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Review

The COVID-19 outbreak: impact on mental health and intervention strategies

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SUMMARY

Although the psychological and psychiatric implications seem to be a central core of health problems during an emergency, they tend to be underestimated and neglected, generating gaps in intervention strategies and increasing the burden of associated diseases. Moreover, pharmacological treatment concerns arise for psychiatrists and the other specialists who deal with psychiatric patients affected by an infectious disease or with patients with an infectious disease that may develop a number of psychiatric symptoms. The mental health consequences of a pandemic may be related to the sequelae of the disease itself or to the preventive measures aimed at containing the spread of infections. In addition, fear of death, drastic changes in family organization and work routines, closings of schools, companies and public places can play a role. Furthermore, stress derived from working activity or economic losses should not be underestimated. In the context of the current COVID-19 pandemic, first studies have shown the presence of stress, anxiety, depression and insomnia in the general population, health-care workers, and people affected by COVID-19. It appears likely that there will be substantial increases in a broad range of other mental disorders, suicide, behavioral disorders, loneliness, domestic violence and child abuse. From these considerations, the evaluation and monitoring of psychological/psychiatric conditions of involved populations, and the provision of focused aid must be part of the care intervention during the initial stage of a pandemic and beyond. The aim of this review is to summarize the current evidence on how mental health outcomes of COVID-19 outbreak have been measured and managed.

Key words: COVID-19, pandemic, mental health, outcomes, psychological impact, measurement, management

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Introduction

Since December 2019, the novel coronavirus disease (COVID-19) has spread from Wuhan to other cities in China and around the world. On 11 March 2020, the World Health Organization (WHO) characterized COVID-19 as a pandemic. As of 23 April 2020, there have been 2.475.723 confirmed cases worldwide, 169.151 deaths, and 208 countries involved. These are unprecedented times in the modern world.

It is well-known that health emergencies are associated with detrimental psychosocial consequences [1], and the COVID-19 outbreak will inevitably cause distress and leave many people vulnerable to mental health problems. Very probably, mental health sequelae will persist for longer and peak later than the actual pandemic. As a matter of fact, during epidemics, the number of people whose mental health is affected tends to be greater than the number of people affected by the infection [2].

Although the psychological and psychiatric implications, both on an individual and a collective level, seem to be a central core of health problems during an emergency, they tend to be underestimated and neglected,

generating gaps in intervention strategies and increasing the burden of associated diseases [3,4]. From these considerations, the evaluation and monitoring of psychological/psychiatric conditions of involved populations, and the provision of focused aid must be part of the care intervention during the initial stage of a pandemic and beyond.

The mental health consequences of a pandemic may be related to the sequelae of the disease itself[5] or to the preventive measures aimed at containing the spread of infections [6], such as quarantine or social distancing. In addition, fear of death, drastic changes in family organization and work routines, closings of schools, companies and public places can play a role. Furthermore, stress derived from working activity, as in the case of health professionals [7], or economic losses [8] should not be underestimated.

In the context of the current COVID-19 pandemic, first studies have shown the presence of stress [9-12,14-16,18,21-23], anxiety [9,13-16,19,21-23], depression [9,13,14,16,17,19,20-23] and insomnia [10,14,16,21-23] in the general population, health-care workers, and people affected by COVID-19. It appears likely that there will be substantial increases in a broad range of other mental disorders, suicide, behavioral disorders as substance use, loneliness, domestic violence and child abuse, as we learned from previous large-scale disasters [1,24].

We have to keep in mind that specific groups are especially vulnerable, for example, older adults, children, pregnant women, persons in detention, people with pre-existing psychiatric or clinical conditions, infected patients and their family members [25].

Strategies against stressful factors during a health emergency must be developed and implemented, at the individual and community level [26]. Mental health-care organizations and public health institutions are now releasing practical guidelines on taking care of mental health and well-being [27-31], but evidence of efficacy is needed for the future.

Last but not least, pharmacological treatment concerns arise for psychiatrists and the other specialists who deal with psychiatric patients infected with COVID-19 or with patients with COVID-19 infection that may develop a number of psychiatric symptoms [32]. The most pressing question for doctors on the front-line of anti-COVID-19 is how to choose the appropriate psychotropic drug in combination with the recommended or proposed medicines, which include antiviral, antiretrovirals, antimalarials and drugs for the treatment of rheumatoid arthritis [33]. The combination of anti-COVID-19 and psychotropic drugs should be considered in the context of potential drug interactions. Most antipsychotic and antiviral drugs utilize cytochrome P450 enzymes for their metabolism. Monoclonal antibodies used for rheumatoid arthritis (i.e., tocilizumab) indirectly increase cytochrome P450 (CYP) enzymes levels through the lowering of IL-6 levels [34]. Special caution should be taken with benzodiazepines as most of them are substrates of various CYP enzymes. In this context, antidepressants, antipsychotic, benzodiazepines and anticonvulsants having minimal P450 interactions should be preferred (i.e., citalopram, escitalopram, olanzapine, lorazepam, valproate) [32]. Regarding other substances such as tobacco, drugs for treatment of alcoholism, it would be expected that some interactions may occur, as they are metabolized by several CYP enzymes [32,34]. Furthermore, it must be paid attention to the drug-induced QT prolongation or the lowering of seizure threshold due to chloroquine and hydroxychloroquine [34].

As it has been pointed out, challenges to address from a psychiatric perspective are far-reaching. In the following sections we will summarize the current evidence on how mental health outcomes of COVID-19 pandemic have been measured and managed.

How to measure the mental health outcomes of the COVID-19 pandemic

From January until now, dozens of studies have been published on the psychological impact of the COVID-19 outbreak and others are still on-going. Given the measure recommending to minimize face-to-face interaction, the usual conduction of surveys with paper questionnaires has been not possible. Hence, researchers designed online surveys, through which data were electronically collected. These studies [9-22] leveraged online openly accessible platforms to invite people to complete questionnaires or used mobile phone app-based questionnaires or phone interviews. Another study [35] used the sampling and analysis of the Weibo (i.e., Chinese social network) posts from active Weibo users, through the approach of Online Ecological Recognition (OER). Convenience and snowball sampling strategy were used. In spite of the inherent limitations of online surveys, the present restrictive measures would have not allowed the enrollment of large samples in specific sampling timeframe as pandemic peaks. The main weaknesses of these studies included information and selection bias. It is possible the surveys did not reach underdeveloped areas due to limited technology availability and omitted people who are not comfortable using technology and the Internet, or who are not on social networks. Anyway, it is likely that these uncommon times will legitimize this research methodology. Preliminary findings call for future research having to overcome multiple methodological obstacles in order to reach useful results.

Most studies focusing on mental health outcomes of COVID-19 pandemic have used self-report question-

naires [9-22]. Anxiety, depression, post-traumatic stress symptoms, and insomnia have been the most often explored psychopathological states [9-22]. Among questionnaires, some were well-known, standardized and validated instruments, whereas others were Chinese tools or "ad hoc" designed measures, thus limiting the generalizability of results. We report below the more often administered questionnaires in current published researches, and besides, three new assessment tools proposed for psychological outcomes related to COVID-19.

Measure for anxiety: Generalized Anxiety Disorder Questionnaire

The 7-item Generalized Anxiety Disorder Scale (GAD-7) is one of the most widely used instruments for the detection and screening of anxiety disorders. It is a self-report questionnaire rated on a 4-point Likert scale, ranging from 0 to 21. The total score is generally interpreted as follows: normal (0-4), mild anxiety (5-9), moderate anxiety (10-14), and severe anxiety (15-21) [36].

Measure for depression: Patient Health Questionnaire

The 9-item Patient Health Questionnaire (PHQ-9) is a self-report measure for the screening, diagnosis, monitoring and measurement of severity of depression. PHQ-9 comprises nine depressive symptoms, rated on a 4-point Likert scale, ranging from 0 to 27. The total score is generally categorized as follows: minimal/no depression (0-4), mild depression (5-9), moderate depression (10-14), or severe depression (15-21) [37].

Measure for stress and post-traumatic stress symptoms: Impact of Event Scale – Revised (IES-R)

The Impact of Event Scale – revised is a 22-item self-report questionnaire used to assess the extent of traumatic stress including trauma-related distressing memories and persistent negative emotions resulting from a traumatic event. It is rated on a 5-point Likert scale, ranging from 0 to 88. The total score is categorized as follows: subclinical distress (0-8), mild distress (9-25), moderate distress (26-43), and severe distress (44-88) [38].

Measure for insomnia: Insomnia Severity Index

The Insomnia Severity Index (ISI) is a 7-item self-report questionnaire assessing the nature, severity and impact of insomnia, rated on a 5-point Likert scale, ranging from 0 to 28. The total score is categorized as follows: no clinically significant insomnia (0-7); subthreshold insomnia (8-14); moderate clinical insomnia (15-21); severe clinical insomnia (22-28) [39].

The Fear of COVID-19 Scale (FCV-19S)

It is a 7-item scale developed to assess the fear of coronavirus. The items were constructed based on extensive review of existing scales on fears, expert evaluations, and participant interviews. The target population of the validation study was the general Iranian population (n = 717). It has shown good psychometric properties. It is rated on a 5-point Likert scale, ranging from 7 to 35. The higher is the score, the greater is the fear of COVID-19. The original authors suggest the FCV-19S as a reliable and valid measure of fear of COVID-19 among the general population [40].

Coronavirus Anxiety Scale (CAS)

It is a 5-item scale developed to identify cases of dysfunctional anxiety associated with the COVID-19 crisis. A pool of 20 candidate items was created based on the psychology of fear and anxiety literature, then factor analyses identified items related to distressing physical symptoms associated with coronavirus fear and anxiety. The target population of the validation study was of 775 adults with a heterogenous ethnicity. It has shown good psychometric properties. It is rated on a 5-point time anchored scale, ranging from 0 to 20. The higher is the score, the greater is the level of anxiety [41].

COVID-19 Peritraumatic Distress Index (CPDI)

It is a self-report questionnaire designed *ad hoc* to assess psychological distress during the COVID-19 pandemic. The CPDI measures the frequency of anxiety, depression, specific phobias, cognitive change, avoidance and compulsive behaviour, physical symptoms and loss of social functioning in the past week. Range is from 0 to 100. The total score is categorized as follows: mild to moderate distress (28-51), severe distress (≥ 52). The content validity of the CPDI was verified by psychiatrists from the Shanghai Mental Health Center. The Cronbach's alpha of CPDI is 0.95 ($p < 0.001$) in the original study [11].

How to manage the mental outcomes of the COVID-19 pandemic

The world was unprepared for facing a pandemic although health emergencies are part of human history; as a result, there were no universal protocols or guidelines for the most effective psychosocial support practices [42]. During the initial stage of COVID-19 outbreak, the National Health Commission of China has published several guideline documents focusing on notification of principles for emergency psychological crisis intervention and guidelines for psychological assistance hotlines [43]; subsequently, other reports on local mental health care strategies have been published [25,44-46]. Since previous evidence refers only to specific situations [47], more comprehensive emergency guidelines for such scenarios are needed.

Strategies against the negative impacts of this pandemic must include plans for addressing mental health issues for the public [26], the health-care professionals [48]

and the other vulnerable sub-populations, such as people with preexisting psychiatric conditions [49], patients affected by COVID-19 [5], pregnant women [50], older adults [51], children [52] and people in detention [53]. Public health surveillance during and after this pandemic must include plans for mental health surveillance to allow for an adequate response to the anticipated mental health issues [54].

Some general steps can be taken to face the inevitable mental health consequences of this pandemic: designing plans to contrast the loneliness and boredom due to social isolation, giving people as much information as possible and providing adequate supplies [6,55]. The institution of multidisciplinary mental health teams and the establishment of secure services for psychological counseling, with improved access for disadvantaged people, are also suggested [25]. Further, it is critical having in place mechanisms for surveillance, reporting, and intervention for suicide [56], and besides, for domestic violence and child abuse episodes that may increase because of forced cohabitation at home [55].

Particular efforts must be directed to vulnerable populations with the provision of targeted interventions. For example, health-care workers [48] 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. As regards people affected by COVID-19 [5], 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. Tele-counseling for pregnancy care and teletriage should be established for helping pregnant women during pregnancy, childbirth and postpartum [50]. The combination of online psychological intervention and face-to-face counselling should be widely adopted in psychiatric hospitals; crowded wards with shared dining and bathroom spaces should be reorganized into spaces where social distancing can be respected; the communication, for example through smartphones, between inpatients and their families should be facilitated to alleviate the stress and negative emotions caused by isolation and loneliness [49]. The use of online counselling tools to preserve continuity in provision of mental health care, the respect of preventive measures and the reorganization of spaces are suggested as well in detention facilities [53]. Regarding children, specific response to the mental distress should include pediatric health-care workers formal training and the use of rapid screening tools to facilitate the early identification of children's mental health problems. In addition, children's access to mental health services has to be improved and evidence-based guidelines to help mental health professionals and parents cope with pandemic-related mental health problems in children are requested [52]. Special attention should be paid to older adults who are at greater risk for death due to COVID-19. Family, and health policy makers should protect this population from contact with the pathogen, and provide social, emotional and practical support. Further, the elderly need help accessing online mental health services, using smartphones and adhering to clinical and psychiatric medication [51].

Practical suggestions for the public on how to organize time and manage physical and mental health, provided by mental health-care organizations and public health institutions [27-31], include: managing media consumption and accessing information which allow us to protect ourselves and our loved ones; doing daily exercise activities; setting up regular phone calls or video conferences with family, friends, and colleagues in order to bridge the gaps brought on by social distancing.

A new psychological crisis intervention model is developing worldwide given the recommendation to minimize face-to-face interaction: digital psychiatry (i.e., online mental health services) and virtualized treatment approaches via telemedicine have been widely adopted in China [57] and health-care planners worldwide are drawing from China's experiences [44-46,58-60]. Telemedicine is a method of providing health-care services through the use of innovative technologies; it consists of activities involving two-way, real time interactive communication between the patient and the physician or practitioner at distant sites [61]. It leverages video consultations, interactive apps with audio and video capabilities, telephone calls or email allowing for synchronous provider-to-provider encounters. Therefore, at a time when physical meetings are discouraged, online psychological counselling services is a valid option [60,62,63].

Digital psychiatry, that is the delivery of care via technology platforms, is proposed to address the lack of access to psychiatric services and includes artificial intelligence, telepsychiatry and an array of new technologies, like internet-based computer-aided mental health tools and services: for example, mental health education with communication programmes and psychological self-help intervention systems. These tools and means should be utilized as an important part of the whole package of measures to mitigate negative mental health effects of the global coronavirus pandemic [64].

Despite there are a number of recommendations and challenges to take into account in developing and implementing a digital health/telemedicine [65,66], there is evidence for the positive impact of digital devices in peoples' lives: younger patients not only are very com-

fortable with this modality, but also sometimes prefer it to in-person interventions [67-70]; therapeutic alliance is maintained [67-70]. Nevertheless, drawbacks of digital engagement and communication are reported and disparities in computer and highspeed internet access that must be addressed in the future [67]. Further, we must keep in mind that introducing telemedicine is a complex change that disrupts long established processes and routines. The implementation process is likely to be difficult and resource intensive [68]. For instance, in Italy, lack of the necessary hardware and technical resources in hospitals have limited the capabilities to deliver telemedicine, although all 20 regions had implemented national telemedicine guidelines as of 2018 [59,71].

Conclusions

Fear, anxiety, depression and post-traumatic stress were common psychological symptoms reported across global disasters, both natural and man-made ones [1,6,72]. Underlying reasons for these symptoms maybe include disruptions in daily routine due to restrictive measure, social isolation, job loss and worries for financial security, their loved ones' well-being, the treatment process, and information pertaining to the disease. Health-care workers, people with preexisting psychiatric conditions, pregnant women, older adults, children and people in detention are examples of vulnerable subpopulations at risk of further distress given their specific condition [48-53]. Therefore, in addition to efforts at various levels to prevent the spread of the disease, the psychological crisis intervention should be formally integrated into public health preparedness and emergency response plans, as well as part of the Government actions [25,26]; moreover, evidence-based recommendations for taking care of mental health and well-being should be made accessible and usable for the public. Strategies against psychological distress should consist of actions aimed at helping infected and quarantined patients, as well as interventions targeting the general population and the groups at higher risk of mental health impairment [25,26,57]. Telemedicine and digital psychiatry are the future of medicine in the context of global disasters and health emergency [69], but improvements are necessary [67,68].

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