Mental health impacts among health workers during COVID-19 in a low resource setting: a cross-sectional survey from Nepal

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Abstract

Background: Health care workers exposed to COVID-19 might be at risk of developing mental health problems. The study aimed to identify factors associated with anxiety, depression and insomnia among health workers involved in COVID-19 response in Nepal.

Methods: This was a cross-sectional web-based survey conducted in between April 26 to May 12, 2020. A total of 475 health workers participated in the study. Anxiety and depression were measured using 14-item Hospital Anxiety and Depression Scale (HADS: 0- 21) and insomnia was measured by using 7-item Insomnia Severity Index (ISI: 0-28). Multivariable logistic regression analysis was done to determine the risk factors of mental health outcomes.

Results: Overall, 41.9% of health workers had symptoms of anxiety, 37.5% had depression symptoms and 33.9% had symptoms of insomnia. Stigma faced by health workers was significantly associated with higher odds of experiencing symptoms of anxiety (AOR: 2.47; 95% CI: 1.62-3.76), depression (AOR: 2.05; 95% CI: 1.34-3.11) and insomnia (AOR: 2.37; 95% CI: 1.46-3.84). History of medication for mental health problems was significantly associated with higher likelihood of experiencing symptoms of anxiety (AOR: 3.40; 95% CI:1.31-8.81) , depression (AOR: 3.83; 95% CI: 1.45-10.14) and insomnia (AOR: 3.82; 95% CI: 1.52-9.62) while inadequate precautionary measures in the workplace was significantly associated with higher odds of exhibiting symptoms of anxiety (AOR: 1.89; 95% CI: 1.12-3.19) and depression (AOR: 1.97; 95% CI: 1.16-3.37). Nurses (AOR: 2.33; 95% CI: 1.21-4.47) were significantly more likely to experience anxiety symptoms than other health workers.

Conclusion: The study findings revealed higher proportion of anxiety, depression and insomnia among health workers during the early phase of the pandemic in Nepal. Health workers facing stigma, those with history of medication for mental health problem, and those reporting to having inadequate precautionary measures in their workplace were more at risk of developing mental health outcomes. A focus on improving mental health wellbeing of health workers should be immediately initiated with attention to reduction of stigma, ensuring adequate support system such as personal protective equipments, and family support for those with history of mental health problems.

Background

The new coronavirus disease 2019 (COVID-19) is currently a threat to the global health in an unprecedented manner. Nepal, a South Asian country, is no exception and is affected by the outbreak with overwhelming effects on its economy and health system. Government of Nepal initiated its response against COVID-19 immediately after its first reported case in last week of January on a Nepalese traveler from China [1, 2]. As of June 29, 13248 cases and 29 deaths have been reported in the country despite nationwide lockdown imposed from March 24, that continued for nearly ten weeks[3].

The mental health impacts of a disease outbreak is usually neglected during pandemic management although the consequences are costly[4]. Early evidence has shown that health workers directly involved

in the diagnosis, treatment, and care of patients with COVID-19 are at risk of developing mental health symptoms [5–8]. Previous studies have also reported adverse psychological reactions to the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak among health care workers [9, 10]. The increasing number of confirmed cases and deaths, work burden, inadequate personal protective equipment (PPE), media coverage, lack of specific treatment, and vulnerability to infection and having to stay in quarantine, as well as feelings of being inadequately supported, can contribute to the mental burden among health workers[11].

Psychological wellbeing has an important impact on individuals' performance. The impact of COVID-19 on mental health is well documented in different countries among different populations including health professionals[4]. However, evidence regarding the impact of the COVID-19 pandemic on health professionals is not available in Nepal. During the initial response to COVID-19, there were media reports regarding inadequate testing kits, and lack of PPEs[12, 13]. At the work place, health workers require a support system to promote their mental wellbeing and their activity need to be continually monitored and this is more necessary during health emergencies[14]. In this context, this study aimed to evaluate mental health outcomes among health care workers involved in COVID-19 response by quantifying the magnitude of symptoms of depression, anxiety and insomnia and by analyzing potential risk factors associated with these symptoms.

Methods

Study design and study participants

A cross-sectional study was conducted via web online survey among health workers working in health facilities in Nepal. Data was collected from April 26 to May 12 in 2020. During the data collection period, Nepal experienced a rise in COVID-19 reported case from 52 to 217. As of May 12, cases were reported from 19 out of 77 districts of Nepal.

Health professionals working in the management of COVID-19 response, in both public and private health facilities were recruited as study participants. A network of 25 hub hospitals are designated for COVID-19 management while other hospitals, primary health centres and health posts coordinate with these hub hospitals and run fever clinics for screening of COVID-19 cases. Health professionals included doctor, nurses, pharmacists, diagnostic personnel, paramedics and public health practitioners. A total of 501 responses were received out of which 26 were redundant and hence removed from the analysis. The final sample size of the study was 475.

Data collection methods

The data collection involved two steps: i) identification of survey anchors for participant's recruitment online, and ii) survey administration. In the first step, we identified the social media platforms to recruit the participants followed by non-random sampling of participants interested to participate in online survey. Online questionnaires via online Google forms were used to collect data from the participants.

Study participants were encouraged to fill the online survey form in their leisure. To limit non health worker's responses to online survey – survey forms were only sent upon invitation to potential participants. The inclusion criteria were health workers aged 18 years and above and living in Nepal, and currently working in COVID-19 management. Participants were excluded if they were below 18 years of age, on leave or unable to participate due to physical or emotional distress.

Study variables

The dependent variable in the study included the status of anxiety, depression and insomnia. Similarly, the independent variables included information about socio-demographic characteristics and work-related variables. The dependent variables and independent variables are presented in Table 1.

Table 1: Study variables

S.N.	Variables	Categories of variables
Dependent variables		
1	Anxiety	Normal (0-7) and Anxiety (more than 7) based on Hospital Anxiety and Depression Scale
2	Depression	Normal (0-7) and Depression (more than 7) based on Hospital Anxiety and Depression Scale
3	Insomnia	No clinically significant insomnia (0-7), Sub threshold insomnia (8-14), Moderate severity (15-21) and Severe clinical insomnia (22-28) based on Insomnia Severity Index. For analysis purpose, a cut-off score of 10 was taken. Absence (0-9) and Presence of insomnia (10 and above)
Independent variables		
Socio-demographic characteristics		
1	Age	Up to 40 years, Above 40 years
2	Gender	Male, Female
3	Ethnicity	Brahmin/Chhetri, Janajati, Madheshi and others. Adopted from Nepal's Health Management Information System
4	Educational qualification	Intermediate and below, Bachelor, Masters and above
5	Profession	Doctors, Nurses, Others
6	Marital status	Single, Ever married
7	Type of family	Nuclear, Joint and Extended
8	Living with child less than 15 years	Yes, No
9	Living with elderly (above 60 years)	Yes, No
10	Having a family member with chronic disease	Yes, No
11	History of medication for mental health problem	Yes, No
Work related variables		

1	Work role	Frontline, second line
2	Work experience	Up to five years, more than 5 years
3	Type of health facility	Primary, secondary and tertiary
4	Precautionary measures in workplace	Sufficient, insufficient
5	Aware of government incentive for health workers	Yes, No
6	Stigma faced due to COVID-19	Yes, No, Do not want to answer
7	Working in affected district	Yes, No (District having at least one confirmed case as affected district)
8	Working overtime	Yes, No
9	Change in regular job duty	Yes, No

Data collection measures

Anxiety, depression and insomnia of the participants were assessed using validated measurement tools. Accordingly, the 14-item Hospital Anxiety and Depression Scale (HADS), and the 7-item Insomnia Severity Index (ISI) were used. Internal consistency of the tool was ascertained by calculating Cronbach's alpha which was 0.81, 0.72 and 0.90 for anxiety, depression and insomnia respectively which is considered sufficient[15, 16].

The HADS is a commonly used tool for measuring anxiety and depression in different settings in many countries including Nepal [17-22]. It has seven items each for measurement of anxiety and depression which are scored from 0-21. The total scores of these tools were interpreted as normal (0-7), borderline abnormal (8-10) and abnormal (11-21). For analysis, score more than 7 was considered as the presence of anxiety and depression. Similarly, the score of ISI which records sleep outcome in the past two weeks was categorized as no clinically significant insomnia (0-7), subthreshold insomnia (8-14), moderate clinical insomnia (15-21) and severe clinical insomnia (22-28) as in studies done elsewhere[8, 23-26]. For further analysis, a cut-off score of 10 was used to categorize the presence or absence of insomnia as suggested by Morin CM et al[27].

Data analysis

Descriptive analysis was done by calculating frequency and percentages for categorical variables and mean and standard deviation for continuous variables. Chi-square test was used to determine the association between categorical independent variables and categorical dependent variables and the analysis is presented in Additional File 1. To determine potential factors associated with the outcome variable, multivariable logistic regression analysis was performed, adjusted odds ratio (AOR) and 95% confidence interval (CI) were calculated. For adjusted regression analysis, those variables which were significant at a 10% significance level in bivariate analysis were included in the multivariable logistic regression analysis [28]. Similarly, the history of medication for a mental health problem was also fitted into the model regardless of the significance based on the prior knowledge[29]. The Variance Inflation Factor (VIF) was calculated before fitting into the model for each of the psychometric scales which showed no evidence of multicollinearity (less than 1.3).

Ethics

Ethical approval for the study was taken from the Nepal Health Research Council (Reference number: 2192, 315/2020). Written digital consent was taken from study participants prior to completing the survey form and voluntariness to participate in the study was respected. Participants gave their consent by ticking in the designated box. No personal identifies such as name was collected during the study. Email address collected from the study participants was only used for quality control and not for analysis purpose.

Results

Socio-demographic characteristic of study participants

Among the study participants, 52.6% were female, 68.4% were in the age group of 20-29 years and 65.9% belonged to Brahmin/Chhetri ethnic group. The mean (±SD) age of the participants was 28.20 (±5.80) years. More than two-thirds of health workers were either nurses (35.2%) or doctors (33.9%). Majority of the participants were single (62.9%) and had a nuclear family structure (64.8%). More than half of the participants (54.5%) had a family member with a chronic disease condition, 25.1% were living with younger children and 34.3% had elderly in the family. The proportion of health workers who had a history of medication for any kind of mental health conditions was 4.6% (Table 2).

Table 2: Socio-demographic characteristics of study participants (n=475)

Variables	Categories	Number	Percentage
Age (years)	Mean(±SD): 28.20 (±5.80)		
	20-29	325	68.4
	30-39	124	26.1
	40-49	19	4.0
	50 and above	7	1.5
Sex			
	Male	225	47.4
	Female	250	52.6
Ethnicity			
	Brahmin/Chhetri	313	65.9
	Janjati	110	23.2
	Madhesi	29	6.1
	Dalit	7	1.5
	Others	16	3.4
Education			
	Technical school level	8	1.7
	Intermediate	86	18.1
	Bachelors	277	58.3
	Masters and above	104	21.9
Position			
	Nurse	167	35.2
	Doctor	161	33.9
	Paramedics	81	17.1
	Laboratory staff	19	4.0
	Pharmacist	15	3.2
	Public health professional	32	6.7
Marital status			

	Single	299	62.9
	Ever married	176	37.1
Family type			
	Nuclear	308	64.8
	Joint	167	35.2
Living with children			
	Yes	119	25.1
	No	356	74.9
Living with older adults (>60 years)			
	Yes	163	34.3
	No	312	65.7
Family member with a chronic medical condition			
	Yes	259	54.5
	No	216	45.5
History of medication for mental health			
	Yes	22	4.6
	No	453	95.4

Work-related characteristics

Regarding the type of health facility, 39% worked in a central or provincial hospital, and 28.2% worked in a private hospital. Nearly half of the participants (45.3%) mentioned working as frontline workers for COVID management while 70.7% had started their job within the last five years. Majority of the participants reported changes in their regular job duties (70.3%) and insufficient precautionary measure in their workplace (78.9%). Around half of the participants (49.1%) were working overtime. The proportion of health workers aware of government incentive scheme for health workers during COVID-19 was 56.8% among which 69.6% were dissatisfied with this scheme. More than half of the participants (53.7%) faced stigma from the community members. Among those who faced stigma, they were stigmatized because of profession (49.8%), accused of being a carrier of the disease (40.0%), threatened (5.9%) or asked to leave their rented place (4.3%) (Table 3).

Table 3: Job-related characteristics of the study participants (n=475)

Variables	Category	Number	Percentage
Level of health institution			
	Central hospital and province hospital	185	39.0
	Private hospital	134	28.2
	Health post	45	9.5
	Community hospital	27	5.7
	Primary hospital (under local government)	20	4.2
	Primary Health centre	19	4.0
	Managerial task of COVID19	45	9.5
Type of health facility			
	Primary	84	17.7
	Secondary and tertiary	391	82.3
Work role			
	Front line	215	45.3
	Second line	260	54.7
Working experience (years)			
	Up to 5	336	70.7
	>5	139	29.3
Precautionary measures in the workplace			
	Sufficient	100	21.1
	Not sufficient	375	78.9
Experience of stigma due to occupation			
	Yes	255	53.7
	No	199	41.9
	Don't want to answer	21	4.4
Type of major stigma experience (n=255)			
	Stigmatized because of	127	49.8

	profession		
	Accused of being a carrier of disease	102	40.0
	Threatened	15	5.9
	Asked to leave rented place	11	4.3
Aware of government incentives for health workers			
	Yes	270	56.8
	No	205	43.2
Satisfied with government incentive (n=270)			
	Yes	82	30.4
	No	188	69.6
Change in regular job duties during covid19			
	Yes	334	70.3
	No	141	29.7
Working overtime during COVID-19			
	Yes	233	49.1
	No	242	50.9

Prevalence of anxiety, depression and insomnia

More than one-third of the participants had some symptoms of anxiety (borderline: 23.6% and abnormal: 18.3%). Similarly, 37.5% of the participants experienced symptoms of depression (borderline: 24% and abnormal: 13.5%). Likewise, symptoms of insomnia was prevalent in 33.9% of the participants (sub-threshold insomnia: 26.7%, moderate insomnia: 5.7% and severe clinical insomnia: 1.5%).There was a significant difference in anxiety (p<0.001) and depression (p=0.001) across different types of profession. However, type of profession was not statistically significant with insomnia (p=0.142). Nurses had a higher proportion of symptoms related to abnormal anxiety, abnormal depression and severe clinical insomnia than other professions (Table 4).

Table 4: Prevalence of anxiety, depression and insomnia by study groups (n=475)

Mental health outcomes	Categories	Total N (%)	Doctor (n=161)	Nurse (n=167)	Other health workers (n=147)	P-value*
Anxiety						
	Normal	276 (58.1)	106 (65.4)	73 (43.7)	97 (66.4)	<0.001
	Borderline	112 (23.6)	34 (21.0)	54 (32.3)	24 (16.4)	
	Abnormal	87 (18.3)	22 (13.6)	40 (24.0)	25 (17.1)	
Depression						
	Normal	297 (62.5)	122 (75.3)	89 (53.3)	86 (58.9)	0.001
	Borderline	114 (24.0)	27 (16.7)	46 (27.5)	41 (28.1)	
	Abnormal	64 (13.5)	13 (8.0)	32 (19.2)	19 (13.0)	
Insomnia						
	No clinically significant	314 (66.1)	115 (71.0)	98 (58.7)	101 (69.2)	0.142
	Sub threshold	127 (26.7)	38 (23.5)	53 (31.7)	36 (24.7)	
	Moderate	27 (5.7)	9 (5.6)	12 (7.2)	6 (4.1)	
	Severe	7 (1.5)	0 (0)	4 (2.4)	3 (2.1)	

Significant at p <0.05, Chi-square test

Factors associated with anxiety among health workers

In the multivariable logistic regression models, the effect of gender, ethnicity, profession, education, living with elderly, family member with chronic disease, precautionary measures in the workplace, faced stigma, worked overtime, awareness about government incentive and history of medication for mental health problem was adjusted. The analysis showed ethnicity, profession, precautionary measures in the workplace, stigma experience and history of medication of mental health problem significantly associated with anxiety. As compared to Brahmin/Chhetri ethnic group, Janajati (AOR=2.34; 95% CI: 1.44-3.81) and nurses (AOR= 2.33; 1.21-4.47) as compared to other health workers had significantly higher odds of having anxiety. Similarly, health workers who had previous history of medication for mental health problems (AOR=3.40; 95% CI: 1.31-8.81), having inadequate precautionary measures in their

workplace (AOR=1.89; 95% CI: 1.12-3.19) and those who faced stigma (AOR=2.47; 95% CI: 1.62-3.76) had significantly higher odds of having anxiety as compared to those with no previous history of medication, having adequate precautionary measures in the workplace and those not facing stigma respectively. Gender, education, living with elderly, family member with chronic disease, working overtime and awareness about government incentive was however not statistically significant with anxiety (Table 5).

Table 5: Factors associated with anxiety among health workers (n=475)

Variables	Category	Anxiety N (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Gender				
	Male	76 (38.2)	Ref	Ref
	Female	123 (61.2)	1.90 (1.31-2.75)*	1.05 (0.59-1.88)
Ethnicity				
	Brahmin/Chhetri	110	Ref	Ref
	Janajati	69	2.71 (1.75-4.20)*	2.34 (1.44-3.81)*
	Madheshi	10	0.97 (0.44-2.16)	1.11 (0.47-2.59)
	Others	10	2.64 (0.98-7.12)	2.19 (0.73-6.54)
Profession				
	Doctor	56	1.05 (0.65-1.68)	1.17 (0.68-2.04)
	Nurses	94	2.55 (1.61-4.04)*	2.33 (1.21-4.47)*
	Others	49	Ref	Ref
Education				
	Intermediate and below	47	Ref	Ref
	Bachelor	116	0.72 (0.45-1.15)	0.97 (0.57-1.67)
	Masters and above	36	0.53 (0.30-0.94)*	0.99 (0.49-1.97)
Living with elderly				
	Yes	78 (39.2)	1.45 (0.99-2.12)	1.43 (0.92-2.22)
	No	121 (60.1)	Ref	Ref
Family member with chronic disease				
	Yes	121	1.55 (1.07-2.25)*	1.25 (0.81-

		(60.8)		1.93)
	No	78 (39.2)	Ref	Ref
Precautionary measures in the workplace				
	Sufficient	29 (14.6)	Ref	Ref
	Insufficient	170 (85.4)	2.03 (1.26-3.27)*	1.89 (1.12-3.19)*
Faced stigma				
	Yes	131 (65.8)	2.36 (1.62-3.44)*	2.47 (1.62-3.76)*
	No	68 (34.2)	Ref	Ref
Worked overtime				
	Yes	107 (53.8)	1.39 (0.96-2.00)	1.31 (0. 87-1.97)
	No	92 (46.2)	Ref	Ref
Aware about government incentive				
	Yes	100 (50.3)	0.63 (0.44-0.91)*	0.78 (0.51-1.18)
	No	99 (49.7)	Ref	Ref
History of medication				
	Yes	14 (7.0)	2.54 (1.04-6.17)*	3.40 (1.31-8.81)*
	No	185 (93.0)	Ref	Ref

Factors associated with depression among health workers

In the multivariable logistic regression model, the effect of age, ethnicity, profession, education, living with children, precautionary measures in the workplace, faced stigma, awareness about government incentive and history of medication for mental health problem was adjusted, The analysis showed that age, profession, precautionary measures in the workplace, stigma experience, awareness about government

incentive, and history of medication of mental health problem was significantly associated with the symptoms of depression. As compared to older health workers (>40 years), younger health workers (AOR=0.33; 95% CI: 0.12-0.91), doctors as compared to other health workers (AOR=0.57; 95% CI: 0.33-0.99) and those who were aware of government incentive for health workers during COVID-19 (AOR=0.51; 95% CI: 0.34-0.78) as compared to those not aware had lower odds of experiencing depression symptoms. Similarly, health workers who had previous history of medication for mental health problems (AOR=3.83; 95% CI: 1.45-10.14), those having inadequate precautionary measures in their workplace (AOR=1.97; 95% CI: 1.16-3.37) and those who faced stigma (AOR=2.05; 95% CO: 1.34-3.11) had significantly higher odds of having depression symptoms as compared to those with no previous history of medication, having adequate precautionary measures in the workplace and those not facing stigma respectively. Ethnicity, education and living with children was however not statistically significant with depression (Table 6)

Table 6: Factors associated with depression among health workers (n=475)

Variables	Category	Depression N (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (years)				
	20-40	165 (92.7)	0.40 (0.17-0.95)*	0.33 (0.12-0.91)*
	>40	13 (7.3)	Ref	Ref
Ethnicity				
	Brahmin/Chhetri	107 (60.1)	Ref	Ref
	Janajati	51 (28.7)	1.51 (0.98-2.33)	1.19 (0.74-1.93)
	Madheshi	9 (5.1)	0.87 (0.38-1.97)	1.03 (0.43-2.49)
	Others	11 (6.2)	3.53 (1.27-9.81)*	2.18 (0.73-6.57)
Profession				
	Doctor	40 (22.5)	0.47 (0.29-0.76)*	0.57 (0.33-0.99)*
	Nurses	78 (43.8)	1.26 (0.80-1.97)	1.25 (0.76-2.06)
	Others	60 (33.7)	Ref	Ref
Education				
	Intermediate and below	51 (28.7)	Ref	Ref
	Bachelor	95 (53.4)	0.44 (0.27-0.71)*	0.69 (0.41-1.16)
	Masters and above	32 (18.0)	0.38 (0.21-0.67)*	0.70 (0.35-1.40)
Living with child				
	Yes	53 (29.8)	1.48 (0.97-2.26)	1.19 (0.74-1.92)
	No	125 (70.2)	Ref	Ref
Precautionary measures in the workplace				
	Sufficient	28 (15.7)	1	Ref
	Not sufficient	150 (84.3)	1.71 (1.06-	1.97 (1.16-

			2.78*)	3.37*)
Faced stigma				
	Yes	116 (65.2)	2.13 (1.45-3.12*)	2.05 (1.34-3.11*)
	No	57 (34.8)	1	Ref
Aware about government incentive				
	Yes	82 (46.1)	0.50 (0.34-0.72*)	0.51 (0.34-0.78*)
	No	96 (53.9)	1	Ref
History of medication				
	Yes	14 (7.9)	3.08 (1.27-7.51*)	3.83 (1.45-10.14*)
	No	164 (92.1)	1	Ref

Factors associated with insomnia among health workers

In the multivariable logistic regression models, the effect of age, ethnicity, profession, education, work experience, living in affected district, faced stigma, working overtime, awareness about government incentive and history of medication for mental health problem was adjusted. The analysis showed that ethnicity, work experience, stigma experience, and history of medication of mental health problem were significantly associated with insomnia. As compared to the Brahmin/Chhetri ethnic group, Janajati (AOR=1.74; 95% CI: 1.04-2.91) had significantly higher odds of having insomnia. Regarding work experience, those who had work experience within the last five years (AOR=0.50; 95% CI: 0.29-0.85) were significantly at lower risk of having insomnia as compared to those with experienced health workers. Similarly, health workers who had previous history of medication for mental health problems (AOR=3.82; 95% CI: 1.52-9.62), and those who faced stigma (AOR=2.37; 95% CI:1.46-3.84) had significantly higher odds of having insomnia as compared to those with no previous history of medication, and those not facing stigma respectively. Age, profession, education, working in affected district, working overtime and awareness about government incentive was however not statistically significant with insomnia (Table 7).

Table 7: Factors associated with insomnia among health workers (n=475)

Variables	Category	Insomnia N (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (years)				
	20-40	108 (92.3)	0.45 (0.19-1.08)	0.45 (0.16-1.29)
	>40	9 (7.7)	Ref	Ref
Ethnicity				
	Brahmin/Chhetri	70 (59.8)	Ref	Ref
	Janajati	41 (35.0)	1.90 (1.19-3.02)*	1.74 (1.04-2.91)*
	Others	6 (5.1)	0.52 (0.21-1.28)	0.40 (0.15-1.06)
Profession				
	Doctor	31 (26.5)	0.72 (0.42-1.25)	1.24 (0.65-2.35)
	Nurses	50 (42.7)	1.31 (0.79-2.16)	1.46 (0.82-2.60)
	Others	36 (30.8)	Ref	Ref
Education				
	Intermediate and below	32 (27.4)	Ref	Ref
	Bachelor	65 (55.6)	0.59 (0.36-0.99)*	0.69 (0.39-1.24)
	Masters and above	20 (17.1)	0.46 (0.24-0.88)*	0.53 (0.24-1.18)
Work experience (year)				
	Up to 5	71 (60.7)	0.54 (0.35-0.84)*	0.50 (0.29-0.85)*
	>5	46 (39.3)	Ref	Ref
Affected district				
	Yes	94 (80.3)	1.63 (0.98-2.71)	1.55 (0.89-2.68)
	No	23 (19.7)	Ref	Ref
Faced stigma				

	Yes	80 (68.4)	2.26 (1.45-3.52)*	2.37 (1.46-3.84)*
	No	37 (31.6)	Ref	Ref
Aware about government incentive				
	Yes	58 (49.6)	0.68 (0.45-1.03)	0.66 (0.41-1.05)
	No	59 (50.4)	1	Ref
Working overtime				
	Yes	69 (59.0)	1.70 (1.11-2.60)*	1.53 (0.96-2.42)
	No	48 (41.0)	1	Ref
History of medication				
	Yes	12 (10.3)	3.98 (1.67-9.47)*	3.82 (1.52-9.62)*
	No	105 (89.7)	1	Ref

Discussion

This study examined the status of anxiety, depression and insomnia symptoms among health workers in Nepal during the early phase of the COVID19 pandemic in Nepal. The prevalence of anxiety (41.9%) and depression (37.5%) symptoms among health workers in this study was found higher than a recent study conducted among general population during COVID-19 pandemic in Nepal which showed 31% of anxiety and 34% of depression [30]. However, the prevalence of anxiety, depression and insomnia in this study was found lower as compared to health workers from China [5] where 44.6%, 50.4% and 34.0% of health workers were reported to have anxiety, depression and insomnia respectively. Mental health outcomes among health workers affect their work performance and to address this, specialized mental health services are required to them [8, 31, 32]. Similarly, higher perceived risk and having to stay in quarantine during epidemic might not just result in short term impacts but also lead to long term mental health consequences among health workers [33–35]. There is thus a need to focus on mental health wellbeing of health workers involved in COVID-19 response.

Our findings unveiled that considerate proportion of health workers in Nepal faced stigma related to COVID-19. Stigma significantly affected all the psychological outcomes among health workers. Stigma among health workers, who are already vulnerable to infection due to increased exposure, might affect their concentration on work. A similar finding was observed in Italy[36] where health workers facing stigma during COVID-19 were found to have more burnout, fatigue and psychological distress. It is thus necessary to increase the morale of health workers who are stigmatized, in fear of getting infected or

spreading infection to others. Importantly, it is important to understand the drivers and facilitators of stigma in health workers for developing effective response which might require wide sector interventions[37, 38]. Information directed towards the public should thus integrate stigma reduction among health workers as an important strategy towards COVID-19 response.

In this study, inadequate precautionary measures were significantly associated with higher odds of anxiety and depression symptoms among health workers. Lack of precautionary measures including PPE can lead to compromised working condition, develop a sense of insecurity and increase exposure to infections. As a large proportion of COVID-19 cases are asymptomatic[39], lack of a proper sense of protection among health workers might increase psychological distress among health workers affecting their mental health well-being. Three out of four health workers reporting inadequate precautionary measures in the workplace in this study reflects the vulnerability of health workers in Nepal for COVID-19 infections. Studies done globally [32, 40–42] have pointed out the need to equip health workers with PPE as well as provide psychological support to increase resilience to adverse mental health outcomes. This finding should be of urgent attention to government for arranging adequate precautionary measures for boosting the work morale of health workers in Nepal.

Our study findings showed that nurses had higher odds of exhibiting anxiety than other health professions. This might be attributed to increased amount of time spent by them in patient care than other health workers. A study from China also showed that nurses, as compared to other health professionals, experienced more unfavourable mental health outcomes[5]. Similar findings were found during the SARS epidemic in Canada [43] where nurses experienced more psychological distress due to fear, social isolation and work stress. Mental health status of health professionals should thus be closely monitored by the employing health institutions including managing their workload, providing emotional support and responding to their personal needs.

In our study, health workers who had a history of medication for mental health problems had higher odds of exhibiting anxiety, depression and insomnia symptoms as compared to those without such history. A similar finding was observed in a study conducted in China where health workers having mental health problems were more likely to have anxiety, depression and stress[29]. Family and organizational support will be required for those health workers as the current pandemic might make them more vulnerable to aggravating their mental health conditions[44, 45].

In this study, gender, work role, marital status, and type of family, living with children, living with elderly, having a family member with chronic disease, type of health facility, change in duties and working overtime had no significant effect on any mental health outcomes. As our study was conducted in the early phase of the pandemic when no mortality was documented and most of the cases had mild symptoms, working role might not have contributed to a significant difference in mental health outcomes. Further studies might be required to confirm these findings as the association might vary over the course of epidemic in the country.

The unprecedented challenge brought by COVID-19 pandemic is unique in Nepal and a major pressure to its health system after 2015 Gorkha Earthquake. Health workers in Nepal are currently working under extreme pressure amidst limited health resources such as inadequate staffing, just above 3000 isolation beds and 840 ventilators (increased from 300 ventilators during the initiation of epidemic) for the population of 29 million [3, 46, 47]. Noteworthy to mention, mental health has not received adequate attention from the government despite its high burden[48]. Based on the study findings, we put forward the following recommendation for improving the mental health well-being of health workers in Nepal. Firstly, the reduction of stigma among health workers working in COVID-19 response should be prioritized through the mobilization of mass media and community engagement strategy. Provision should be made for living arrangement in the vicinity of health facilities which may help reduce the stigma faced by the health workers at their residence and neighborhood as well as may reduce the worry of being the carrier of the disease to home to family members. Secondly, there should be an enabling work environment with a good support system, rotation of health care staffs to manage workload, adequate availability of PPE, proper training to health workers on management of COVID-19 and focus on incentives which boost their work morale. It is apt to provide educational interventions for clearing of doubts of healthcare workers about COVID-19 and provide adequate logistic support to increase protection. Thirdly, personal and family support might be required especially in those who have a history of medication for mental health problems. Finally, psychological intervention with a focus on health workers should be a part of preparedness to reduce its impact on not only on their well-being but also on the health system at large.

The study has some limitations which need to be acknowledged. Firstly, the study was conducted during the early phase of pandemic and thus, the mental health outcomes might still reflect conditions existing prior to pandemic. The relative contribution of pandemic on the rise of mental health disorders further needs to be evaluated using a longitudinal study design. Secondly, there might have been the introduction of selection bias as those health workers without internet access, older health workers, and probably, those who might have been busy in their work duties might not have participated in the study. Thirdly, there might be respondent bias as the findings were self-reported by health workers and based on a subjective scale. Importantly, the tool used in the study should be taken into consideration while reporting mental health outcomes. Also, though the history of mental illness and medications taken for any kind of mental illness was included in the questionnaire, specific type of mental illness was not identified, which may or may not have affected the current symptoms of anxiety, depression and insomnia. Despite limitations, this study provides early evidence on the mental health status among health workers during COVID-19 pandemic in Nepal which could be of interest to policymakers, health facility managers and those involved in COVID-19 response or any other future epidemic of such nature.

Conclusions

This study reported a high prevalence of symptoms of anxiety, depression and insomnia among health workers in Nepal during the initial phase of the pandemic. More than half of the health workers faced stigma and only one out of five health workers reported precautionary measures in their workplace as sufficient. Stigma and history of medication for mental health problems was significantly associated with

all the mental health outcomes while inadequate precautionary measures was associated with higher odds of having anxiety and depression symptoms. Nurses as compared to other health workers, had higher odds of developing anxiety. Focus on improving mental health wellbeing of health workers is recommended by focusing on stigma reduction, equipping health workers with protective measures, as well as ensuring personal and family support for those with history of medication for a mental health problem.

Abbreviations

AOR: Adjusted Odds Ratio; CI:Confidence interval; COVID-19:corona virus disease 2019; HADS:Hospital Anxiety Depression Scale; ISI:Insomnia Severity Index; MERS:Middle East Respiratory Syndrome; PPE:personal protective equipment; SARS:Severe Acute Respiratory Syndrome; SD:Standard deviation; VIF:Variance Inflation Factor

Declarations

Ethics approval and consent to participate

Ethical approval for this study was provided by the Nepal Health Research Council, Kathmandu, Nepal (Registration number: 2192; 315/2020) while a letter of support was obtained from Ministry of Health and Population. An informed e-consent was obtained from individual participants. Study participants were informed clearly about their freedom to opt out of the study at any point of time without providing justification for doing so.

Consent for publication

Not applicable

Availability of data and materials

All data generated during this study are included in the manuscript and the supplementary file.

Competing interests

Authors have no competing interest associated with this paper. The author's affiliation does not necessarily reflect the view of their employing organizations. The authors prepared a policy brief of 2 pages based on preliminary findings and have shared it to the Ministry of Health and Population.

Funding

None

Author's contributions

PK, ND and KP conceived the concept and design of the study. ND and KP conducted the survey while PK and MD conducted data analysis. PK wrote the first draft and underwent substantial revision based on the inputs from all other authors. DJ supervised the whole study process. All the authors have read, reviewed and endorsed the final version of the manuscript.

Acknowledgements

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