. Il virus ha già avuto un impatto diretto sulla salute fisica di milioni di persone e si pensa che possa rappresentare una minaccia di grande portata per la salute mentale a livello globale. Questa revisione ha lo scopo di sintetizzare l'evidenza crescente relativa alle reazioni psicologiche immediate durante la fase iniziale della pandemia di CoViD-19 nella popolazione generale, negli operatori sanitari e nelle popolazioni cliniche. Gli esperti sottolineano la necessità di prestare particolare attenzione ad altri gruppi a rischio di ulteriore distress che potrebbero richiedere interventi mirati. Fornire il primo soccorso psicologico è una componente di assistenza essenziale per le popolazioni che sono state vittime di emergenze e disastri, prima, durante e dopo l'evento. È necessario un nuovo modello di intervento per la crisi psicologica allo scopo di affrontare meglio i problemi psicologici urgenti delle persone coinvolte nella pandemia di CoViD-19. I servizi di salute mentale online sono stati ampiamente adottati in Cina e sono sollecitati negli altri Paesi, data la raccomandazione di ridurre al minimo le interazioni faccia a faccia.

**PAROLE CHIAVE:** CoViD-19, pandemia, salute mentale, impatto psicologico, stress, ansia, depressione.

## INTRODUCTION

The novel coronavirus disease pandemic originated from Wuhan, China, at the end of 2019 and has now rapidly spread over the world<sup>1</sup>. The CoronaVirus Disease 2019 (CoViD-19) outbreak was declared a public health emergency of international concern on Jan 30, 2020, by the World Health Organization (WHO)<sup>2</sup>.

Clinical features of CoViD-19 range from asymptomatic state to severe acute respiratory distress syndrome and multi organ dysfunction<sup>3</sup>. CoViD-19 not only threatens physical health: global public health and social systems are collapsing under coronavirus spread. Intensive care units are completely overwhelmed in some countries. Extremely strict pandemic prevention measures, the mandatory closure of schools and

the suspension of all nonessential productions and commercial activities are seriously affecting people daily life, working activity, and putting economic organizations in danger<sup>4</sup>.

Regardless of whether it succeeds in controlling the outbreak, the widespread contagion and lockdown will inevitably have a psychological effect<sup>5,6</sup>. These effects might represent the mental health outcomes for people affected by CoViD-19<sup>6</sup> or be associated with the prevention measures<sup>5</sup> and the socio-economic impact<sup>4</sup> for the general population. Furthermore, specific populations like the elderly<sup>7</sup>, the children<sup>8</sup> and the health-care workers<sup>9</sup> might report different level of psychological distress. Experts point out the need to pay specific attention to other groups at risk of further distress that may need tailored interventions, such as people with preexisting psychiatric conditions<sup>10</sup>, pregnant women<sup>11</sup>, persons in detention<sup>12</sup>, international migrant workers<sup>13</sup>, and international students<sup>14</sup>.

Therefore, in addition to efforts at various levels to prevent the spread of the disease and other worrisome conditions, the psychological crisis intervention must be part of the public health response to the CoViD-19 outbreak<sup>15</sup>. With the aim of dealing better with the urgent psychological problems of people involved in the CoViD-19 pandemic, a new psychological crisis intervention model is needed. Given the recommendation to minimize face-to-face interaction, online mental health services have been widely adopted in China<sup>16</sup> and are urged in other countries<sup>17-19</sup>.

To sum up, the mental health outcomes associated with a pandemic represent a complex and multi-layered issue.

Past literature reports that pandemic and measures to prevent it affect mental health of those who undergo them<sup>20,21</sup>. Timely research reports concerning CoViD-19 outbreak are already reporting a substantial psychological impact of both the outbreak and the response, suggesting that the population may express high levels of psychopathological symptoms<sup>22</sup>.

Given the developing situation with coronavirus, evidence synthesis about mental health outcomes is needed to produce guidance for the health care institutions and the public.

The aim of this review is to summarize relevant literature about the psychological impact of the CoViD-19 pandemic in the affected populations. Potential critical implications for management of mental health outcomes will be discussed. Further, critical issues for future research will be suggested.

## THE PSYCHOLOGICAL IMPACT OF A PANDEMIC AND ITS RESTRICTIVE MEASURES

Pandemics and epidemics have always been an essential part of human history and only in the last century, the Spanish flu (1918-1920), the Asiatic flu (1956-1957), the Severe acute respiratory syndrome (SARS, 2002-2003), the "Swine" flu (2009), the Ebola (2013-2014) and others affected people worldwide.

Several researches with different study design were conducted in the past with the aim to assess the psychological symptoms arising from these and other pandemics/epidemics<sup>5,20,21</sup>. Literature suggests that restrictive measures such as quarantine, isolation, and social distancing, have an impact on psychological wellbeing of people as well as emotive reactions to pandemic itself<sup>5,20,21</sup>. Nevertheless, methodological drawbacks and heterogeneity of studies could limit generalizability and conclusions of the impact of such sequelae.

Psychological reactions to pandemics include maladaptive behaviours, emotional distress and defensive responses<sup>21</sup>: anxiety, fear, frustration, loneliness, anger, boredom, depression, stress, avoidance behaviors. A peculiar syndrome known as "headline stress disorder" can be observed during modern pandemics: it is characterized by high emotional response, as stress and anxiety, to endless reports from the news media, that may cause physical symptoms including palpitation and insomnia; further progression to physical and mental disorders is possible<sup>23</sup>.

SARS survivors (i.e., non-health care workers and health care workers) had higher stress levels during the outbreak compared with control subjects<sup>24</sup>. One year after, they not only had elevated stress levels, but also high levels of depression, anxiety, and posttraumatic symptoms, and psychiatric morbidity. Health care workers had higher levels of

stress and psychological distress than non-health care workers survivors<sup>24</sup>. General population reported negative affects in response to quarantine: fear, nervousness, sadness, guilt, confusion, anger, numbness, and anxiety-induced insomnia<sup>25,26</sup>. Studies of hospital staff found that having been quarantined was the most predictive factor of acute stress disorder or of posttraumatic stress symptoms even three years later<sup>27</sup>. Another study found that health-care workers who had been quarantined had more severe symptoms of posttraumatic stress than members of the general public who had been quarantined<sup>25</sup>; moreover, health-care workers also felt greater stigmatization, exhibited more avoidance behaviours after quarantine, reported greater lost income, and were consistently more affected psychologically. They were also substantially more likely to think they had SARS and to be concerned about infecting others<sup>25</sup>. Studies on long-term effects found that three years after the SARS pandemics, alcohol abuse or dependency symptoms were positively associated with having been quarantined in health-care workers<sup>28</sup>.

During the 2009 H1N1 influenza outbreak ("swine flu"), avoidance behaviours, high levels of anxiety and worries about the infection were estimated among general populations<sup>29,30</sup> and hospital staff<sup>31</sup> with large regional differences. Family members of patients showed elevated levels of perceived stress and depression, compared to a control population, and moderate levels of death anxiety<sup>32</sup>. A study of mental health patients found that children and patients with neurotic and somatoform disorders were significantly over-represented among those expressing moderate or severe concerns about swine flu concerns<sup>33</sup>.

Since 2012, an outbreak of Middle East respiratory syndrome (MERS) has affected several countries, primarily in its namesake, the Middle East. Studies on the psychological impact confirmed higher levels of anxiety, worries, social avoidance behaviours in the general population<sup>34</sup>. MERS survivors of critical illness reported lower quality of life than survivors of less severe illness<sup>35</sup>, showed psychiatric symptoms and received a psychiatric diagnosis and medication during their hospital stay<sup>36</sup>. Stress, depression and stigma in front-line health care workers<sup>37</sup>, and anxiety and anger in quarantined people having a history of mental disorder<sup>38</sup> were found as well.

Researches on the psychological response to quarantine during Ebola outbreak confirmed previous findings: people reported fear, anger and anxiety-induced insomnia<sup>39,40</sup>. Stigma from the others were found to be a major issue<sup>41</sup>. Depression, anxiety and post-traumatic stress were common sequelae in Ebola survivors<sup>42</sup>. Front-line health care providers reported profound sense of stigmatization, suffering, loneliness, isolation and sadness<sup>43</sup>. Psychological distress, alcohol/drug misuse, post-traumatic stress disorder, depression, anxiety and insomnia were also found in military populations deployed in the emergency in west Africa<sup>44</sup>.

## SEARCH STRATEGY AND SELECTION CRITERIA

We searched MEDLINE, PsycINFO, and Web of Science through the combination of terms relating to CoViD-19 (eg, "coronavirus" and "COronaVirus Disease 19"), restrictive measures (eg, "quarantine", "isolation" and "social distancing"), psychological outcomes (eg, "psych", "depression", and

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“stress”), and guidelines (eg, “guide” and “managing”). In this review, we included only original researches. The studies had to be published in peer-reviewed journals or be available as preprints, be written in English or Chinese and included data on mental illness or psychological wellbeing, or on factors associated with mental illness or psychological wellbeing (i.e., any predictors of psychological wellbeing). The initial search took place from March 28 to April 3, 2020 and yielded 104 papers, of which 15 showed relevant data and were included in this Review. The characteristics of studies that met out inclusion criteria are presented in the tables (Table 1, Table 2 and Table 3).

## MENTAL HEALTH OUTCOMES ASSOCIATED WITH THE COVID-19 PANDEMIC

### Non-clinical populations

Among the papers included in this review, six were primary researches focused on mental health of general populations (Table 1). All of them were online surveys on Chinese population with a cross-sectional design<sup>22,45-49</sup>. Convenience<sup>49</sup>

and snowball sampling strategy were used<sup>22,49</sup>. Four studies leveraged an online openly accessible platform to invite people to complete questionnaires<sup>22,46-48</sup>, one study used a mobile phone app-based questionnaire and phone interviews<sup>49</sup>, and the other study sampled and analyzed the Weibo posts from active Weibo users, using the approach of Online Ecological Recognition (OER)<sup>45</sup>. Most of the studies started after the WHO declaration of the CoViD-19 outbreak as a public health emergency of international concern (30 January)<sup>22,46-48</sup>. The studies investigated the emotive reactions of the last 7<sup>46,49</sup>, 14 days<sup>22</sup>, or last month<sup>45</sup>; data collection took place from few days<sup>22,46,47,49</sup> to two weeks on average<sup>45</sup>.

Another cross-sectional study investigated the mental health status of the subpopulation of medical students from a college in the Hubei province<sup>50</sup>. The respondents in the target population were sampled by cluster sampling. The applied procedures have not been further described.

Globally, findings showed that the most of Chinese people, from 7% to 53.8%, experienced psychological distress during the initial stage of the CoViD-19 outbreak<sup>22,45-47,49</sup>. A range of negative psychological responses were identified: besides anxiety, depression, and stress, which were the most explored conditions<sup>22,46-50</sup>, insomnia<sup>46</sup>, indignation<sup>45</sup>, worries about their

Table 1. Original researches on general population.

	Country	Design	Population	Period	Measures
Li et al. <sup>10</sup>	China	Online Ecological Recognition (OER)	17,865 active Weibo users	From 13 January to 26 January 2020	Emotional indicators (e.g., anxiety, depression, indignation, and Oxford happiness); cognitive indicators (e.g., social risk judgment and life satisfaction)
Zhang & Ma <sup>49</sup>	China	Cross-sectional (mobile phone app-based and phone interviews)	263 individuals	From 28 January to 5 February 2020	Impact of Event Scale (IES)
Liu et al. <sup>46</sup>	China	Cross-sectional (online survey)	285 residents in Wuhan and surrounding cities	From 30 January to 8 February 2020	PTSD Checklist for DSM-5 (PCL-5); items from the Pittsburgh Sleep Quality Index (PSQI)
Qiu et al. <sup>47</sup>	China	Cross-sectional (online survey)	52,730 individuals	From 31 January 2020	CoviD-19 Peritraumatic Distress Index (CPDI)
Wang et al. <sup>22</sup>	China	Cross-sectional (online survey)	1210 individuals	From 31 January to 2 February 2020	Impact of Event Scale-Revised (IES-R); Depression, Anxiety and Stress Scale (DASS-21)
Wang et al. <sup>48</sup>	China	Cross-sectional (online survey)	600 individuals	From 6 February to 9 February 2020	Self-Rating Anxiety Scale (SAS); Self-Rating Depression Scale (SDS)
Cao et al. <sup>50</sup>	China	Cross-sectional	7143 medical students living in Hubei province	Not specified	Generalized Anxiety Disorder Scale (GAD-7)

Table 2. Original researches on health-care workers.

	Country	Design	Population	Period	Measures
Lai et al. <sup>51</sup>	China	Cross-sectional	1257 health-care workers: 493 physicians and 764 nurses	From 29 January to 3 February 2020	Patient Health Questionnaire (PHQ-9); Generalized Anxiety Disorder scale (GAD-7); Insomnia Severity Index (ISI-7); Impact of Event Scale-Revised (IES-R)
Kang et al. <sup>53</sup>	China	Cross-sectional (online survey)	994 health-care professionals working in Wuhan: 183 doctors and 811 nurses	From 29 January to 4 February 2020	Patient Health Questionnaire (PHQ-9); Generalized Anxiety Disorder (GAD-7); Insomnia Severity Index (ISI); Impact of Event Scale-Revised (IES-R)
Huang et al. <sup>52</sup>	China	Cross-sectional	230 health-care professionals working in a tertiary infectious disease hospital: 70 doctors and 160 nurses	From 7 February to 14 February 2020	Self-rating Anxiety Scale (SAS); Post-Traumatic Stress Disorder Self-rating scale (PTSD-SS)
Li et al. <sup>54</sup>	China	Cross-sectional (mobile phone app-based)	740 individuals: 214 general public, 234 front-line nurses and 292 non-front-line nurses	From 17 February to 21 February 2020	Chinese version of the vicarious traumatization questionnaire
Cao et al. <sup>55</sup>	China	qualitative-quantitative – letter to the Editor	37 health-care professionals working in a fever clinic for CoViD-19: 16 doctors, 19 nurses and 2 clinical technicians	February 2020	Patient Health Questionnaire (PHQ-9); Maslach Burn-out Inventory (MBI)

Table 3. Original researches on patients with CoViD-19.

	Country	Design	Population	Period	Measures
Zhao et al. <sup>56</sup>	China	Cross-sectional (online survey)	106 CoViD-19 patients during isolation treatment from Tongji Hospital in Wuhan	From 2 February to 16 February 2020	Patient Health Questionnaire-9 (PHQ-9); Generalized Anxiety Disorder Scale-7 (GAD-7); Patient Health Questionnaire-15 (PHQ-15)
Nguyen et al. <sup>57</sup>	Vietnam	Cross-sectional	3947 outpatients from departments of nine hospitals and health centers across Vietnam: 1387 with suspected CoViD-19 and 2560 without suspected CoViD-19	From 14 February to 2 March 2020	Patient health questionnaire (PHQ-9); 36-Item Short Form Survey (SF-36); International Physical Activity Questionnaire (IPAQ); Short form of the health literacy questionnaire (HLS-SF12)
Bo et al. <sup>58</sup>	China	Cross-sectional (online survey)	714 clinically stable CoViD-19 patients prior to their discharge from “Fang Cang” hospitals in Wuhan	March 2020	PTSD Checklist (PCL-C)

own health and family<sup>45</sup>, sensitivity to social risks<sup>45</sup>, life dissatisfaction<sup>45</sup>, phobias<sup>47</sup>, avoidance<sup>47</sup>, compulsive behaviour<sup>47</sup>, physical symptoms<sup>22,47</sup>, and social functioning impairment<sup>47</sup> were explored as well. The levels of stress<sup>22,47,49</sup>, anxiety<sup>22</sup> and depression<sup>22</sup> ranged from mild to moderate-severe. In the college student's population, rates of mild, moderate, and severe

anxiety were 21.3%, 2.7%, and 0.9%, respectively<sup>50</sup>. Only one study found that people were psychologically stable, with just the 6.33% and 17.17% of the participant reporting respectively anxiety and depression<sup>48</sup>. With regard to factors associated with higher level of psychological distress, consistent findings were shown, except for education level: female gender<sup>22,46-48</sup>,



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young adults (aged 18-40)<sup>47,48</sup> experienced a major negative impact. Occupation (e.g. migrant workers<sup>47</sup>, student status<sup>22</sup>, professionals<sup>48</sup>), place of residence (hit hardest or not by epidemics)<sup>47</sup>, specific physical symptoms<sup>22</sup>, poor self-rated health status<sup>22</sup>, and having relatives or acquaintances infected with CoViD-19<sup>49</sup> were also suggested as risk factors. High<sup>47,48</sup> and low<sup>22</sup> education level were both found as risk factors for negative psychological outcomes.

Although the above-mentioned findings are consistent with previous literature<sup>20,21,24-44</sup>, they should be interpreted carefully given the inherent methodological shortcomings of these studies: study design, sampling methods, the use of self-report questionnaires or not validated questionnaires, and machine-learning predictive models may have biased results to some extent.

### **Health-care workers**

Previous literature showed that health-care providers are at particular risk of negative psychological impact during pandemics, especially if they were front-line workers<sup>24,27,28,31,37,43</sup>.

To date, five original researches on the psychological conditions of health-care workers during CoViD-19 pandemics have been published<sup>51-55</sup> (Tab. 2). One study has been published as a "Letter to the Editor"<sup>55</sup>. They were all carried out in China over six consecutive days on average, in a period ranged from the end of January to the end of February<sup>51-55</sup>.

As the studies on the general public, these researches were all cross-sectional, though some differences in methods exist (Table 2). Moreover, the variables explored were not the same. In fact, four studies explored the mental health outcomes among health-care workers exposed to CoViD-19, that is, anxiety, depression and psychological distress<sup>51-53,55</sup>, whereas the fifth study compared the severity of vicarious traumatization in front-line nurses, non-front-line nurses, and the general public<sup>54</sup>.

Lai et al.<sup>51</sup> recently published a well-designed hospital-based survey, conducted via a region-stratified, 2-stage cluster sampling. Samples were stratified by their geographic location. Since Wuhan was most severely affected, more hospitals of the city were sampled. Then, one clinical department was randomly sampled from each selected hospital. Both secondary and tertiary hospitals were involved. The target sample size of participants was mathematically determined before starting the survey. The final sample consisted of 1257 respondents (response rate=68.7%), 493 medical doctors and 764 nurses, who completed well-known, internationally validated questionnaires. Another research<sup>52</sup> was published in Chinese language. It involved 230 members of medical staffs, 70 doctors and 160 nurses, in a tertiary infectious disease hospital for CoViD-19 of Fuyang, next to Wuhan (response rate= 93.5%). They were enrolled using a cluster sampling and were asked to complete two Chinese questionnaires. The method of administration of the questionnaires was not specified in both researches, albeit a web-based method is hinted.

Kang et al.<sup>53</sup> conducted a study using an online survey tool. The sample included 183 medical doctors and 811 nurses (N=994). A total of 31.1% worked in high-risk departments in Wuhan. Cao et al.<sup>55</sup> made qualitative and quantitative evaluations on health-care providers working in a 24-h

fever clinic set up in an Emergency Department, in the framework of the psychological support provided through a hotline service. Interviews were conducted whenever the medical workers were free. Each medical worker was interviewed several times during their 2- to 3-week work time rotation. The research on vicarious traumatization was a mobile phone app-based questionnaire survey<sup>54</sup>. 214 general public and 526 nurses (i.e., 234 front-line nurses and 292 non-front-line nurses), were enrolled and assessed by the Chinese version of the vicarious traumatization evaluation scale.

Findings showed that health-care workers have been exposed to high levels of stressful or traumatic events and expressed substantial negative mental health outcomes<sup>51-53,55</sup>, including stress-related symptoms<sup>51-53</sup>, depression<sup>51,53,55</sup>, anxiety<sup>51-53</sup> and insomnia<sup>51,53</sup>. Depression rate was of 50.4%<sup>51</sup>, anxiety rate ranged from 23.04%<sup>52</sup> to 44.6%<sup>51</sup>, insomnia rate was of 34.0%<sup>51</sup>, and stress rate ranged from 27.39%<sup>52</sup> to 71.5%<sup>51</sup>. Most of health-care workers suffered from mild-moderate disturbances<sup>51,52,53,55</sup>.

Nurses<sup>51,52</sup>, women<sup>51-53</sup>, young age<sup>53</sup>, front-line health-care workers<sup>51</sup>, and those working in Wuhan<sup>51</sup>, intermediate professionals<sup>52</sup> reported more severe degrees of mental health symptoms than other health-care workers<sup>51</sup>. Front-line health-care workers were associated with a higher risk of psychological symptoms during the CoViD-19 outbreak<sup>51</sup>. Compared with working in second-line positions, working in the front-line directly treating patients with CoViD-19 appeared to be an independent risk factor for all psychiatric symptoms after adjustment<sup>51</sup>. Compared with those working in tertiary hospitals, participants working in secondary hospitals were more likely to report severe psychopathological symptoms<sup>51</sup>. No differences were found based on others demographic data<sup>51,52</sup>, that is, marital status, educational level, place of residence. However, limitations of these studies may reduce the generalizability of their findings, as the cross-sectional nature of the study design, the administration of self-report questionnaires or not widely used questionnaires.

The vicarious traumatization of front-line nurses was found to be less serious than that of non-front-line medical staff and of the general public<sup>54</sup>. There was no significant difference between the general population and non-front-line nurses. Among nurses, being married, divorced or widowed was associated with a higher level of vicarious traumatization<sup>54</sup>. Nevertheless, the results may be biased by the heterogeneity of the sample.

### **Patients affected by CoViD-19**

Previous researches focusing on pandemics confirmed that individuals who have experienced public health emergencies reported varying degrees of psychological disorders<sup>24,35,36,42</sup>. Hence, the outbreak of the CoViD-19 is supposed to cause huge psychological problems and psychiatric morbidities in the sub-population of patients with confirmed and suspected infections. It is hypothesized that patients affected by CoViD-19 may experience psychopathological symptoms due to several reasons: clinical symptoms or disease progression, medication side effects, perceived danger, fear of virus transmission to others or social isolation, uncertainty, physical discomfort, and overwhelming negative news portrayal in mass media coverage<sup>15,17</sup>.

At present, the mental health problems of the patients infected with CoViD-19 have been reported in three cross-sectional studies (Table 3), of which two were carried out in Wuhan, China<sup>56,58</sup>, and the other in Vietnam<sup>57</sup>. The observation period was 14 days on average. These researches were heterogeneous in methods: Bo et al.<sup>58</sup> made an online assessment of stress symptoms and patients' attitude toward crisis mental health services as part of the crisis psychological interventions for clinically stable CoViD-19 patients; Zhao et al.<sup>56</sup> recruited CoViD-19 patients during isolation treatment through an online questionnaire measuring anxiety, depression and somatic symptoms, whereas the Vietnamese study<sup>57</sup> enrolled CoViD-19 and no-CoViD-19 outpatients and interviewed them using printed questionnaires on depression and related factors.

Findings suggest that the psychological impact on CoViD-19 patients is relevant: the 96.2% of clinically stable patients reported significant post-traumatic stress symptoms prior to discharge<sup>58</sup>, likely leading to lower quality of life and impaired working performance. The remarkable prevalence of stress could be attributed to the particular illness phases (i.e., clinically stable CoViD-19 inpatients). Only half of the patients hold positive attitudes towards crisis mental health services<sup>58</sup>: this result could be due to the difficulties of specific patients (i.e., older patients) in accessing online mental health services. Nearly 50% of people diagnosed with CoViD-19 in the other Chinese study<sup>56</sup> had depressive symptoms, over 55% had anxiety and almost 70% had somatic symptoms. Among these patients, 9%, 15% and 21% were severe cases, respectively. Patients who were married and nucleic-acid-positive had more severe depression than their counterparts, whereas patients who were married and nucleic-acid-negative had more somatic symptoms<sup>56</sup>. In this study people reported also insomnia (67.92%) and self-mutilating or suicidal thoughts (25%). The Vietnamese study<sup>57</sup> found that out of all participants, 7.4% were depressed: the prevalence of depression was significantly higher in people with CoViD-19 (64.3%) than in people non-affected (35.7%). The health-related quality of life score was significantly lower in the people with CoViD-19. Some demographic data were associated with higher degree of depression<sup>57</sup>, such as older age (i.e., 60 years old or above), comorbidities, lower education attainment, lower physical activity. Health literacy was found to be a protective factor for improving depression and health-related quality of life during the CoViD-19 epidemic<sup>57</sup>.

Findings in these studies should be interpreted carefully given their inherent methodological shortcomings.

### Patients with mental disorders

Up until now, no observational studies aiming at exploring the psychological impact of the CoViD-19 pandemic of the patients with mental disorders were conducted.

There is a need for research on this field since this population is a vulnerable group for several reasons<sup>10</sup>. First, even in normal conditions, people with established mental illness have a lower life expectancy and poorer physical health outcomes than the general population<sup>59</sup>. When epidemics arise, these people are generally more susceptible to infections due to cognitive impairment, little awareness of risk, and diminished efforts regarding personal protection<sup>60</sup>. Second, they

can be exposed to more barriers in accessing timely health services, because of discrimination associated with mental illness in health-care settings<sup>60</sup>. Additionally, mental health disorder comorbidities to CoViD-19 will make the treatment more challenging and potentially less effective<sup>60</sup>. Third, people with mental health conditions could be more substantially influenced by the emotional responses brought on by the CoViD-19 pandemic, resulting in relapses or worsening of an already existing mental health condition because of high susceptibility to stress compared with the general population<sup>60</sup>. Compared with patients from other departments, psychiatric patients encountered more barriers and problems<sup>10</sup>. For instance, they were often confined to crowded living conditions in hospitals where they share common dining and bathroom spaces; their family visiting was cancelled due to fear of transmission of the novel coronavirus; smartphones and other electronic equipment were not permitted in the ward and no online information was made available<sup>10</sup>.

As a result, they might be at increased risk of infection with CoViD-19, increased risk of having problems accessing testing and treatment, and increased risk of negative physical and psychological effects stemming from the pandemic<sup>59</sup>.

Evidence derived from scientific research could represent a valid support for mental health-care workers and authorities to offer effective, tailored and timely psychological services for psychiatric patients.

### CONCLUSIONS AND FUTURE DIRECTIONS

Taken together, evidence accumulated so far confirms that the on-going CoViD-19 pandemic is having a huge psychological impact on individuals. People experienced considerable psychological distress during the initial stage of the CoViD-19 outbreak in terms of anxiety, depression and post-traumatic symptoms. Globally, findings were relatively consistent in terms of severity: most of individuals suffered from mild-moderate disturbances, whereas subjects reporting severe symptoms were a minority. Conversely, the observed prevalence was not homogenous: this inconsistency could be due, among other things, to differences in methodology, in administered assessment tools or examined populations. Some categories have proven to be more vulnerable, that is, health workers and patients affected by CoViD-19. Furthermore, some variables were associated with higher psychological impact, such as female gender and young age. Preliminary findings from our research project are in line with the Chinese studies. We found high rates of negative mental health outcomes, including post-traumatic stress symptoms and anxiety, in the Italian general population<sup>61</sup> and in health-care professionals<sup>62</sup> three weeks into the CoViD-19 lockdown measures, associated with different CoViD-19 related risk factors: female gender and younger age were associated with higher risk for mental health outcomes.

These findings support the notion that public mental health interventions should be formally integrated into public health preparedness and emergency response plans. Xi-ang et al.<sup>15</sup> suggested three important steps: institution of multidisciplinary mental health teams, clear communication with appropriate updates about the CoViD-19 outbreak, and establishment of secure services to provide psychological

# Mental health outcomes of the CoViD-19 pandemic

counseling though telemedicine (e.g., electronic devices, application, online mental health services), with improved access for disadvantaged people like older adults or psychiatric patients. Particular effort must be directed to vulnerable populations with the provision of targeted psychological interventions. For example, health workers could benefit from a continuous monitoring of psychological status, from a pre-job training on how to relax properly and on how to deal with uncooperative patients, or from the presence in hospitals of a place for rest where temporarily isolate themselves from their family if they get infected<sup>63</sup>. As regards people affected by CoViD-19, interventions should be based on a comprehensive assessment of risk factors leading to psychological issues, including poor mental health before a crisis, bereavement, injury to self or family members, life-threatening circumstances, panic, separation from family and low household income<sup>6</sup>. These measures can help diminish or prevent future psychiatric morbidity.

Mental health-care organizations and public health institutions are releasing practical guidelines on taking care of mental health and well-being. The American Psychiatric Association (APA)<sup>64</sup>, the National Alliance On Mental Illness (NAMI)<sup>65</sup>, and the Substance Abuse and Mental Health Services Administration (SAMHSA)<sup>66</sup> provide general tips for the community on how to organize their own time and manage their physical and mental health. The Centers for Disease Control and Prevention (CDC)<sup>67</sup> and the WHO<sup>68</sup> supply further information specific for the high-risk groups.

Although some crucial aspects of these interactions need further clarification, convincing evidence now suggests a relation between CoViD-19 pandemic, lockdown, socio-economic impact and mental illness. Potential risk and protective factors have to be further investigated. Furthermore, future studies investigating the long-term psychological consequences that affect people facing the CoViD-19 outbreak are needed. Future research should also be dedicated to addressing the development of proper prevention, treatment and rehabilitation strategies against a world public health emergency such a pandemic. Another challenge will be tailoring targeted intervention for most affected categories.

*Conflict of interests:* the authors have no conflict of interests to declare.

## REFERENCES

- Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. *Lancet* 2020; 395: 470-73.
- World Health Organization. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). Jan 30, 2020. <https://bit.ly/2zc56Vk> (accessed May 2020).
- Singhal T. A review of Coronavirus Disease-2019 (CoViD-19). *Indian J Pediatr* 2020; 87: 281-6.
- Ayittey FK, Ayittey MK, Chiwero NB, Kamasah JS, Dzuor C. Economic impacts of Wuhan 2019-nCoV on China and the world. *J Med Virol* 2020; 92: 473-5.
- Rubin JG. The psychological effects of quarantining a city. *BMJ* 2020; 368: m313.
- Duan L, Zhu G. Psychological interventions for people affected by the CoViD-19 epidemic. *Lancet Psychiatry* 2020; 7:300-2.
- Yang Y, Li W, Zhang Q, Zhang L, Cheung T, Xiang YT. Mental health services for older adults in China during the CoViD-19 outbreak. *Lancet Psychiatry* 2020; 7: e19.
- Liu JJ, Bao Y, Huang X, Shi J, Lu L. Mental health considerations for children quarantined because of CoViD-19. *Lancet Child Adolesc Health* 2020; pii: S2352-4642(20)30096-1.
- World Health Organization. Mental Health Considerations during CoViD-19 Outbreak. Geneva: World Health Organization, 2020.
- Li S, Zhang Y. Mental healthcare for psychiatric inpatients during the CoViD-19 epidemic. *BMJ General Psychiatry* 2020; 33: e100216.
- Rashidi Fakari F, Simbar M. Coronavirus pandemic and worries during pregnancy; a letter to Editor. *Arch Acad Emerg Med* 2020; 8: e21.
- Liebrezn M, Bhugra D, Buadze A, et al. Caring for persons in detention suffering with mental illness during the CoViD-19 outbreak. *Forensic Science International: Mind and Law* 2020; 100013.
- Liem A, Wang C, Wariyanti Y, Latkin CA, Hall BJ. The neglected health of international migrant workers in the CoViD-19 epidemic. *Lancet Psychiatry* 2020; 7: e20.
- Zhai Y, Du X. Mental health care for international Chinese students affected by the CoViD-19 outbreak. *Lancet Psychiatry* 2020; 7: e22.
- Xiang YT, Yang Y, Li W, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry* 2020; 7: 228-9.
- Zhang J, Wu W, Zhao Z, Zhang W. Recommended psychological crisis intervention response to the 2019 novel Coronavirus pneumonia outbreak in China: a model of west China hospital. *Precis. Clinical Med* 2020; pbaa006.
- Park SC, Park YC. Mental health care measures in response to the 2019 novel coronavirus outbreak in Korea. *Psychiatry Investig* 2020; 17: 85-6.
- Shigemura J, Ursano RJ, Morganstein JC, Kurosawa M, Benedek DM. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: mental health consequences and target populations. *Psychiatry Clin Neurosci* 2020; 74: 281-2.
- Zandifar A, Badrfam R. Iranian mental health during the CoViD-19 epidemic. *Asian J Psychiatr* 2020; 51: 101990.
- Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 2020; 395: 912-20.
- Taylor S. The psychology of pandemics: preparing for the next global outbreak of infectious disease. Newcastle upon Tyne: Cambridge Scholars Publishing, 2019.
- Wang C, Pan R, Wan X, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (CoViD-19) epidemic among the general population in China. *Int J Env Res Public Heal* 2020; 17. pii: E1729.
- Dong M, Zheng J. Letter to the editor: headline stress disorder caused by Netnews during the outbreak of CoViD-19. *Health Expect* 2020; 23: 259-60.
- Lee AM, Wong JG, McAlonan GM, et al. Stress and psychological distress among SARS survivors 1 year after the outbreak. *Can J Psychiatry* 2007; 52: 233-40.
- Reynolds DL, Garay JR, Deamond SL, Moran MK, Gold W, Styra R. Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol Infect* 2008; 136: 997-1007.
- DiGiovanni C, Conley J, Chiu D, Zaborski J. Factors influencing compliance with quarantine in Toronto during the 2003 SARS outbreak. *Biosecur Bioterror* 2004; 2: 265-72.
- Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry* 2009; 54: 302-11.
- Wu P, Liu X, Fang Y, et al. Alcohol abuse/dependence symptoms among hospital employees exposed to a SARS outbreak. *Alcohol Alcohol* 2008; 43: 706-12.
- Jones JH, Salathé M. Early assessment of anxiety and behavioral response to novel swine-origin influenza A(H1N1). *PLoS One* 2009; 4: e8032.



30. Goodwin R, Gaines SO Jr, Myers L, Neto F. Initial psychological responses to swine flu. *Int J Behav Med* 2011; 18: 88-92.
31. Goulia P, Mantas C, Dimitroula D, Mantis D, Hyphantis T. General hospital staff worries, perceived sufficiency of information and associated psychological distress during the A/H1N1 influenza pandemic. *BMC Infect Dis* 2010; 10: 322.
32. Elizarrarás-Rivas J, Vargas-Mendoza JE, Mayoral-García M, et al. Psychological response of family members of patients hospitalised for influenza A/H1N1 in Oaxaca, Mexico. *BMC Psychiatry* 2010; 10: 104.
33. Page LA, Seetharaman S, Suhail I, Wessely S, Pereira J, Rubin GJ. Using electronic patient records to assess the impact of swine flu (influenza H1N1) on mental health patients. *J Ment Health* 2011; 20: 60-9.
34. Ro JS, Lee JS, Kang SC, Jung H. Worry experienced during the 2015 Middle East Respiratory Syndrome (MERS) pandemic in Korea. *PLoS One* 2017; 12: e0173234.
35. Batawi S, Tarazan N, Al-Raddadi R, et al. Quality of life reported by survivors after hospitalization for Middle East respiratory syndrome (MERS). *Health Qual Life Outcomes* 2019; 17: 101.
36. Kim HC, Yoo SY, Lee BH, Lee SH, Shin HS. Psychiatric findings in suspected and confirmed Middle East Respiratory Syndrome patients quarantined in hospital: a retrospective chart analysis. *Psychiatry Investig* 2018; 15: 355-60.
37. Um DH, Kim JS, Lee HW, Lee SH. Psychological effects on medical doctors from the Middle East Respiratory Syndrome (MERS) outbreak: a comparison of whether they worked at the MERS occurred hospital or not, and whether they participated in MERS diagnosis and treatment. *J Korean Neuropsychiatr Assoc* 2017; 56: 28-34.
38. Jeong H, Yim HW, Song Y-J, et al. Mental health status of people isolated due to Middle East respiratory syndrome. *Epidemiol Health* 2016; 38: e2016048.
39. Caleo G, Duncombe J, Jephcott F, et al. The factors affecting household transmission dynamics and community compliance with Ebola control measures: a mixed-methods study in a rural village in Sierra Leone. *BMC Public Health* 2018; 18: 248.
40. Desclaux A, Badji D, Ndione AG, Sow K. Accepted monitoring or endured quarantine? Ebola contacts' perceptions in Senegal. *Soc Sci Med* 2017; 178: 38-45.
41. Pellicchia U, Crestani R, Decroo T, Van den Bergh R, Al-Kourdi Y. Social consequences of Ebola containment measures in Liberia. *PLoS One* 2015; 10: e0143036.
42. Lötsch F, Schnyder J, Goorhuis A, Grobusch MP. Neuropsychological long-term sequelae of Ebola virus disease survivors. A systematic review. *Travel Med Infect Dis* 2017; 18: 18-23.
43. McMahon SA, Ho LS, Brown H, Miller L, Ansumana R, Kennedy CE. Healthcare providers on the frontlines: a qualitative investigation of the social and emotional impact of delivering health services during Sierra Leone's Ebola epidemic. *Health Policy Plan* 2016; 31: 1232-9.
44. Vyas KJ, Delaney EM, Webb-Murphy JA, Johnston SL. Psychological impact of deploying in support of the U.S. response to Ebola: a systematic review and meta-analysis of past outbreaks. *Mil Med* 2016; 181: e1515-31.
45. Li S, Wang Y, Xue J, Zhao N, Zhu T. The Impact of CoViD-19 epidemic declaration on psychological consequences: a study on active weibo users. *Int J Environ Res Public Health* 2020; 17: pii: E2032.
46. Liu N, Zhang F, Wei C, et al. Prevalence and predictors of PTSS during CoViD-19 outbreak in China hardest-hit areas: gender differences matter. *Psychiatry Res* 2020; 287: 112921.
47. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the CoViD-19 epidemic: implications and policy recommendations. *Gen Psychiatr* 2020; 33: e100213.
48. Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (CoViD-19) in some regions of China. *Psychol Health Med* 2020; 1-10.
49. Zhang Y, Ma ZF. Impact of the CoViD-19 Pandemic on Mental Health and Quality of Life among Local Residents in Liaoning Province, China: A Cross-Sectional Study. *Int J Environ Res Public Health* 2020; 17: pii: E2381.
50. Cao W, Fang Z, Hou G, et al. The psychological impact of the CoViD-19 epidemic on college students in China. *Psychiatry Res* 2020; 287: 112934.
51. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to Coronavirus Disease 2019. *JAMA Netw Open* 2020; 3: e203976.
52. Huang JZ, Han MF, Luo TD, Ren AK, Zhou XP. Mental health survey of 230 medical staff in a tertiary infectious disease hospital for CoViD-19. *Chin Ind Hyg Occup Dis* 2020; 38: E001.
53. Kang L, Ma S, Chen M, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain Behav Immun* 2020; pii: S0889-1591(20)30348-2.
54. Li Z, Ge J, Yang M, et al. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in CoViD-19 control. *Brain Behav Immun* 2020. pii: S0889-1591(20)30309-3.
55. Cao J, Wei J, Zhu H, et al. A Study of basic needs and psychological wellbeing of medical workers in the fever clinic of a tertiary general hospital in Beijing during the CoViD-19 outbreak. *Psychother Psychosom* 2020 Mar 30; 1-3.
56. Zhao Q, Hu C, Feng R, Yang Yuan. Investigation of the mental health of patients with novel coronavirus pneumonia. *Chin J Neurol* 2020; 53:
57. Nguyen HC, Nguyen MH, Do BN, et al. People with suspected CoViD-19 symptoms were more likely depressed and had lower health-related quality of life: the potential benefit of health literacy. *J Clin Med* 2020; 9: pii: E965.
58. Bo HX, Li W, Yang Y, et al. Posttraumatic stress symptoms and attitude toward crisis mental health services among clinically stable patients with CoViD-19 in China. *Psychol Med* 2020 Mar 27; 1-7.
59. Cullen W, Gulati G, Kelly BD. Mental health in the CoViD-19 pandemic. *QJM* 2020. pii: hcaa110.
60. Yao H, Chen JH, Xu YF. Patients with mental health disorders in the CoViD-19 epidemic. *Lancet Psychiatry* 2020; 7: e21.
61. Rossi R, Socci V, Talevi D, et al. CoViD-19 pandemic and lockdown measures impact on mental health among the general population in Italy. An N=18147 web-based survey. *medRxiv* 2020.04.09.20057802.
62. Rossi R, Socci V, Pacitti F, et al. Mental health outcomes among front and second line health workers associated with the CoViD-19 pandemic in Italy. *medRxiv* 2020.04.16.20067801.
63. Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the CoViD-19 outbreak. *Lancet Psychiatry* 2020; 7: e15-e16.
64. Morganstein J. Coronavirus and mental health: taking care of ourselves during infectious disease outbreaks. *American Psychiatric Association*, 2020. <https://bit.ly/2yoE3WQ>
65. National Alliance on Mental Illness (NAMI). CoViD-19 Resource and Information Guide. <https://www.nami.org/CoViD-19-guide>
66. Substance Abuse and Mental Health Services Administration (SAMHSA). Tips for social distancing, quarantine, and isolation during an infectious disease outbreak. <https://bit.ly/2YA98RY> (accessed May 2020).
67. Centers for Disease Control and Prevention (CDC). Outbreaks can be stressful. <https://bit.ly/3fpLWvF> (accessed May 2020).
68. World Health Organization. Mental health and psychosocial considerations during the CoViD-19 outbreak. WHO, 2020. <https://bit.ly/2W6VKmI> (accessed May 2020).