Impact of COVID-19 Pandemic on Mental Health of Health Care Workers. A Systematic Review in Low-and Middle-Income Countries

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Abstract

Background: Coronavirus disease which is threatening the global world started in 2019. It has created a higher risk of infection and death to health workers due to excessive exposure to covid 19. This review aimed to find the mental health impacts of covid 19 among health care workers in low and middle-income countries.Method: Online databases EBSCOhost, PubMed, and Google Scholar were used to identify published articles evaluating the effects of the covid 19 on the mental health of health workers. The search was restricted to studies conducted from 01/01/2020 to 29/02/2021in the English language. All cross-sectional studies and observational studies were considered if they focused on the effects of covid 19 on the mental health of health care workers. This review was based on Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) followed by the flowchart. The quality of cross-sectional studies was done using a Quality assessment checklist for prevalence studies.

Index terms— covid 19. mental health, health care workers.

1 Introduction

OVID pandemic first originated in Wuhan, China and has spread domestic and internationally. This virus was also given name as Severe Acute Respiratory Syndrome Coronavirus (SARS COV-2). World health organization had declared the Coronavirus pandemic as a public health emergency. This virus has affected millions of lives and still poses a serious public health threat globally. By 1 June 2020, after 6

Author ?: e-mail: alisawithme@gmail.com months of the outbreak, the virus had spread to more than 198 countries with more than 6,040,609 confirmed cases and 370,657 deaths reported and was therefore considered a global pandemic. Corona-virus pandemic possessed an increasing demand for public health care workers (World Health Organization, 2020).

This pandemic had severely burdened and overwhelmed the health care systems including the health care workers (Armocida et al., 2020). The World Health Organization and governments across the world have laid stress on health care workers to prevent or minimize the risks and save the lives of the patients (WHO, 2020). Both the frontline and non-front line health care workers were at high risk of developing mental health consequences as they were directly involved in the treatment, care, diagnosis of the disease.

A study assessing 13 articles showed that Posttraumatic stress disorder, burnout, depression, and anxiety were the most common mental health problems associated with the health care workers' occupational activities during pandemics. Several reports indicated that the health care workers became infected with the COVID 19 pandemic when they were in close contact with the infected cases. As of reports, (Pappa et al., 2020) also revealed that as of March 2020, 29% of all hospitalized patients were health care workers. Health care workers are the vulnerable people for developing serious psychological consequences. Current studies showed that the growing number of suspected and confirmed cases, increasing death tolls, limited safety equipment and vaccines, overwhelming workload, feeling of inadequately supported, widespread media coverage etc. can lead to unwillingness to work, stress, anxiety which could have long term psychological implications on health care workers.

Likewise (Pappa et al., 2020) had evaluated thirteen research conducted on mental health of the health-care workers; they concluded that one in five health care workers experienced anxiety, depression and 2 out of 5 suffered from insomnia. Furthermore, **??**Vindegaard & Eriksen Benros, 2020) had assessed twenty studies which concluded that anxiety, depression, sleep problems were more prevalent in health care workers compared to the general population.

2   II.

3   Rationale

Till date, the literature on the mental health consequences regarding the impact of covid 19 on mental health care workers be easily found. However, there were no systematic reviews that have consistent results. Reviews that were done did not explain about what mental health problems are more common. The very few systematic reviews done before were not inclusive studies which focused on the impact on mental health of health workers working with people infected by COVID pandemic, and no review provided clear guidelines that might direct the leaders and practitioners on the planning of interventions. Furthermore, a consensus regarding the effects of COVID 19 pandemic on the psychological wellbeing of health care workers had not been reached yet.

To address this gap, systematic review was conducted to examine the evidence of the impact of COVID 19 outbreak pandemic on the psychological health of health care workers who worked in the hospital treating patients with covid. This study aimed to identify the evidence on the psychological impact of COVID 19 pandemic on the health care workers. Furthermore, the findings of the study could enable the leaders and practitioners to develop the interventions or recommendations to minimize the negative consequences in future.

4   III.

5   Methods

This review was based on Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) followed by the flowchart. Hence it is systematic review ethical consent was not required.

6   IV.

7   Eligibility Criteria

Inclusion criteria to consider studies followed the PICOS guidelines presented in Table 1.

8   Types of Studies

Cross sectional and observational studies were considered if the article were based on the physiological impact of covid 19 on health care workers. This study has excluded the duplicates of the same articles based on the same author and same countries. Studies conducted on the non-health care workers (General population) were excluded. Furthermore, articles that were irrelevant to the outcomes and only consisting of title and abstract were also excluded in this study.

9   VI. Data Source and Search Strategy

The online databases EBSCOhost, Google Scholar and PubMed were searched for literature.

Searches were limited to studies that were published in English language from 2019 to 2021. The search strategy was based on PICOS criteria which is provided in Annex I.

10   VII.

11   Study Selection

Articles selected according to the eligibility criteria were screened for inclusion in the review. After the selection, 901 duplicates were removed using Mendeley. Subsequently, titles and abstracts retrieved were assessed independently by two researchers (AT and KP) to identify articles that potentially met the eligibility criteria described previously. Any disagreement was discussed with the third researcher (SK) for final decisions. Afterwards, the full text of articles was retrieved and assessed by two independent researchers (AT and KP) and any disagreement was discussed with a third researcher (SK) for validation.

12   VIII.

13   Data Items and Extraction Process

Data from included studies were extracted independently by 2 researchers (MS and OO), using a Microsoft Excel spreadsheet. The spreadsheet included author, year of publication, journal or conference article, country, city, setting, study design, population details, sample size, age distribution, gender, measurement tools accessing

mental health outcomes, and severity of outcomes. The results include mental health disorders due to covid 19 pandemic.

14 IX. Risk of Bias in Individual Studies

Individual studies were assessed independently by 2 researchers (AT and KP) and the disagreements were discussed with the third researcher (SK). Any uncertainty about the level of bias of an individual study was discussed until consensus was reached.

To evaluate the quality of cross-sectional studies the evaluation was done using Quality assessment checklist for prevalence studies. (Hoy et al. 2012). The tool allowed researchers to evaluate the target population of close representation of national population, sampling frame, sampling methods, nonresponse bias, reliability and validity, data collection methods, exposure method, incomplete outcome and overall risk of study (Hoy, et al, 2012). The quality assessment for all individual studies is summarized in Annex II.

15 X.

16 Data-synthesis

Data were summarized narratively, and we have described exposure based on the information provided in the studies and also have tried to include data from figures, tables, charts from the included studies.

17 XI.

18 Results

19 a) Study selection

Altogether 2525 records were retrieved through database searching. 901 articles were removed and remaining 1624 articles were screened to identify whether title and abstract were relevant or not. After screening, only 23 articles were left for full text screening. Out of 23 articles, 9 articles were selected that met the potential eligibility criteria of the study. The detail of study selection is shown in the flowchart in figure 1. Eight studies were cross-sectional, and one was observational study. Out of 9 studies retrieved, four studies were conducted online through web -based surveys, 2 studies were conducted through structural self-reported questionnaires and 3 through structural questionnaires. All the surveys were hospital-based. The age of participants ranged between 20-50years. This paper included the population from low-and middleincome countries. The sample size ranged from 105-475 participants across studies. All papers were published journal articles between 2020 to 2021.

20 c) Prevalence outcomes of mental health disorder due to Covid-19 pandemic

Study findings are provided in Table 3. All nine studies reported prevalence data of mental health variables among health care workers represented as proportions or percentages. Two of these studies measured anxiety depression and stress symptoms, whereas three measured anxiety, depression, and insomnia, and four studies measured only anxiety and depression.

The first of these studies measured symptoms of anxiety, depression, insomnia among health care workers in Nepal during the first phase of pandemic (Khanal et al., 2020). A total of 475 Health care workers (HCWs) participated in the study through cross sectional web-based survey. The survey measured 41.9% of anxiety symptoms in health workers, whereas 37.5% had depression and 33.9% had insomnia like symptoms. 14item Hospital Anxiety and Depression Scale (HADS) was used for Anxiety and depression while the 7-item Insomnia Severity Index (ISI) was used for Measuring Insomnia. Nurses had reported higher levels of anxiety symptoms than other health care workers (data referred from table 3).

The second study measured moderate levels of depression, anxiety, and other stress symptoms among frontline health care workers in Vietnam during the peak of Covid-19 pandemic (Than et al., 2020). Among 173 health care worker participants, the frequency of depression, anxiety and stress symptoms were 20.2%, 33.5%, and 12.7%, respectively. However, 12.1% had major PTSD symptoms and 20.2% had sleeping disorders. The Depression, Anxiety, and Stress Scale -21 Items (DASS-21) was used to measure the perceived stress, anxiety, and depression symptoms. Impact of Event Scale -Revised (IES-R) and the Insomnia Severity Index (ISI) was used to assess the psychological distress and insomnia disorder (referred table 3).

The third study examined the correlation between religious coping, anxiety, and depression among health care workers during Covid-19 pandemic in Kuala Lumpur, Malaysia (Chow et al., 2021). In a total of 200 Health worker participants, the prevalence of anxiety and depression was 36.5% and 29.5%. Hospital Anxiety and Depression Scale (HADS) was used to assess anxiety and depression among the participants. The Brief Religious Coping Scale (Brief RCOPE M) was used to measure the significant association of positive and negative religious coping with anxiety and depression. The positive religious coping and improving negative religious coping through cognitive therapy, religious counselling was found effective in improving mental health of health care workers in pandemic (referred table 3).

The fourth study aimed to evaluate the anxiety and depression symptoms among health care givers in the early stage of Covid-19 pandemic in Lagos, Nigeria (Erinoso et al., 2020). A total of 105 participants enrolled in a cross sectional structural self-reported questionnaire-based survey. Around 9.5% reported with mild anxiety, 3.8% moderate, 1.9 % severe anxiety while 12.4% had mild depression, 0.9% moderate and 2.9% had severe depression symptoms. 9-item patient health care questionnaire (PHQ-9) was used to measure the level of depression and 6-item Generalized Anxiety Disorder (GAD-6) was used to measure the level of anxiety. Frontline health care workers who spent longer time working in Covid-19 related capacity had higher odds of moderate to severe depression symptoms as compared to those who spent less time (referred table 3).

The fifth study as per referred table 3, examined the mental health of physicians or health care staff by evaluating the prevalence and association of anxiety and depression like potential risk factors in Bangladesh during Covid-19 pandemic (Khatun et al., 2021). The prevalence of anxiety among male and female health workers were 27.6% and 42.1%, while the rate of depression on male and female health care workers were 26.3% and 50%. 7-item Generalized Anxiety Disorder (GAD-7) scale and Nine-item Patient Health Questionnaire (PHQ-9) were used to measure the anxiety and depression among 114 front line (HCWs) participants. The study examined that the marital status, job location, and workload per day were risk factors for anxiety, while age, sex and marital status were risk factor for depression.

The sixth study in table 3 (study findings) measured the anxiety, depression, and stress among 112 (health care professionals) participants during Covid-19 pandemic condition in Karachi, Pakistan (Sandesh et al., 2020). 72.3% had suffered from moderate to extremely severe depression, 85.7% had suffered from moderate to extremely severe anxiety and 90.1% had reported moderate to extreme stress levels. 21-item Depression Anxiety Scale (DASS-21) tool was used to measure the three negative emotional states which were anxiety, depression, and stress.

The seventh study examined the anxiety, depression, insomnia, and other psychological symptoms in health care workers (200) and non-health care workers (100) during lockdown or rapid spread of Covid-19 pandemic for complete duration of 3 months in India (Raj et al., 2020). The prevalence of anxiety was 55.65%, 48.54%, 52.34%, and 56% of physicians, nursing staff, technicians, and non-healthcare workers, while depression was reported from 32.1%, 53.72%, 42.7%, and 35% of the above-mentioned categories, respectively. The frequency of insomnia was 47%, 38.2%, 39.4%, and 43% and other psychological problems were found 43.51%, 41.9%, 28.3%, and 45% of the physicians, nurses, technical staff, and nonhealthcare professionals. Generalized Anxiety Disorder scale and structural questionnaire was used to assess the anxiety, depression, and insomnia among participants (referred table 3).

The eighth study examined the symptoms of depression, anxiety, and stress among health care workers during peak of Covid -19 pandemic in three states of Pakistan (Multan, Lahore, and Faisalabad) (Arshad et al., 2020). The frequency of Depression, Anxiety and Stress (DAS) in the health care worker participants (n=276) was 10.1%, 25.4%, and 7.3%, respectively. Females were more depressed than males (female vs male: 6.47 ±2.77 vs 4.66 ±3.40, p <0.001). Whereas in comparison to males, the anxiety symptoms were more common among female HCWs (female vs male: 5.60 ±3.14 vs 4.51 ±3.35, p <0.001). Depression, anxiety, and stress scale (DASS-21) was used to measure anxiety, depression, and stress symptoms among participants (data given in table 3).

Finally, the last study aimed to examine the anxiety and depression symptoms and associated risk factors among physicians during Covid-19 outbreak in Bangladesh. A total of 412 Bangladeshi physicians were enrolled for cross sectional web-based surveys. The prevalence of anxiety and depressive symptoms among physicians was 67.72% and 48.5% respectively. The outcome assessed through Hospital Anxiety and Depression Scale (HADS) and Covid-19 related questionnaires. The risk factors for high rate of anxiety and depression among participants were found fear of being infected, low income, heavy workload, inadequate training, use of self-funded PPE (Personal Protective Equipment) and shortage of staff (referred table 3).

21 d) Risk of bias in individual studies

Risk of bias assessment for the cross -sectional studies was assessed using a tool by (Hoy et al., 2012). The grading criteria of the overall risk of bias for crosssectional studies were based on the selection of population, sampling frame, randomization, nonresponse bias, data collection, case definition, reliability & validity, data collection mode and numerators & denominators. Out of nine studies eight studies had clearly specified population. And only one did not specify clearly about nonresponse bias. The sampling frame, settings and data collection, methods were described clearly. The prevalence and the outcomes were specified. Overall, the quality of the study was identified as low risk. The details are listed in table 4.

22 Discussion

This analysis of HCW mental health across low and middle-income countries shows two key findings. First, at least one form of mental health outcome was prevalent across the nine different studies. Secondly, anxiety and depression were the common forms of mental health prevalent in health workers.

Covid 19 pandemic has affected health care systems around the world and especially low and the middle -income countries. The health care workers are facing several challenges from treating patients with covid 19 to oneself becoming high risk of getting the Virus. Covid 19 has possessed a unique challenge in our health care workforce that will not only not interrupt their regular duties but also affect their mental health status.

The findings from our study indicates that the psychological impacts of covid 19 on the health professionals is considerable, with increased levels of anxiety, depression, insomnia and stress. Majority outcomes females than male health care workers. Studies highlighted by (Arshad et al., 2020) and (Khatun et al., 2021) at Pakistan and Bangladesh revealed that psychological disorders were more prevalent among female population. On our findings the anxiety and depression level of female is very high which was stated in 4 countries, Nepal, Bangladesh, Pakistan, Malaysia and Vietnam. This is similar to the study findings of (Zhang et al., 2020) which revealed that female suffering from anxiety symptoms were 2.5 times greater than their counterparts. Along with it the findings are also similar to the findings of the systematic study done by (Vizheh et al., 2020) on 'The mental health of healthcare workers in the COVID-19 pandemic' which, mentioned that female care worker and nurses have high depressive and anxiety symptoms than male workers. (Vizheh et al., 2020). (Khatun et al. 2021 andArshad et al. 2020), these two studies out of nine studies included in the paper, showed that older (more than 35 years) health care workers or physicians had lower risk of experiencing depression or anxiety than the young (less than 35 years) health care workers, which is supported by study in Taiwan for prevalence of psychological adaptation in health care workers during outbreak of SARS (Su et al., 2007). Moreover, similar results were reported by previous web based cross sectional study in China during Covid-19 pandemic, which shows that anxiety symptoms were more likely to occur in younger health care workers than over or 35 years health care workers (Huang et al., 2020). However, two other studies out of 9 studies reported that younger participants and who were more aware about government incentives for health care workers were less likely to stressed than older participants (41-50 years or over 50 years) (Khanal et al. 2020 andRaj et al. 2020). Because they were more stressed with extended working hours and highly worried about passing the infection to their family members, similar study was also conducted on health care workers to analysis the psychological impact and coping strategies during covid-19 in China (Cai et al., 2020). Therefore, the results suggested that need to implement stress management programs or interventions for both young and older health care workers in order to manage their stress.

23 XIII.

24 Strength and Limitations

PRISMA guidelines was used for analysis of the reports which was considered as the strength. In addition, the elaborated eligibility and search criteria, the total number of databases identified, and three independent reviewers to assess the validity and reliability of the report. Additionally, only cross-sectional studies were used for analysis which gives clear data presentation. Risk of bias assessment has very low score which makes this study a reliable one. However, our study is limited to investigating the impact of COVID 19 pandemic on the mental health of health workers in low and middle-income countries.

XIV.

25 Policy Implications

The findings from this research indicate that despite the strategies implemented by low and middleincome countries such as screening, handwashing and use of personal protective equipment there is still need of some strategies that mitigate or prevent the impact of COVID-19 pandemic on the mental health of health-care workers. The mental health of health care workers is neglected which can be improved by considering vulnerable health care workers. All health care workers should be undertaken risk assessment and if possible, they should be deployed to the non-care-based roles. This study guides the leaders and practitioners for the implementation of early intervention to mitigate loss of health care workers. Also, this might be helpful for guiding the future researchers.

XV.

26 Conclusion

This study found that frontline care workers are at high risk for developing mental health consequences during working in Covid-19 pandemic situation. We found that during providing care to Covid-

1

PICOS	Inclusion Criteria
Population	Health care workers
Exposure	Covid 19 pandemic
outcome	Mental Health Disorders
Setting	Lower middle-income countries
	Angola, Bangladesh, Kenya, Algeria, India, Honduras, Papua New Guinea, Philippines, Benin, Kiribati, Senegal, Bhutan, Kyrgyz Republic, Solomon Island, Bolivia, Lao PDR, Sri Lanka, Cabo Verde, Lesotho, Tanzania, Cambodia,

Mauritania, Cameroon, Timor Leste,

Micronesia, Fed. Sts. Tunisia, Comoros, Moldova, Ukraine, Congo, Rep. Mongolia, Uzbekistan, Côte d'Ivoire, Morocco, Vanuatu, Djibouti, Myanmar, Vietnam, Egypt, Arab Rep. Nepal, West Bank and Gaza, El Salvador, Nicaragua, Zambia, Eswatini, Nigeria, Zimbabwe, Ghana, Pakistan, São Tomé and Principe.

V.

Figure 1: Table 1 :

2

Year 2021

6

[Note: Note: we included either frontline or non-frontline health care worker]

Figure 2: Table 2 :

3

S. N	Year	Male/ female	Age Distribution	Scale used/ measurement tools
1	2025	Female:52.6% Male: 47.4%	28.20(±5.80) years	14-item Hospital Anxiety and Depression Scale (HADS) was used for Anxiety and depression while the 7-item Insomnia Severity Index (ISI) was used for Measuring Insomnia.
2	2025	Female:68.2% Male:31.8%	median age is 31	The Depression, Anxiety, and Stress Scale -21 Items (DASS-21) was used to measure the perceived stress, anxiety, and depression psychological distress and insomnia disorder.
3	2025	Male: (39.5%)	31-40:	HADS was used to assess anxiety and depression among the participants.

4

Hoy et al tool questions

1. Was the study's target population a close representation of the national population in relation to relevant variables (e.g age, sex, occupation)? 2. Was the sampling frame a true or close representation of the target population? 3. Was some form of random selection used to select the sample, OR was a census undertaken?

4. Was the likelihood of non-response bias minimal? 5. Were data collected directly from the subjects (as opposed to a proxy)?

6. Was an acceptable case definition used in the study? 7. Was the study instrument that measured the parameter of interest (e.g prevalence of low back pain) shown to have reliability and validity (if necessary)? 8. Was the same mode of data collection used for all subjects?

Figure 4: Table 4 :

19 patients care givers experienced high level of anxiety, stress, insomnia, and other mental health issues. Implementation of interventions or strategies can help to reduce the mental pressure of health care workers. Early interventions for health care workers, opportunistic screening for mental health disorders, treatment in both psychological and pharmacological modalities, Appendices Annex I: Data source and search strategy Communication and Dissemination Keyword PubMed EBSCOhost Google Scholar Afghanistan OR Albania OR Algeria OR Angola OR Antigua OR Barbuda OR Argentina OR Armenia OR Azerbaijan OR Bangladesh OR Belarus OR Belize OR Benin OR Bhutan OR Bolivia OR Bosnia OR Herzegovina OR Botswana OR Brazil OR Burkina OR Faso OR Burundi OR Cabo Verde OR Cambodia OR Cameroon OR Central African Republic OR Chad OR China OR People's Republic of Colombia OR Comoros OR Democratic Republic of Congo OR Congo OR Costa Rica OR Côte d'Ivoire OR Cuba OR Djibouti OR Dominica OR Dominican Republic OR Ecuador OR Egypt OR El Salvador OR Equatorial Guinea OR Eritrea OR Eswatini OR Ethiopia OR Fiji OR Gabon OR Gambia OR Georgia OR Ghana OR Grenada OR Guatemala OR Guinea OR Guinea-Bissau OR Guyana OR Haiti OR Honduras OR India OR Indonesia OR Iran OR Iraq OR Jamaica OR Jordan OR Kazakhstan OR Kenya Kiribati OR Democratic People's Republic of Korea OR Kosovo OR Kyrgyzstan OR Lao People's Democratic Republic OR Lebanon OR Lesotho OR Liberia OR Libya OR North Macedonia OR Madagascar OR Malawi OR Malaysia OR Maldives OR Mali OR Marshall Islands OR Tomé and Príncipe OR OR Senegal OR Serbia OR Sierra Leone 950 950 625 OR Solomon Islands 4397491 40552379 2750000 meditation, reducing XVI. Mauritania OR Mauritius OR Mexico OR Micronesia OR Moldova Depression, OR Insomnia, OR Anxiety, OR Extreme mood OR Mongolia OR Montenegro OR Montserrat OR Morocco OR Mozambique OR Myanmar OR Namibia OR Nauru OR Nepal OR Philippines OR Rwanda OR Saint Helena OR Samoa OR OR São Mental Health Filters: Full text Sort by: Publication Date OR Panama OR Papua New Guinea OR Paraguay OR Peru OR Traumatic Stress Disorder, OR Schizophrenia OR Stress OR Nicaragua OR Niger OR Nigeria OR Niue OR Pakistan OR Palau changes, OR Dementia or Bipolar disorder OR Extreme forgetfulness OR Obsessive-compulsive disorder OR Post 1956267 7214507 105000

[Note: Covid-19 OR SARS-COV-2 OR , Covid-19 Pneumonia OR Nobel covid-19 OR Novel-Coronavirus, , Covid -19 Infection, Covid 19 illness. Filters: Full text Sort by: Publication Date 111018 1200486 348000]

Figure 5:

This research review will be published in the Torrens University Journals. Also, various workshops and building interpersonal relationships, partnership and identifying the people can be helpful for the rapid dissemination of information. This study guides the leaders and practitioners for the efficacy of the interventions. Also, this might be helpful for guiding the future researchers. The result of our evaluation "mental health impact of COVID-19 Pandemic on health care workers" will be disseminated through the presentation and workshops.

.1 14

Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I 2) for each meta-analysis.

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