

The cost of caring during recent epidemics: a rapid review of risk factors, psychological manifestations, and strategies for its treatment

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Abstract

Background. During epidemics, health care workers (HCWs) are particularly exposed to the risk of secondary trauma. If not effectively addressed, the consequences of such psychological distress can progress to more severe conditions.

Methods. A systematic search of several databases on the effect of SARS, MERS, and COVID-19 epidemics on the mental health of HCWs was performed according to both the Cochrane Handbook for Systematic Reviews of Interventions and the WHO Rapid Review Guide for Health Policy and Systems Research.

Results. The 77 reviewed studies highlighted that work organization and individual characteristics can add to mental health risk. Providing adequate training to prevent infection and prepare HCWs to handle the epidemic, strengthening team work to improve organization, and ensuring appropriate protective equipment is available can help prevent risk of psychiatric illness.

Conclusions. Monitoring and addressing through tailored interventions the mental health consequences of pandemics in HCWs is necessary.

Key words

- health care workers
- Coronavirus
- mental health
- epidemics
- prevalence

INTRODUCTION

On March 11, 2020, the WHO Director General declared that a “novel coronavirus (SARS-CoV-2) causing a severe acute respiratory syndrome called COVID-19 had reached pandemic diffusion from its initial outbreak in Wuhan, China, in December 2019 [1]”. Since the very first weeks of the pandemic it became apparent that health care workers (HCWs) were among the professional categories at the highest risk of acquiring the infection [2], reporting a disproportionately higher number of deaths than the general population, [3, 4] and these numbers are expected to dramatically increase [5].

In addition to the risk of acute illness, physical disability and death, HCWs are also particularly exposed

to stress and to situations of discomfort with limited possibilities of resolution, producing negative effects either on their wellbeing and mental health or on the quality of care provided to patients [6]. These phenomena can be described as compassion fatigue or compassion stress. A number of factors contribute to this profession-related psychological distress including: the real and perceived increased risk of infection; the voluntary or forced self-isolation from family members for fear of infecting them; the experience of stigmatization (HCWs seen as “plague spreaders”); the prolonged exposure to death and suffering (including the death of colleagues and family members); the experience of being often the only caregiver of dying patients due to isolation policies; feelings of helplessness in treating a

disease for which an effective cure has not been found [7], the need to make ethically challenging treatment choices due to limited resources available [8, 9], and at the same time concerns of being sued for malpractice by family members of deceased patients [10]. Moreover, during the COVID-19 pandemic, many doctors and nurses lacking specific training and experience have been diverted to wards managing infected patients, enduring an overwhelming workload, scarcity or absence of personal protection equipment (PPE), and overexposure to widespread of misinformation through social media platforms [11].

If untreated, psychological distress of HCWs can further progress to more severe psychiatric conditions including major depressive and post-traumatic stress disorder [6]. Prolonged absences from work, which can result from infection and obligatory quarantine, may also be a consequence of burn out [6], putting an increased strain on already overloaded HCWs. Ultimately, the health consequences of psychological distress experienced by HCWs during a pandemic, if not effectively addressed may put the entire health care system, already under-resourced, at risk of collapse [12].

The psychological consequences of epidemics on HCWs have been the object of several investigations over the course of the past several years: coronavirus epidemics, like those caused by SARS, MERS, and the ongoing COVID-19 pandemic, can be considered natural traumatic events that have been putting a great deal of burden on frontline workers, with both short and long term consequences for their mental health [13-20].

However, no systematic review, of which we are aware of, has been conducted so far on this topic.

Given the increased risk of psychological distress on frontline health care professionals involved at various degrees in the management of the COVID-19 pandemic, as well as during previous epidemics, the implementation of strategies to prevent, recognize, and treat mental health symptoms is needed [12, 21-23]. Hence, it is important to describe which actions have been already adopted during and after previous pandemic, and which one of these can be implemented now.

To this purpose, the present paper aims to review: 1) the HCWs psychological consequences of caring (risk factors for, psychological manifestations, prevalence of diagnosable mental disorders) during epidemics; and 2) strategies used for the prevention and treatment of these consequences.

METHODS

The methodology of the rapid review was guided by both the Cochrane Handbook for Systematic Reviews of Interventions [24] and the WHO Rapid Review Guide for Health Policy and Systems Research [25]. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement was utilized to report the results of this review [26]. The protocol of the review have been submitted to OSF Registries on May 7, 2020 [27].

A librarian with experience in systematic review methodology (MCF) developed a search strategy in consultation with the authors. The searches were trans-

lated between databases for proper controlled vocabulary terms and syntax.

On April 11, 2020, systematic searches were done in the following databases: MEDLINE (Ovid), APA Psycinfo (Ovid), and Global Health (Ovid). The search was updated on May 4, 2020. To maximize sensitivity, the formal search used a combination of controlled vocabulary terms and free-text terms to capture the concept of psychological distress during an epidemic/ecological disaster by HCWs. An additional search of the grey literature was done to find articles in preprint servers (biorxiv.org/medrxiv.org), publisher's websites, and examining reference lists of included studies. No date limit was applied. The search strategy can be found in *Appendix*.

Eligibility criteria

Inclusion criteria for this review were: papers had to report outcomes in health care workers (HCWs) with reference to one of the aims of this review: risk factors for, symptoms of, prevention and treatment of mental health consequences of caring during an epidemic. Papers have to be published in peer-reviewed journals, and be written in English or Italian.

Study selection

Two reviewers (MF, FK) independently screened titles, abstracts, and full-text of relevant studies that met predefined inclusion criteria. Any conflict was resolved through consultation with a third reviewer or through discussion.

Data collection process

Using a standardized Microsoft Excel form, four reviewers (MF, FK, FV, ET) extracted the data independently. Another reviewer (FS) independently checked the data for consistency and clarity.

RESULTS

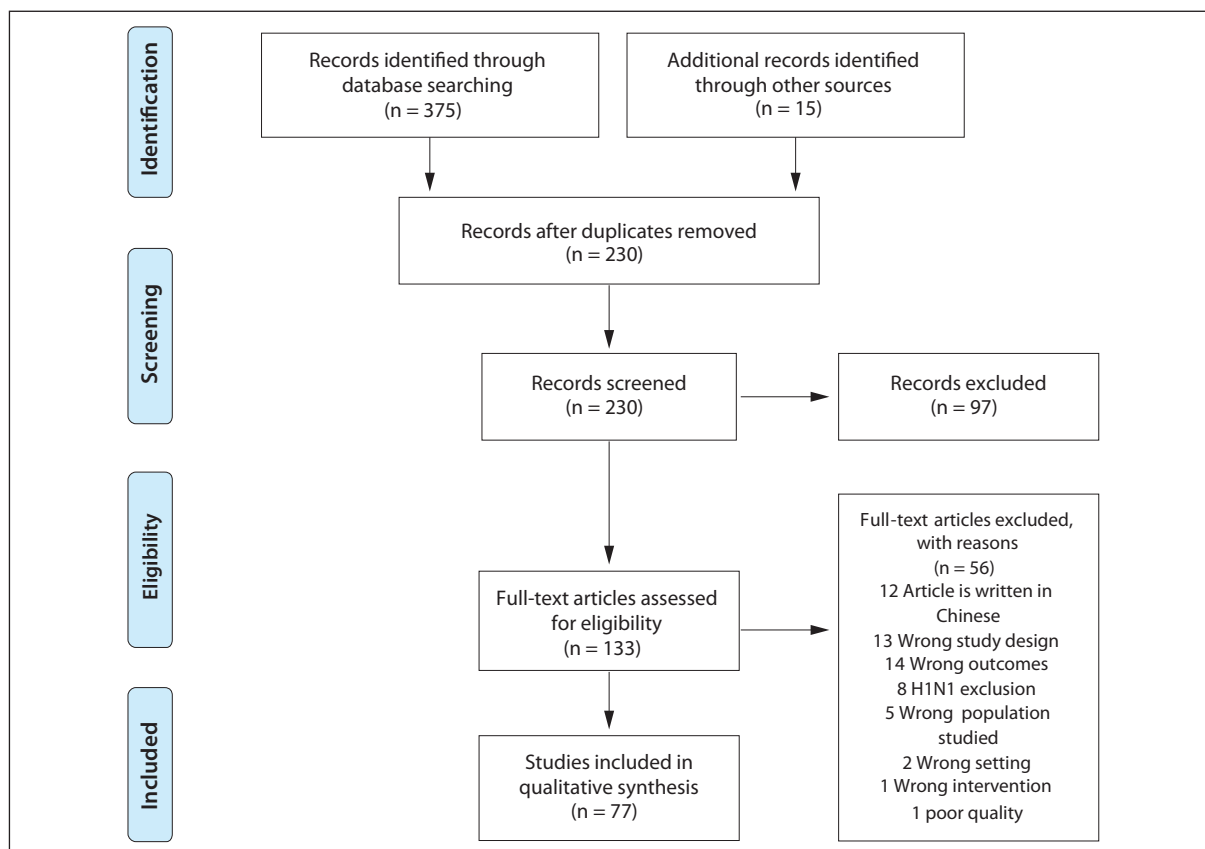
Characteristics of the included studies

The initial search yielded 375 studies, which were pooled in EndNote (endnote.com) and de-duplicated to 215. This set was uploaded to Covidence (covidence.org) for screening. An additional 15 articles were found outside of the database search.

There were 133 relevant studies for full text screening. Of those, 77 articles were selected for this review as they met eligibility criteria; only peer-reviewed articles were retained. Details of papers excluded at each screening stage is included in the *Figure 1*, and detailed in the *online Supplementary Material*.

Table 1 (available online as *Supplementary Material*) shows a summary of the 77 studies included in this review: 71 were original papers, 52 of which had a cross-sectional design, and six were reviews. Most papers focused on the SARS epidemic (n=49), while the remaining studies focused on MERS (n=5), and COVID-19 (n=23). All studies were published during the past 17 years, across eleven countries.

Despite the great variability in the methods and the format of the studies examined, all papers were included in the discussion, and limitations were acknowl-

**Figure 1**

PRISMA 2009 Flowchart of the screening process of the articles included in the review.

Adapted from: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(7): e1000097. doi: 10.1371/journal.pmed1000097

edged. Here we summarize the findings according to the aims of this review: 1) the HCWs psychological consequences of caring (risk factors for, psychological manifestations, prevalence of diagnosable mental disorders) during epidemics; and 2) strategies used for the prevention and treatment of these consequences.

Risk factors for psychological symptoms

In total, 46 papers identified risk factors for psychological distress during epidemics (*Table 1a, Supplementary Material*).

HCWs suffer higher levels of distress compared to non-HCWs [28]. HCWs working during a pandemic carry the burden of fears of contagion and of infecting others [29], feelings of frustration due to the uncertainty in walking an uncharted (medical) territory, and feeling lonely as a result of forced physical isolation [28].

Compared to the non-clinical personnel, HCWs that worked in high risk departments treating respiratory infectious diseases were twice more likely to suffer from depression and anxiety [28]. Chen *et al.* pointed out that resuscitation maneuvers that can put HCWs at higher risk of contracting infection were associated with greater distress [30] among nurses during the peak of the SARS outbreak. Shifts with longer working hours [29, 31, 32], being a frontline worker [33, 34], and contact with SARS patients were correlated with ei-

ther more anxiety, depression, and post traumatic stress disorder (PTSD) [34, 35], somatic anxiety [36], with emotional exhaustion [37, 38], state anger [38], and the onset of new psychological symptoms [39]. Many reported that, within health care roles, being a nurse put the subject at higher risk of developing psychological symptoms, compared to other health care professionals [13, 18, 40-45]. However, having an intermediate technical title seems to carry a risk for psychological distress as well [31]. General practitioners involved in the care of SARS patients also showed higher psychiatric comorbidity than traditional Chinese medicine doctors; this higher prevalence was correlated with post event trauma and stigma [46].

The lack of preparedness of the team to face the epidemic, both in terms of skills as well as provision of adequate PPE, was a common risk factor. Chen *et al.* highlighted that, for emergency department staff, changes in care pathways, working in high risk units, and inadequate PPE were risk factors for higher levels of stress during SARS outbreak [47]. Isolation, high work intensity and pressure, witnessing mortality, wearing protective clothing every day, and handling hazardous materials triggered anxiety and sleep disturbances [48]. The shortage of PPE was one of the factors mostly correlated with feelings of worrisome, pressure, frustration [28], and burnout [49].

HCWs reported stress mostly being related to feelings of uncertainty, inadequate staffing and PPE, and fears of nosocomial spread [42]. Moreover, tension between team members interfered with team work [42]. Working in adverse workplace environments, holding numerous responsibilities, lacking proper support and feedback from supervisors were associated with lower adherence with infection control measures by HCWs [50]. Part-time employment status was associated with loss of sleep, loss of self-confidence, inability to make decisions [44].

Training and years of health care experience were inversely associated with developing a new psychiatric disorder [51]. Younger age was, in fact, associated with higher prevalence of anxiety, depression, PTSD, and sleep disturbances [2, 52]; it was also a risk factor for stress symptoms [45]. Younger age was also associated with post traumatic morbidity [53].

Being forced into quarantine was recognized as a risk factor for more severe psychological outcomes, such as depressive symptoms [54, 55], PTSD [2, 21, 54, 56, 57], insomnia [18, 58], emotional exhaustion [18, 58], anger [17, 37, 38], avoidance behavior [37], sleep disturbances [17], anxiety [55]. Social isolation, typical of quarantine measures, has been identified as a risk factor for anxiety [13] and sleep disturbances [48].

Being infected was associated with depressed mood, fear of social contact, and fatigue in 20% of patients (of whom 30% were HCWs) [59].

Social factors also contributed to poor psychological adjustment: specifically, being a woman [31, 60, 61], having children [13], being the only child who can support parents in need [62]. Marital status has been reported to play a role as well: a study reported that being single as compared to be married increased the risk for experiencing psychiatric symptoms [63], however it has also been reported that being married compared to be not married was associated to worst psychological adjustment [41, 53]. Living in rural areas was a risk factor for insomnia, symptoms of anxiety, obsessive compulsive disorder, and depression [64].

Premorbid psychological traits, such as neuroticism, and attachment features were identified as contributors to a higher severity of somatic symptoms [28, 65]. Pre-outbreak traumatic experiences were predictive of post-outbreak level of depressive symptoms. In Toronto, stress mostly manifested in HCWs in the forms of maladaptive coping behaviors, such as self-blame, hostile confrontation, and avoidance [20]. Past history of a mental health disorder was a risk factor for developing a new psychiatric illness [51]. More specifically, a past history of mood disorder [52], and current depressive affect were risk factors for PTSD [34].

Post traumatic morbidity was associated with less humor, less venting, and less acceptance [53]. Finally, having a physical illness contributed to increase the risk for developing different psychiatric symptoms [21].

Prevalence of psychiatric symptoms and diagnoses

Twenty-three studies in total reported the results of administering structured diagnostic instruments for various psychiatric disorders in the HCW population

(Table 1b, Supplementary Material). During the SARS outbreak, Sim *et al.*, reported that, out of 277 respondents (91 doctors and 186 nurses), 20.6% of physicians in primary care settings displayed psychiatric morbidity [53], a proportion similar to that observed by Tham *et al.* in the emergency departments (18.8%) [66]. The incidence of any psychiatric disorder can be as high as 5% among HCWs, even up to two years after an epidemic, as outlined by Lancee *et al.* [51]. Kang *et al.* [67], interestingly, grouped the results of a survey administered to 998 HCW in four progressive level of severity of mental health disturbances (which included rated scores for anxiety, depression, impact of stressful life events, insomnia): 36% had subthreshold symptoms, 34% mild, 22.4% moderate, and 6.2% severe.

Trauma-related diagnoses

The majority of the studies focused on trauma-related diagnoses. Acute stress trauma was present in 5% of HCWs during SARS outbreak, and it was mostly related to the quarantine [58]. During the peak of the SARS epidemic, 11% of nurses, more frequently those who worked in high-risk units, surveyed in Taiwan had a stress reaction syndrome which can include anxiety, depression, and somatization [30], lower than the 17.7% of the 124 emergency department HCWs in Singapore who had post-event stress (more frequent in nurses vs physicians) [66].

PTSD diagnosis was investigated in 13 studies. Sim *et al.* reported that 9.4% of HCWs within a primary health care setting (doctors and nurses) had post traumatic morbidity [53]. The score for likelihood of PTSD was higher in clinical staff compared to non-clinical staff, in a study conducted by Son *et al.* during MERS [35]. PTSD diagnosis was present in 33% of HCWs in the SARS units [52]. According to Jung *et al.*, the majority of the nurses experienced PTSD, half of them with the full level of symptoms [68]. The SARS outbreak was traumatic for the vast majority of medical staff, according to Lin *et al.* [32], with emergency department HCWs suffering more severe symptoms of PTSD when compared to the staff from the psychiatric ward [32]. 7.7% among 470 HCWs surveyed (76.8% were either physicians, nurses, or allied health care professionals) expressed clinical concern of PTSD [22], with higher trauma scores observed in non-medical health care workers in Singapore [22].

During the SARS outbreak, HCWs in high-risk wards showed elevated levels of stress similar to those suffered by HCW from low-risk units. However, one year later, high-risk HCWs not only had higher stress levels compared to those at low-risk, but their distress was associated with higher rates of anxiety, depression, and PTSD symptoms [33].

Four studies showed that HCWs have a high risk to suffer from chronic levels of PTSD: in Canada, the incidence of PTSD was still 2% up to two years after the SARS epidemic [51]. One year after the SARS outbreak, HCWs at high risk reported chronic stress [33]. In the three years following SARS outbreak, high levels of PTSD symptoms were reported by about 10% among 549 HCWs [2]; three years later, high levels of

PTSD symptoms persisted in 22 of them (about 40%), especially in those with low household income or those being single [2]. Two months post SARS outbreak, approximately 20% among 661 participants (113 doctors, 548 nurses) presented PTSD symptoms [63].

Psychosomatic and sleep disorders

Psychosomatic disorders appeared to be common in HCWs during epidemics. Cao *et al.* reported 6/37 doctors and 11/19 nurses complained of mild body discomfort in the absence of COVID-19 infection in fever clinics [69]. Somatization was more prevalent in HCWs compared to non-HCWs, according to Zhang [64]. High-risk HCWs reported a large number of physical and psychological complaints; moreover they expressed worries about fears of contagion during social contact, despite having confidence in measures to control the spread of the infection [33]. Less-specific signs of stress were reported by Tam *et al.* [45], and Phua *et al.* [70].

Insomnia was present in 38.4% of 927 medical HCWs during the COVID-19 outbreak [64], and it was higher in SARS nurses than in non-SARS nurses (37% vs 9.7%) [52].

Depressive symptoms

Depression had higher prevalence in nurses working with SARS patients vs nurses caring for non-SARS (38.5% vs 6.7%, respectively) [52]. During the COVID outbreak, Tan *et al.* found that 8.9% of 470 HCWs screened positive for depression [22]. Rates and severity of depression vary according to profession and risk: depression was more frequent in medical HCWs vs non-medical (12.2% vs 9.5%) [64]. During the COVID epidemic in Fujian provincial Hospital, Lu *et al.* found that mild to moderate depression was present in 11.8% of medical staff, and severe depression in 0.3%: the severity of depression was more pronounced than in non-clinical staff, particularly in HCWs from high risk units [71]. One to two years after the the SARS epidemic in Canada, the incidence of new episodes of major depression among active HCWs was still 4% [51].

Anxiety and obsessive compulsive symptoms

Symptoms of anxiety frequently feature among the psychological consequences of epidemics on HCWs. Anxiety was reported as being higher in medical HCWs compared to non-medical HCWs (13.5 % vs 8.5%) by Zhang *et al.* [64]. However, Tan *et al.* found that the prevalence of anxiety was higher among non-medical HCWs than medical personnel [22]. Lu *et al.* [28] found higher levels of anxiety in medical staff, compared to administrative staff; within medical staff, 22.6% reported mild to moderate and 2.9% severe anxiety. According to Poon, staff who had exposed to SARS patients suffered higher level of anxiety as compared to those who had not been exposed [29]. Anxiety scores correlated with the discomfort from the use of PPE [29], and with burnout scores regardless of contact with SARS patients or role as front-line worker.

Only one study reported obsessive compulsive disorder symptoms which were present in 5.3% of medical HCW surveyed vs 2.2% of non-medical HCW [64],

however the assessment of premorbid condition was not performed.

Lastly, but not for importance, the prevalence of burnout was reported higher for nurses working in the emergency department during MERS outbreak, than in those assigned to other departments [49].

Prevention strategies

Thirtyseven papers addressed this topic, but only seven studies reported on tested interventions aimed at preventing psychological distress in HCWs during or after an epidemic (*Table 1c, Supplementary Material*) [7, 19, 35, 38, 48, 72, 73].

Aiello described a resilience training developed after SARS. This intervention, directed at 1250 staff members, increased the confidence of participants in facing higher than usual demands; moreover, the feedback collected were used to tailor the actions implemented during the H1N1 outbreak. For example, the presence of senior staff was increased in order to oversee younger hospital members and to provide a stronger leadership. Immunization to HCWs family members was provided. Additional psychosocial support was offered. E-learning was also encouraged [72].

During the SARS outbreak in Taiwan, 116 nurses underwent an anxiety prevention program which include training, re-allocation of manpower resources, and the allocation of a mental health team. This program led to a reduction of anxiety after two weeks since its implementation, with a return to normal levels (pre-SARS) one month after the hospital returned to normal operations. Sleep quality also improved [73].

Maunder *et al.* reviewed approaches aimed at reducing HCWs distress by building resilience prior to the pandemic. The goal was to empower HCWs, especially nurses, by implementing organizational changes to reduce the caseload, and increase professionals' agency and autonomy [19]. Fiksenbaum *et al.* reported that levels of organizational support significantly reduced perceived SARS threat, emotional fatigue, and state anger in a sample of 333 nurses [38].

After the MERS outbreak, in South Korea a preventive program was addressed to 280 HCWs. It included strategies such as resilience-building programs, and debriefing sessions. HCWs benefit the most from interventions aimed at lowering perceived risk [35]. As already reported by Kim *et al.* during the MERS outbreak [49], Xiao *et al.* reported preventive social support measures implemented during the COVID-19 pandemic: these were helpful in reducing anxiety and stress levels, increased their self-efficacy but did not improve their sleep quality [48].

Finally, Ripp *et al.* describe the characteristics of an "Employee, Faculty, and Trainee Crisis Support Task Force" created in the Mount Sinai Health System early during the COVID-19 outbreak in New York City. This multidisciplinary team, composed of leaders from human resources, behavioral health and well-being from across the health system, employed a rapid needs assessment model in order to capture HCWs' worries and necessities. They focused the intervention in meeting basic needs (e.g. transportation, food, personal safe-

ty, childcare), communication (town halls, website, email), and psychosocial support (mindfulness, support groups, individual mental health services voluntary and offsite, 24/7 mental health crisis support, and mental health professionals deployed to units either virtually or in person) [7].

During COVID-19, Kang *et al.* [67] reported 36.3% of the HCWs in Wuhan had received psychological support materials, half of HCWs had accessed the psychological resources available online, but less than one in five had attended group counselling. Moreover, those who had the most severe presentation were also those who were less likely to request counselling directly from professionals.

As Shanafelt *et al.* pointed out [74], listening to the needs of HCWs directly can offer valuable guidance on how to tailor interventions and identify sources of anxiety. These keyworkers during listening sessions delineated leaders' roles during time of crisis: the leader should be able to understand the sources of concerns, recognize the manifestation of such worries, involve HCWs in the conversation about strategies to adopt, encourage HCWs to ask for help, legitimize the willingness to re-prioritize activities, and recognize HCWs efforts by expressing gratitude.

Interventions

Twelve papers, half of which were qualitative, provided insights regarding strategies to address the psychological consequences suffered by HCWs during an epidemic (Table 1d, Supplementary Material).

Maunder *et al.* identified that individual as well as systemic aspects mediate long-term adverse effects of epidemics. At the individual level, interventions, such as moral support and protection, mentorship or "buddying" programs, which reduce maladaptive coping, may decrease prolonged suffering. At the system level, provision of enhanced support training might reduce burnout and post-traumatic stress [20].

After the SARS epidemic, a qualitative analysis was conducted by Amaratunga *et al.* to describe key features and remaining gaps in hospital influenza emergency plans [75]. Employees had access to grief counseling (individual or group sessions), spiritual and psychological services, and counseling for PTSD. Web and telephone counseling were available for both affected individuals and their families. Workshops were specifically designed to assist workers and the workplace to resume optimal productivity. Actions included: 1) providing rest periods and relief to staff in all key positions, including management; 2) informing employees about their rights and obligations surrounding work refusal; and 3) instructions on how to apply for requests for redeployment. The qualitative analyses highlighted that the HCWs identified different areas that still needed tailored efforts: psychological support services, management responsibilities outline, immunizations planning, strategies to handle media, and professional development [75].

Three studies [16-18] focused on how to identify and manage psychosocial impacts of the SARS epidemic on HCWs. These studies proposed four distinct levels of strategies that included: i) training to HCWs to

gain confidence to perform under difficult conditions by engaging them in the overall planning [16, 18]; ii) managers as enablers of supportive relationships between HCWs [16, 18], and providers of up-to-date communications [17, 18], preparing employees on the consequence of the epidemic [17, 18], promoting psychological wellbeing [16, 18], providing educational intervention to manage fear [17, 18], and web base support for feeling less isolated [17, 18]; iii) addressing the immediate and longer term psychological needs of trauma-survivors [16]; iv) providing psychoeducation and signposting for insomnia anxiety and stress to every nursing unit involved in quarantine [17].

Seven articles reported actions taken early in the course of COVID-19 outbreak, such as 1) building a psychological intervention medical team to provide the medical team online courses on how to deal with patients' psychological difficulties [76]; 2) providing a psychological assistance hotline team, for supervision and problem solving advice, and group stress-release activities; 3) availability of a place where the staff could rest, and provision of food, and daily living supplies; 4) reinforce hospital security to manage non-compliant patients; 5) education activities to teach how to use PPE.

Huang *et al.* described all the activities put in place in Chinese hospitals during the COVID-19 outbreak: telephone and online counseling for frontline medical staff, early psychological support through strategies to reduce psychological stress, online consultation with psychiatrists; psychological training for the front-line medical staff (online, onsite, group); innovative psychological interventions through short videos, online games and self-help mental health handbooks; self-rated rating scales for medical staff with signposting according to results [77].

Jianget described advantages and limitations of a two-pronged (online and onsite) approach for psychological crisis intervention during COVID-19 in Shanghai [78]. Psychological care becomes an integral part of the comprehensive plan for the control of the epidemic: it is aimed to minimize the risk of infections among mental health providers and to reduce their exposure to trauma and stress. They identified four different degrees of at-risk populations in order to tailor treatment and set priorities: onsite services were offered to the two highest at risk populations (which includes front line staff regardless the severity of psychological distress), and 24/7 remote real time support to the others (which include the general public). Remote consultations minimized the risk of infection for health care professionals. However, they also reduced the ability to collect psychometric data and fully appreciate body language, integral parts of a full psychological and psychiatric assessment.

Kang provided a description of the multifaceted psychological interventions targeting medical workers in China during COVID-19 [79]. There were four psychological intervention teams in Wuhan: a) a front-door response team; b) a supervision team composed by senior psychologists; c) a specialist team (mainly psychiatrists) targeting health-care workers and patients; and d) volunteers covering a consultation hotline.

Ho *et al.*, in their commentary, outlined possible ar-

eas of intervention: such as online psychotherapy (CBT and Mindfulness-based therapy), psychoeducation for general population; peer support for HCWs [61].

Neto *et al.* further suggested the regional and national authorities should promote the establishment of mental health teams (with diversified professional profiles) dedicated to patients and HCWs [80]. The use of smartphones was encouraged to provide a clear communication channel and decrease isolation between HCWs and their family members. Clear communication with regular updates regarding the outbreak is useful to address HCWs sense of uncertainty. Safe psychological counseling service should be provided using electronic devices.

Greenberg *et al.* in their editorial outlined actionable items that healthcare managers need to design and implement to protect HCWs' mental health. These included the provision of training and safe forums to discuss the emotional toll of making morally challenging decisions. To deal with avoidance, staff should reach out to those who state they are too busy to have a conversation about their psychological difficulties. Trained peer supporters and a chaplain should be offered to professionals for mental health support. Single session debriefing approaches were discouraged in favor of meetings addressing moral injuries and what to look out in terms of psychological symptoms [12].

DISCUSSION

This rapid review covers three important areas of the psychological consequences of recent epidemics for HCWs, including the ongoing COVID-19 pandemic. It summarizes risk factors for HCWs psychological distress, common symptoms and diagnoses, and preventive strategies adopted in previous epidemics. It offers insights about possible actions that health care authorities and managers can adopt during or immediately after an epidemic.

Risk factors

Our review highlights that HCWs are at greater risk of developing psychiatric symptoms when compared to the general population. Both the type of work and its organizational factors, as well as personal factors can contribute to this risk. Nurses are especially affected, in particular those who work in high risk units in close contact with infected patients. A poorly organized structure where interpersonal relationships are inadequately managed and where practical support and protection, especially PPE, are lacking puts staff mental health at greater risk.

These findings need to be taken into account by health care managers and team leaders in targeting support and preventive initiatives. Care managers and team leaders should promote the planning, organization, and coordination of communication with and between professionals [81]. HCWs should receive clear, timely, and up-to-date communications on procedures and measures to be implemented in different contexts and their motivations. Workplace and time allocation should carefully organized by a clear assignment of roles and tasks, taking into consideration professional

skills and pre-existent health conditions. In addition, high level of cohesion and supportive climate between HCWs, moments of sharing between operative units, dissemination of the strategies and good practices, and recognition of the personal and professional contributions and efforts should be encouraged [81]. HCWs should also receive appropriate training to reduce the feeling of inadequacy, uncertainty, and lack of support by implementing distance trainings and technical reports. For example, training in communication with the patient's family members in the specific context of the pandemic emergency has become crucial.

Other risk factors include: having little work experience, a pre-existing chronic condition, having experienced trauma in the past, being a single woman, and having children.

HCWs should be provided of material support interventions such as provision of adequate PPE, the organization of places of recovery and rest in the context of work, support in the supply of necessities (e.g., food), the provision of dedicated housing to avoid return home or for the management of isolation, support in the management of children, and economic awards. Care managers and team leaders should promote HCWs' psychological well-being by disseminating individual support strategies (e.g., try to ensure a restful sleep, take a light and nutritious diet, practice physical activities, enjoy relaxing music, maintain contact with family even if remotely, avoid prolonged work overload, avoid overexposure to content and information through the media), and monitoring reactions related to discomfort (e.g., poor quality of sleep, poor or excessive appetite, fatigue, tension, and stress) [81, 82].

Prevalence of psychiatric diagnoses

Reviewed studies highlight a high prevalence of new psychiatric diagnoses in HCWs: as expected, PTSD, depression, anxiety and somatic disorders are the most common [83]. Two interesting findings are worth mentioning. First, during the outbreaks reviewed, the number of HCWs with PTSD symptoms can reach up to 57%. Second, the few studies with post-outbreak follow up show that this figure drops but remains still significant in the long term. These results both highlight the mental health price HCWs have to pay during the pandemic and underscore that symptoms, if left untreated, may become chronic. Long-term effects may affect HCWs performance, resulting in greater risks for patients and the system of care as a whole [84].

There is a need to better understand predictors of long-term mental health consequences among HCWs in pandemics. In the meanwhile, public oriented services, especially those whose mission is to provide care, should bear a trauma-informed focus in the organization of the daily clinical work. It can be useful to schedule meetings, also remotely, to allow HCWs to share their concerns and encourage support, with particular attention to those who have a history of mental health problems.

Preventive measures and interventions

Preventive interventions offered to HCWs before a pandemic outbreak need to address the following: pro-

viding adequate training to handle the epidemic and its specific professional demands, strengthening team work to improve organization and relationships, and ensuring appropriate PPE availability. During the pandemic, interventions should address several levels of needs: practical life needs (e.g. transportation, food, personal safety, childcare), communication needs (website, email), and treatment needs. These include psychosocial and mental health support such as mindfulness, support groups, individual mental health support, and offsite, 24/7 mental health crisis support, and mental health professionals deployed to affected units either virtually or in person. Key elements to support HCWs during an epidemic include organizational aspects of the work including the reduction of prolonged shift time and night shifts; ensuring adequate staffing by re-allocation and postponing of elective activities [85]; and enlisting retired personnel/military/government funded resources. Finally, team leaders should encourage and facilitate confidential screening for depression and suicidal ideation [86].

HCWs should be provided with psychological support interventions to prevent and treat stress-related conditions in the work environment and promote resilience. Psychiatric and psychopharmacological interventions should also be offered, when appropriate, within clinics dedicated to HCWs.

This review underscores the importance of mental health consequences of pandemics for HCWs, in the short and long term. The need for a centralized and coordinated control room [61] with mental health professionals and experts included in regional and national COVID-19 Task Forces to advise the government on mental health policies appears of paramount importance.

Strength of the review

A main strength of this rapid review is the ability to provide a timely update on a relevant global mental health issue, HCWs mental health during epidemics, combining available epidemiological data on previous and current strategies to address psychological consequences of the cost of caring for HCWs. Differently from previous similar studies, this review was registered on OSF, it adopted a comprehensive appraisal of available studies, a larger source of information (which included Global Health, preprint servers, publisher websites, and references of included studies) [87], with no date limit, guided by the contribution of an expert librarian.

Offering a full picture of risk factors, preventive measures, and intervention strategies, it suggests effective organizational and practical operational procedures and policies for countries that are in the early, mid, or late stages of a pandemic.

Limitation of the study

Many interventions, studies, and reviews of mental health impact on HCWs are certainly underway at the time of writing. Although broad criteria were used in searches, some papers might have been missed. However, the high number of studies included suggests that the search strategy was comprehensive.

CONCLUSION

Pandemics carry a significant risk to the mental health of HCWs. Timely, targeted and evidence-based actions are needed to avoid personal suffering and disability and to reduce services disruption, which has a cascade effect on society wellbeing as a whole.

This review underscores that psychological protection of HCWs is a key component of public health measures

APPENDIX

Ovid MEDLINE search strategy

Search line	Search string
1	mental disorders/ or anxiety disorders/ or obsessive-compulsive disorder/ or panic disorder/ or gambling/ or mood disorders/ or depressive disorder/ or affective disorders, psychotic/ or sleep wake disorders/ or somatoform disorders/ or hypochondriasis/ or neurasthenia/ or "trauma and stressor related disorders"/ or adjustment disorders/ or stress disorders, traumatic anxiety disorders/ or substance-related disorders/ or alcohol-related disorders/ or ("mental disease*" or "mental disorder*" or "mental health" or "mental illness*" or "mentally ill" or anxieties or anxiety or "obsessive compulsive" or panic or gambling or "eating disorder*" or mood disorder* or depress* or "affective disorder*" or psych* or "sleeping disorder*" or "sleep disorder*" or insomnia or "Somatic symptom disorder*" or "somatization disorder*" or "somatoform disorder*" or hypochondria* or neurasthenia or stress or traum* or adjustment disorder* or ptsd or "substance use").tw.
2	health personnel/ OR exp nurses/ OR exp physicians/ OR (clinician OR health care personnel OR healthcare personnel OR health care provider* OR healthcare provider* OR health care worker* OR healthcare worker* OR health personnel OR health provider* OR health care professional* OR healthcare professional* OR medical personnel OR medical professional* OR medical staff OR medical worker* OR medical workforce OR nurse* OR nursing assistant* OR paramedic* OR paramedical personnel OR physician*).tw
3	exp SARS Virus/ OR exp Middle East Respiratory Syndrome Coronavirus/ OR exp Influenza A Virus, H1N1 Subtype/ OR (H1N1 OR "Swine flu" OR "swine influenza" OR "Severe Acute Respiratory Syndrome" OR SARS OR "Middle East Respiratory Syndrome" OR MERS OR covid19 OR covid 19 OR nCoV OR CoV 2 OR CoV2 OR sarscov2 OR 2019nCoV OR novel coronavirus* OR new coronavirus OR 2019 novel CoV OR wuhan virus* OR "coronavirus 2019" or "2019 coronavirus" OR ((wuhan OR hubei OR huanan) and (coronavir* OR corona virus* OR betacoronavir* OR severe acute respiratory OR pneumonia*))).mp.
4	1 AND 2 AND 3

Note: The search was last updated on April 27, 2020.

to be addressed during an epidemic [31].

Given the recurrent nature of pandemics, involving more and more citizens due to globalization and easy mobility, more research is needed on how to better protect HCWs' mental health during the emerging scenario, to guide the implementation at national, regional, and local level of clear action plans, appropriately resourced and reviewed.

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Conflict of interest statement

Authors declare no conflicts of interests.

Funding

This work received no funding.

Received on 19 October 2020.

Accepted on 15 December 2020.

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