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A review of psychological and mental health impacts of COVID-19 pandemic on healthcare workers in China

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Abstract

The COVID-19 pandemic has put healthcare workers in an unprecedented situation, increasing their psychological and mental health distress. Much research has focused on the issues surrounding anxiety, depression and stress among healthcare workers. The consequences of mental health problems on healthcare workers' physical health, health-compromising behaviours, suicide ideation, family relationships, and job satisfaction during the COVID-19 pandemic are not well studied. Enhanced psychological stress has known effects on an individual's physical health. In healthcare workers with pre-existing comorbidities, psychological stressors may exacerbate their current health problems. Healthcare professionals are known to have a high risk of substance use, hence they may be at risk of the development of substance use addiction or vulnerable to addiction relapse. Frontline COVID-19 healthcare workers are being pushed above and beyond their limits, possibly resulting in suicidal tendencies. Furthermore, the burden of high workload and burnout may also have serious manifestations in relationships with family and an intention to quit their jobs. Future studies should explore the above-mentioned deleterious consequences to provide insight into the development of mental healthcare strategies to combat the psychological impact of COVID-19 on healthcare workers during the COVID-19 emergency. Is it imperative to employ strategies to care for and policies to protect the psychological well-being of healthcare workers.

Key words: Psychological, Mental health, COVID-19, Healthcare workers, China

Core tip: Much has been investigated surrounding the issue of anxiety, depression, and stress during the COVID-19 pandemic among the healthcare workers in China. Nonetheless, the consequences of psychological and mental distress on healthcare workers' physical health, general well-being, family relationships, job satisfaction, and anticipated turnover are not well studied. We herein discuss the multi-faceted consequences of psychological and mental health on healthcare workers in China during the COVID-19 pandemic. This review also highlights the important areas overlooked in research and mental health policies.

INTRODUCTION

The 2019 novel Coronavirus (COVID-19) infection was first reported in Wuhan, China in December 2019, and spread rapidly throughout China. Just three months later, the World Health Organisation (WHO) declared the spread of the novel coronavirus COVID-19 a pandemic. In a short one year, the COVID-19 pandemic has become a major global health crisis. While the pandemic is still a crisis in many countries worldwide, China has managed to control the pandemic rapidly and effectively in just over three months after its onset.[1] As of the end of December, 2020, China had confirmed 96,324 cases of COVID-19 and 4777 deaths, while there have been over 79.2 million cases and over 1.7 million deaths globally since the start of the pandemic.[2]

The COVID-19 pandemic is not only a threat to human life. Beyond the direct impacts of the virus, the mental health of the entire population is profoundly impacted. More importantly, the psychological and mental health of healthcare workers has been greatly challenged during this pandemic owing to their often extensive and close contact with COVID-19 patients in

healthcare settings. High rates of infections and deaths among the healthcare workers involved in the fight against COVID-19 are causing them to experience high levels of distress and fear.[3,4] Worldwide, COVID-19 has affected large numbers of frontline healthcare workers. As of April 8, 2020, the WHO estimated that over 20,000 health workers in 52 countries had contracted COVID-19.[5] In China, the outbreak has forced health professionals to work under extreme pressure and uncertainty, battling the novel coronavirus that is not fully understood and has claimed many lives. In a short intense three months of battle against the coronavirus, the outbreak has exerted significant negative psychological impacts on healthcare professionals, particularly frontline health workers. A study of over 72,000 patients with COVID-19 by the Chinese Centre for Disease Control and Prevention showed that around 3000 healthcare workers had become infected by February, accounting for 3.8% of all cases of COVID-19.[6] In addition to the fear of contagion during the early phase of the outbreak, healthcare workers in Wuhan also faced enormous pressure, including inadequate protection from contamination, work burden, isolation, witnessing patients suffering and dying, a lack of contact with their families, fear of transmitting the disease to families and loved ones, and exhaustion, which collectively contributed to serious mental health problems such as stress, anxiety, depressive symptoms, and insomnia.[4,7]

Since the onset of the pandemic, there have been many published studies on the mental health of healthcare workers in the COVID-19 pandemic in China and other countries impacted by the COVID-19 pandemic. There were also several systematic reviews and meta-analyses that synthesised the findings of all published studies. A systematic review and meta-analysis of 13 studies of mental health during the COVID-19 pandemic published up to 17 April, 2020, where 12 studies were from China and one from Singapore, reported a pooled prevalence of 23.2% for

anxiety, 22.8% for depression and 38.9% for insomnia.[8] An integrative review of the mental health of healthcare professionals in China during the new coronavirus pandemic found intense psychological experiences, traumatization, and various mental health disorders among healthcare workers, while also describing the importance of self-coping and psychological needs.[9] A recently published meta-analysis of 8 studies of frontline healthcare workers in China reported that the pooled prevalence of depression and anxiety was 31.5% and 23.7%, respectively,[10] which was relatively higher than the former.

Although much has been investigated surrounding the issue of psychological and mental health impacts of the COVID-19 pandemic, most of the current published literature and reviews have investigated the level of anxiety, depression, and stress. The negative consequences of psychological and mental impacts during the era of the COVID-19 pandemic remains a relatively neglected area of inquiry. Among these are physical health, health-compromising behaviours, such as substance use disorders, suicide attempts or suicidal ideation, the disruption of family relationships and the intention to leave jobs. To date, it has been over a year since COVID-19 first emerged in China. Many countries in the world are facing a resurgence of COVID-19 cases as the pandemic progresses. Healthcare workers in China may once again resume the COVID-19 battlefield and continue facing psychological distress. In light of the preceding discussion, this article discusses the multi-faceted consequences of psychological and mental health on healthcare workers in China during the COVID-19 pandemic.

Physical health

Recent research continues to demonstrate that poor mental health is related to adverse physical health.[11] Mounting evidence is showing associations between psychological distress and physical health such as hypertension and cardiovascular diseases.[12] Emerging evidence indicating that the COVID-19 pandemic has posed significant psychological stress on the community with emerging cardiovascular implications [13]. Recent reports showing the link between emotional pressure caused by COVID-19 and takotsubo cardiomyopathy presenting as acute heart failure [14]. Despite this, increasing trends in the prevalence of chronic diseases are not prominent. This could be due to a large delay in treatment-seeking during the pandemic [13]. Henceforth, public as well as healthcare workers with pre-existing cardiovascular comorbidities, psychological stressors may exacerbate their current health conditions. More importantly, a study in China showed that patients with hypertension were associated with severe outcomes from COVID-19. [15]Furthermore, there is also a significant association between the fatality rate in COVID-19 patients and cardiovascular metabolic diseases.[16] As in many developing countries, in China, hypertension remains a pervasive problem among Chinese adults. Results from the China Hypertension Survey, 2012–2015, stated that 23.2% (approximately 244.5 million) of the Chinese adult population ≥18 years of age had hypertension.[17] The high prevalence of cardiovascular risk factors was also reported among healthcare workers in China and is of growing concern. The prevalence of hypertension among nurses in China was reported to be close to 30%.[18] Although it is well established that stressful life events are a factor mediating the progression of chronic diseases such as cancer growth and development of metastases [19], as well as metabolic syndrome and type II diabetes mellitus [20], direct evidence linking to COVID-19 pandemic related stress has yet been reported. Considering that untreated psychological and mental health problems may cause severe physical health problems, it is of utmost importance to

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not downplay the psychological and mental health of healthcare workers with cardiovascular risk factors or chronic illnesses during their fight against COVID-19.

Thus, it is essential to build a work environment where there is some recognition of mental health as a dangerous risk factor to physical health, particularly during the current pandemic situation. Raising awareness of mental health as a dangerous risk factor to physical health is also important because mental health literacy may help an individual to cope, seek help, or self-advocate for health improvement.[21] Having a workplace mental health policy that looks into the well-being of healthcare staff with health issues or comorbidities is of paramount importance. Local evidence on the interlink of physical and mental health problems remains a crucial area of investigation in China.

Substance use disorders

The COVID-19 pandemic has serious implications for people with substance use disorders. Fear of contagion, uncertainty and anxiety, social distancing and isolation, loneliness and economic repercussions were among the factors that promote substance use during the pandemic[22]. Deaths from alcohol, drugs and suicide, collectively known as "deaths of despair", are receiving growing international attention.[23,34] According to the findings of a study from the Well Being Trust released in May 2020, an estimate of 75,000 "deaths of despair" associated with drug, alcohol, and suicide has been directly related to the COVID-19 pandemic.[25] Recently, it is estimated that the number of "deaths of despair" could double up to 150,000 due to the pandemic's slow recovery.[26] Stressful events have long been known to also cause increased substance use risk in healthcare workers.[27-29] An issue that is overlooked in the COVID-19

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pandemic crisis among healthcare workers is the reactive behaviour to negative impacts of disasters such as the development of addiction and addiction relapse vulnerability. There has been a report of an increase in substance use among people who have existing substance problems in China in the era of the COVID-19 pandemic.[30] Nevertheless, to date, relatively little has been reported in substance use among healthcare workers in China during the COVID-19 pandemic. Healthcare workers may similarly be vulnerable to substance use disorders during the COVID-19 pandemic. In a previous report, PTSD and alcohol abuse or dependence symptoms 3 years post Beijing's 2003 SARS outbreak were prevalent among hospital employees who lived through the outbreak.[31] Substance use prevention and cessation support should be provided in healthcare settings. Increase substance abuse during the COVID-19 pandemic among people without substance abuse history have not been reported and warrant further observation. Despite this, psychological intervention and advice for preventing substance use during COVID-19 pandemic should be disseminated to the public at large and specifically targeted at people with a history of substance abuse. Given the amount of intensified psychological and mental issues facing medical care workers during the pandemic, understanding the extent and nature of healthcare workers' substance use disorders is essential for appropriate psychosocial management and successful treatment. However, the stigma associated with substance use disorders covers the entire trajectory of diagnosis, prevention, treatment, and recovery; hence, this is a major obstacle for healthcare-providers seeking diagnosis and treatment. There is a need to sensitise the public and healthcare organisations about addiction-related issues among healthcare workers during this pandemic. Family members' awareness and involvement in the treatment of substance use disorders are imperative.[32] Health systems should also facilitate

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access to substance use disorder treatment for healthcare workers, particularly those with pre-existing psychiatric conditions.

Suicide attempts and suicidal ideation

Suicide is a worldwide phenomenon and studies have shown that suicide deaths are related to mental health disorders. There is growing concern that multiple lines of evidence point towards the increase in the rates of suicide attempts and completed suicides during the COVID-19 pandemic.[33-36] The profound pandemic related psychological impacts associated with prolonged social isolation, loneliness, fear of COVID-19 infection, uncertainty, occupational deprivation and economic difficulties lead to the development or exacerbation of depression, anxiety and ultimately aggravate vulnerability to suicidal thoughts and behaviours.[35] Vulnerable populations for the exacerbation of psychological or mental-related disorders and suicidal thoughts include individuals with pre-existing psychiatric disorders, less resilient people, those living in high COVID-19 prevalence areas and people who have lost loved ones to COVID-19.[37,38] People in the medical-related profession have also been known to have a high prevalence of suicide attempts and suicidal ideation.[39] It was noted that the COVID-19 pandemic has increased the risk of suicide among healthcare workers due to the increased psychological distress, including witnessing COVID-19 patients' deaths, a lack of feelings of control, personal blame for the inability to do more for patients, and increased working hours.[40] Suicide cases among healthcare workers have been reported across many countries including the U.S, England, Italy, Mexico, and India.[41-43]

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In China, relatively little has been reported on suicidal ideation or suicide attempts among the healthcare workers in Wuhan, the epicentre of the coronavirus outbreak, despite high level of psychological and mental disorders during the early phase of the outbreak. China has promptly launched a psychological intervention and mental health support system to cope with the widespread psychological stress during the COVID-19 pandemic.[44,45] Psychological assistance hotlines providing online psychological counselling services have been established by mental health professionals in medical institutions, universities, and academic societies throughout all provinces and regions in mainland China, which provide free 24-hour services were widely made available to the public and healthcare workers. The online psychological self-help intervention systems include online cognitive behavioural therapy for depression, anxiety, and insomnia.[46] Of note, the current literature is lacking on suicide attempts or suicidal ideation in healthcare workers in China. It is unclear whether the lack of evidence is due to under-reporting or under-diagnosis. It is well known that despite the high rates of depressive and anxiety disorders among physicians, dealing with suicide is challenging as stigma and embarrassment prevent a large number of them from seeking care for mental health diagnosis and treatment.[47]

Although the COVID-19 pandemic is largely under control in China now, posttraumatic stress disorder (PSTD) in the aftermath of the COVID-19 pandemic is an issue that should not be overlooked. The impact on mental health can be long lasting for large scale crisis events like the COVID-19 pandemic.[48] The distressing events of the past three months, particularly among the frontline healthcare workers providing care to patients with COVID-19, witnessing the pandemic's massive death and trauma, could lead to long-term mental health problems. A study reported that a total of 3.8% of 377 healthcare workers in China reported PTSD a month after the

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outbreak and those with PTSD had a significantly higher probability of experiencing poor sleep quality.[49] Another study of 863 medical care workers from seven provinces in China reported that 40.2% were positive for PTSD.[50] PTSD is known to be a risk factor for suicide and was found to account for 0.6% of suicides in men and 3.5% in women.[51] The psychological sequelae of the pandemic will probably persist for months and years to come and suicide is probably going to become an even more significant concern as the pandemic unfolds. [36] Suicide prevention research emphasises building meaningful social connections and interventions to decrease burdensomeness among healthcare workers are urgently needed.

Family relationship and well-being

The coronavirus pandemic has profound negative emotional impacts affecting personal and family harmony worldwide. The fear and uncertainty associated with pandemics provide an enabling environment that may aggravate family conflicts or violence in a family or relationship.[52-54] Prolonged lockdown and long-term home isolation measures and the stress of the COVID-19 pandemic have aggravated family conflicts and strained relationships, leading to a variety of family problems, including family violence and divorce. In China, after the two-month lockdown, the number of cases of family violence and divorces surged in March.[55] It is unclear if the strain of life under lockdown has contributed to the increase in divorce rate as the unprecedented number of divorces could also be due to backlog in cases as the pandemic has forced offices to close for months. Little is known about whether the adverse psychological or mental health of healthcare workers during the COVID-19 pandemic has negative effects on their families or personal lives. It is well established that the high workload of healthcare

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workers has restricted their family life, leading to burnout and distress, which consequently have serious manifestations on family relationships and marital complications.[56,57]

More research is needed to assess the experience of family turbulence due to the COVID-19 pandemic among healthcare workers in China. Sudden changes in daily work lives during the pandemic and high exposure to psychological distress are situations that put healthcare providers at an increased risk of negative effects on family relationships. Policies should take into consideration the implications of the pandemic on the family members of healthcare providers. Current mental health services and interventions for healthcare providers should adopt a more holistic approach, including supportive care for their family members and loved ones.

Job satisfaction and turnover intention

As the pandemic progressed, evidence began to show a deterioration in the psychological and mental well-being of healthcare workers, resulting in decreased job satisfaction and triggering turnover intention.[58,59] In China, although the statistics of healthcare workers quitting their jobs during the COVID-19 pandemic are unknown, poor psychological well-being and heightened turnover intention were evident in healthcare workers fighting COVID-19 during the peak of the outbreak.[60,61] It is crucial for healthcare workers to feel satisfied with their jobs during the COVID-19 pandemic. Poor level job satisfaction among healthcare workers during the COVID-19 pandemic has been reported in several studies worldwide. Mean occupational satisfaction of 3.6 (score range 1-5) was reported during the COVID-19 pandemic among Israeli nurses [62]. Job satisfaction score of 2.8 (out of a possible score of 4) was reported in a large-scale study among healthcare workers in Italy [63]. Large-scale empirical study assessing the level of job satisfaction

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of healthcare workers in China is lacking. To date, two small-scale studies reported job satisfaction score of 32 (out of possible 48) [61] and 82 (out of possible 100) [64] in healthcare workers in China during the COVID-19 pandemic. Further large-scale studies are warranted to accurately determine the level of job satisfaction of healthcare workers in China in the era of the COVID-19 pandemic. The shortage of healthcare professionals in China is an issue that has long been at the forefront of the healthcare industry before the COVID-19 pandemic, and the COVID-19 pandemic has simply increased the demand for healthcare professionals in China, resulting in the heightened importance of preventing the loss of the medical workforce in the healthcare service.[65] It is important to identify specific psychological or work problems surrounding poor job satisfaction and turnover intention among healthcare workers to enable more accurate targeted interventions. The catastrophic toll on mental health, inadequate protection, and fear of safety, along with that of their families, may cause many healthcare workers to choose to step away from their jobs.[60] As the need for medical doctors continues to increase with the world facing the unprecedented global health threat of coronavirus infection, the government must do everything in its power to retain employees in the healthcare setting.

The summary of psychological and mental health impact of COVID-19 pandemic discussed is illustrated in Figure 1.

CONCLUSION

There is a need to recognise the adverse consequences of psychological and mental health problems on the well-being of healthcare workers. Poor psychological and mental health among healthcare workers is harmful not only to themselves, but also to their patients, families, organisations, and healthcare services. The public, healthcare organisations, and government authorities should be made aware of the manifestations of mental health among healthcare

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workers, their correlations and the fact that any strategies to manage them must encompass all levels of society. The lacunae in the existing literature on the consequences of psychological and mental problems on healthcare workers may need to be completed over time through further research. Psychiatry and psychological first aid should be considered broadly during a crisis such as the COVID-19 pandemic. Efforts to destigmatise help-seeking behaviour for psychological and mental health problems are warranted. A workplace mental health strategy and policy are essential for a healthy workplace environment during a pandemic crisis.

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Footnotes

Conflict-of-interest statement: Authors declare no conflict of interests for this article.

Figure legend

Figure 1 Summary of psychological and mental health impact of COVID-19 pandemic

Reviewer #1:
Scientific Quality: Grade C (Good)
Language Quality: Grade A (Priority publishing)
Conclusion: Major revision

删除的内容: <#>**Burki T**. China's successful control of COVID-19. *Lancet Infectious Diseases* 2020; **20**:1240-1241. DOI: https://doi.org/10.1016/S1473-3099(20)30830-6

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<#>**Kang LJ**, Li Y, Hu SH, Chen M, Yang C, Yang BX et.al. The ment...

Specific Comments to Authors: The authors reviewed current literature about psychological and mental health's impact on healthcare workers during COVID-19's pandemic. This topic is important. General opinion: The authors proposed many valuable opinions and research directions. These opinions are important but some of them may be a little difficult to be further investigated in China, I guess. Expanding this topic's readers to international may be better than merely focusing these issues in China. I notice there are international collaborations for this review.

Physical health: 1. The author states that "In healthcare workers ... exacerbate their current health conditions." This opinion is vague. It may be better to write it more clearly. For example, what type of stress exacerbates what type of disease? Also, add citations to support these.

Reply: In this specific paragraph, it is referring to cardiovascular morbidities, as indicated in the priory sentence. The sentence has been rephrased and added a citation to support the facts. Rephrased and added citation.

Line 107-112. [Please note the line number is referring to the tracked version]

Emerging evidence indicating that the COVID-19 pandemic has posed significant psychological stress on the community with emerging cardiovascular implications [13]. Recent reports showing the link between emotional pressure caused by COVID-19 and takotsubo cardiomyopathy presenting as acute heart failure [14]. Hence, in healthcare workers with pre-existing cardiovascular comorbidities, psychological stressors may exacerbate their current health conditions.

2. I only see hypertension discussed in this part. How about other chronic diseases? Does mental health exacerbate other chronic diseases?

Reply added other potential chronic diseases, however evidence is yet reported: Added line 120-124

Although it is well established that stressful life events are a factor mediating the progression of chronic diseases such as cancer growth and development of metastases [19], as well as metabolic syndrome and type II diabetes mellitus [20], direct evidence linking to COVID-19 pandemic related stress has yet been reported.

3. Again, lack detailed description on how mental health affects patients with chronic disease. Better providing statistics (e.g., RR?) from original paper.

Reply: We cite the information of mental health impact chronic diseases from reference [13], which did not provide statistics. Unfortunately to date, little evidence has report increased prevalence of chronic diseases associated with mental health impact of the Covid-19 pandemic. This could be due to delay in treatment-seeking during the pandemic and people avoid going to hospitals.

Added line 110-112

Despite this, increasing trends in the prevalence of chronic diseases are not prominent. This could be due to a large delay in treatment-seeking during the pandemic [13].

Substance use disorders 4. The readers may be confused about some opinions. For example, "Fear of contagion, uncertainty ... promote substance use during the pandemic." Whether this opinion from direct evidence or postulations? Also for "Like the general public ... during the pandemic."?

Reply, added reference [22] to the sentence. We remove “Like the general public” rephrased the sentence.

Line 155

Healthcare workers may similarly be vulnerable to substance use disorders during the COVID-19 pandemic.

5. Is substance abuse a problem for subjects without substance abuse history during pandemic? Please specify potential target populations for psychological intervention.

Added line 158-163

Substance use prevention and cessation support should be provided in healthcare settings. Increase substance abuse during the COVID-19 pandemic among people without substance abuse history have not been reported and warrant further observation. Despite this, psychological intervention and advice for preventing substance use during COVID-19 pandemic should be disseminated to the public at large and specifically targeted at people with a history of substance abuse.

Family relationship: 6. The reason for the surge of divorce? The service is not available during the peak period of pandemic, and therefore the cases accumulated.

Added line 231-234

It is unclear if the strain of life under lockdown has contributed to the increase in divorce rate as the unprecedented number of divorce could also be due to backlog in cases as the pandemic has forced offices to close for months.

Job satisfaction: 7. Can authors give statistics to describe how severe of job dissatisfaction during covid pandemic?

Added line 250-263

In China, although the statistics of healthcare workers quitting their jobs during the COVID-19 pandemic are unknown, poor psychological well-being and heightened turnover intention were evident in healthcare workers fighting COVID-19 during the peak of the outbreak.[60,61] It is crucial for healthcare workers to feel satisfied with their jobs during the COVID-19 pandemic. Poor level job satisfaction among healthcare workers during the COVID-19 pandemic have been

reported in several studies worldwide. Mean occupational satisfaction of 3.6 (score range 1-5) was reported during the COVID-19 pandemic among Israeli nurses [62]. Job satisfaction score of 2.8 (out of possible score of 4) was reported in a large-scale study among healthcare workers in Italy [63]. Large-scale empirical study assessing the level of job satisfaction of healthcare workers in China is lacking. To date, two small-scale studies reported job satisfaction score of 32 (out of possible 48) [61] and 82 (out of possible 100) [64] in healthcare workers in China during the COVID-19 pandemic. Further large-scale studies are warranted to accurately determine the level of job satisfaction of healthcare workers in China in the era of the COVID-19 pandemic.

(1) ***Science editor:*** 1 Scientific quality: The manuscript describes a review of the psychological and mental health impacts of COVID-19 pandemic on healthcare workers in China: implication for policy, practice and future research. The topic is within the scope of the WJP. (1) Classification: Grade C; (2) Summary of the Peer-Review Report: The authors reviewed current literature about psychological and mental health's impact on healthcare workers during COVID-19's pandemic. This topic is important. However, the questions raised by the reviewer should be answered; and (3) Format: There are no tables and figures. (4) References: A total of 58 references are cited, including 46 references published in the last 3 years; (5) Self-cited references: There are no self-cited references; and (6) References recommend: The authors have the right to refuse to cite improper references recommended by peer reviewer(s), especially the references published by the peer reviewer(s) themselves. If the authors found the peer reviewer(s) request the authors to cite improper references published by themselves, please send the peer reviewer's ID number to the editorialoffice@wjgnet.com. The Editorial Office will close and remove the peer reviewer from the F6Publishing system immediately. 2 Language evaluation: Classification: Grade A. 3 Academic norms and rules: No academic misconduct was found in the Bing search. 4 Supplementary comments: This is an invited manuscript. The study was supported by 2 grants. The topic has not previously been published in the WJP. 5 Issues raised: (1) The authors did not provide the approved grant application form(s). Please upload the approved grant application form(s) or funding agency copy of any approval document(s); (2) The authors should add some figures or tables. (3) PMID and DOI numbers are missing in the reference list. Please provide the PubMed numbers and DOI citation numbers to the reference list and list all authors of the references. Please revise throughout; and (4) The column should be minireviews. 6 Recommendation: Conditional acceptance.

Reply: We enclosed a copy of the approved grant

We also included a figure as suggested.

References have been formatted, and added Pubmed numbers and DOI citations. In some references only DOI citation numbers indicated as Pubmed numbers are not available.

(3) ***Company editor-in-chief:*** I have reviewed the Peer-Review Report, the full text of the manuscript, and the relevant ethics documents, all of which have met the basic publishing requirements of the World Journal of Psychiatry, and the manuscript is conditionally accepted. I have sent the manuscript to the author(s) for its revision according to the Peer-Review Report, Editorial Office's comments and the Criteria for Manuscript Revision by Authors. The title of the manuscript is too long and must be shortened to meet the requirement of the journal (Title:

The title should be no more than 18 words). Before final acceptance, the author(s) must add a table/figure to the manuscript.

Reply: Shorten the title “A review of psychological and mental health impacts of COVID-19 pandemic on healthcare workers in China”.

Added figure, we added line 275

The summary of thepsychological and mental health impact of COVID-19 pandemic discussed is illustrated in Figure 1.