Psychological effect of COVID-19 pandemic on healthcare professionals of Yemen and coping strategies

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Abstract

Background: COVID-19 pandemic has triggered psychological stress such as anxiety and depression among people around the globe. Due to the nature of the job, healthcare professionals are at high risk of infection and are facing social stigma as well. In such a scenarios, it has aggravated their mental health and they are applying various measures to cope with such adverse scenario. Therefore, this research is conducted with the objective to evaluate the psychological influence of the COVID-19 pandemic among healthcare professionals of Yemen and the coping strategies adopted thereof.

Methods: A web-based, as well as face-to-face cross-sectional study, was carried out from July 2020 to December 2020 among healthcare professionals currently working in different provinces of Yemen using a standard questionnaire. The generalized anxiety disorder scale (GAD-7), patient health questionnaire (PHQ-9), and Brief-COPE scales were applied for evaluation of anxiety, depression, and the coping strategies among them.

Results: A total of 197 healthcare professionals (N=197) participated in the study where the majority were male 68.5% (n=135) in gender and physicians 42.13% (n=83) by profession. The prevalence of both anxiety (6.84 ± 5.67 for male and 7.37 ± 4.44 for female) and depression (8.06 ± 6.51 for male and 9.56 ± 6.46 for female) were found of mild category among the respondents. A significant statistical difference was observed between physician versus nurse regarding anxiety and depression based on the working area ($p=0.017$). Trained professionals demonstrated less anxiety (6.29 ± 5.33) and depression (7.90 ± 6.78) as compared to untrained ones. Source of stress varied in a different province where high fear of self-health and family members was found more in female (3.90 ± 1.00) and such fear was found more in province Sanaa, Lahij, and Abyan (4.75 ± 0.96), (4.57 ± 1.27) (4.50 ± 2.12) respectively. Religion was indicated as a highly adopted coping strategy meanwhile emotional support was found the least used.

Conclusions: COVID-19 pandemic has aggravated the psychological stress among healthcare professionals of Yemen. Our findings illustrate the requirement of efficient policies through administrative, clinical, and welfare perspectives from the regulatory body in preparedness and preventive measures towards such pandemic that aids healthcare professionals to provide service in a stress-free condition and thus better healthcare delivery are assured.

Background

The COVID-19 pandemic has become a serious public health threat worldwide. The World Health Organization (WHO), on 30 January 2020, announced the occurrence of the novel coronavirus and declared a Public Health Emergency of International Concern (PHEIC) under the International Health Regulations (IHR) [1]. Later, it was declared a pandemic on 11 March 2020 [2].

In such a critical situation, life has been changed due to the restrictions of movement and social contacts. In fact, healthcare professionals (HCPs) wholeheartedly continued providing service with a high risk of getting infected with COVID-19 in such a grave situation. Therefore, HCPs are regarded as one of the most susceptible types of professionals to get psychological problems and mental catastrophe amid COVID-19 pandemic [3]. Different studies are consistently showing that the HCPs experience more stress related to work as compared to the general public [4].

As a standard procedure of containment strategy in such pandemics, a lockdown approach is usually imposed to bound the disease spread and lessen new potential cases by maintaining social distancing [5]. Though it is somewhat feasible for general people to assume such measures, the HCPs are, by the nature of their profession, left exposed to deal with the health-related issues that arise due to such situation and they have to be exposed to the situation. HCPs experience unexpectedly lengthy office hours as they have to deal with a load of cases due to such pandemic with the available resources and infrastructure that may not be up to the standard in such an emergency [6]. They often face physical distress and from time to time difficulties in breathing while wearing personal protective equipment (PPE), which is mandatory for safety measures to get saved from viral exposure [7].

Because little is known about the COVID-19, and subsequently, without the proven therapy, many HCPs are unrehearsed to perform duties [8]. The fear of autoinoculation, social stigma, and the risk of transmitting the disease to the family members and friends are adding extra burden to them that definitely impact their mental health [8-10].

Thus, it is particularly significant to assess the HCPs who are at greater risk of exhaustion and are probable to get suffered from anxiety, depression, and stress in such a pandemic. It is also equally essential to recognize and manage the responsible factors for such mental stress. The mental health status of HCPs of Yemen and their coping strategies have not yet been fully studied. Therefore, this study is conducted with the objectives to assess the anxiety and depression faced by Yemeni HCPs and to determine the coping strategies implemented amid COVID-19 pandemic.

Methods

Study design and participants

A cross-sectional survey was carried out via Google form as well as a self-administered questionnaire among healthcare professionals face-to-face for those who were not reachable with web-based survey in Yemen from July 2020 to December 2020. A total of 197 participants were selected by convenience sampling from different provinces all over Yemen.

The survey included questions regarding psychological screening, bothering issues faced by the health professionals, assessment of sources of the distress, coping strategies, or behavior. The questionnaire was developed and distributed in English and Arabic language. The questionnaire was validated by two experts in the field and was pilot tested among five participants.

Study site

The study was conducted in Yemen which is a country with a low-income economy and the poverty and the decade-long civil war has seriously affected the country. Many healthcare substructures are vulnerable and the basic healthcare facility is unobtainable to many people. Moreover, the shortage of medicines and medical equipment, the fragile healthcare status, and the limited healthcare resources are the challenging factors for the healthcare delivery amid COVID-19 pandemic in Yemen [11].

Inclusion/Exclusion criteria

All the healthcare professionals comprising physicians, pharmacists, nurses, and others who provided care at the medical center were included in this study. The professionals who refused to participate, from a non-healthcare profession and those who cannot read and write were excluded from the study.

Study questionnaire

The study questionnaire was categorized into four sections. All the questions were in understandable language and the participant was required to answer the questions on their own.

The first section of the questionnaires was about the demographics of participants that provided personal and organizational information of the health employee.

The second section of the questionnaire comprised of total of seven questions linked to the generalized anxiety scale (GAD-7) for anxiety assessment [12]. It had seven items with a score 0 (not at all) to 3 (nearly every day) that provided a 0 to 21 score. The total score was classified into four severity groups, namely; minimal to none (≤ 4), mild (5-9), moderate (10-14), and severe (≥ 15).

The third section consisted of total of nine questions related to patient health questionnaire (PHQ-9) to assess depression [13]. It had nine items with a score 0 (not at all) to 3 (nearly every day) that provided a 0-27 score. The total score was divided into five severity groups, namely; minimal to none (≤ 4), mild (5-9), moderate (10-14), moderately severe (15-19), and severe (≥ 20) [8]. In the current study, the participants' attaining score ≥ 10 on GAD-7 and PHQ-9 were regarded as anxiety and depression, respectively.

The sources of distress from the current pandemic were measured with a 14-item scale designed from an earlier study on anxiety among university students amid SARS outbreak [14]. It was based on a two-point Likert-scale. The items were categorized under 4 scales such as the health of self, family, and loved ones (possible score: 3 to 6); transmission (possible score: 3 to 6); containment (possible score: 3 to 6); measures taken by authority (possible score: 3 to 6); and effects on daily activities (possible score: 3 to 6).

The fourth section was all about 28-questions of the Brief-COPE scale [15]. It aimed to identify the coping strategies implemented amid COVID-19 pandemic. It consisted of four response choices ranging from the importance of doing activities to cope with the outbreak; (a) not doing this at all, (b) a little bit, (c) moderate amount, (d) doing this a lot. That scale was developed to discover the 14 coping methods: self-distraction, active coping, denial, and substance use, use of emotional support, venting, behavioral disengagement, acceptance, positive reframing, planning, humor, use of instrumental support, religion, and self-blame. Likely scores for every subscale were in a range of 2 to 8, where higher scores indicated propensity to appliance the analogous coping style.

Ethical approval

The study has been reviewed and approved by The Human Ethical Committee, University of the Punjab, Lahore. The ethical and professional considerations were followed throughout the study to keep the data and investigational information strictly confidential.

Statistical analysis

The data were coded, entered, and analyzed from SPSS (IBM, version 22). Results were articulated by using descriptive statistics where continuous data were expressed as mean and standard deviation (SD) whereas categorical data were presented as numbers and percentages. A p-value of less than 0.05 was considered statistically significant.

Independent t-test and ANOVA test were executed, wherever applicable, for comparison of the difference of scores related to anxiety, depression, source of distress, and coping strategies among demographic variables. Furthermore, for prior polychotomus variables, a series of post-hoc analysis with Bonferroni adjustment was implemented to evaluate significance among intergroup variables.

Results

There was a total of 197 respondents (n=197) in our study. The demographic of respondents with anxiety and depression scores are depicted in **table 1**. The majority of the participants were of age between 20-30 years (n=111) followed by 30-40 years (n=44) and ≥ 40 (n=42). Most of the participants were male (68.5%) and almost half of the respondents were physicians (n=83) followed by other health professionals (n= 41), pharmacists (n = 37), and nurses (n = 36). Approximately 21% of total HCPs were working in COVID-19 isolation wards and 11% were performing duties in COVID-19 intensive care unit (ICU). Meanwhile, 13.7% of respondents were working in quarantines, and the rest of the 53.3% were in other healthcare areas.

Table 1 Demographics with Anxiety and Depression Score

Variables	N (%)	Anxiety Score (Mean±SD)	Depression Score (Mean±SD)
Age (Years)			
20-30	111 (56.34)	6.74±5.37	8.73±6.57
30-40	44 (22.33)	7.50±4.93	8.79±6.80
>40	42 (21.32)	7.21±5.57	7.73±6.16
Gender			
Male	135 (68.53)	6.84±5.67	8.06±6.51
Female	62 (31.47)	7.37±4.44	9.56±6.46
Occupation			
Physician	83 (42.13)	7.02±5.30	7.40±6.11
Nurse	37 (18.78)	7.38±4.54	11.21±6.99
Pharmacist	36 (18.27)	6.33±5.44	9.15±7.21
Other HCPs	41 (20.81)	7.24±5.94	8.53±6.52
Experience (years)			
<5	110 (55.84)	6.69±5.33	8.16±6.21
5-10	31 (15.74)	7.45±5.30	9.97±7.11
>10	56 (28.43)	7.41±5.30	8.46±6.52
Province			
Aden	44 (22.33)	6.66±5.36	7.84±5.67
Hadramaut	52 (26.39)	7.30±5.62	8.55±6.64
Taiza	59 (29.95)	8.05±4.66	10.39±6.38
Aldhaleh	9 (4.57)	3.11±5.23	3.78±6.22
Sanaa	4 (2.03)	6.75±4.64	6.75±4.03
Ibb	8 (4.06)	8.12±2.85	9.25±5.33
Abyan	2 (1.01)	1.5±0.70	1±1.41
Hajjah	1 (0.51)	2.00	6.00
Lahij	11 (5.58)	4.29±4.71	4.57±5.69
Shabwah	7 (3.55)	7.09±7.54	9.36±9.51
Working area (Placement)			
Quarantine	27 (13.70)	6.30±5.72	8.30±5.91
Isolation	43 (21.83)	7.25±4.02	7.67±5.94
ICU	22 (11.17)	7.40±5.88	11.73±7.32
Other	105 (53.30)	7.01±5.80	8.28±6.61
Training (COVID-19)			
Yes	116 (58.88)	6.29±5.33	7.90±6.78
No	81 (41.12)	8.04±5.12	9.43±6.06

The mean anxiety level for males (6.84 ± 5.67) and females (7.37 ± 4.44) was found to be of mild category. Similarly, the depression was also rated as mild type in both genders (male = 8.06 ± 6.51 , female = 9.56 ± 6.46). Out of total respondents, 116 HCPs who were trained regarding COVID-19 management had shown less anxiety (6.29 ± 5.33) as compared to the non-trained (8.04 ± 5.12) ones. Similarly, depression score of trained HCPs was found less (7.90 ± 6.78) as compared to untrained (9.43 ± 6.06) ones.

The comparison of scores related to anxiety and depression in the categories of age, occupation, experience, posting, and training are shown in **table 2**. The anxiety and depression score for all age groups were not statistically significant, meanwhile, significant statistical differences of depression score were reported in occupation wise comparison between physician versus nurse ($p = 0.017$).

Table 2 Post-Hoc Analysis (Bonferroni Correction for Anxiety and Depression Scores in Categories Age, Occupation, Experience, Posting, and Training)

Variables	Anxiety Score (P-value)	Depression Score (P-value)
Age (Years)		
20-30 Vs 30-40	1.00	1.00
20-30 Vs >40	1.00	1.00
30-40 Vs >40	1.00	1.00
Occupation		
Physician Vs Nurse	1.000	0.017
Physician Vs Pharmacist	1.000	1.000
Physician Vs others	1.000	0.926
Nurse Vs Pharmacist	1.000	0.119
Nurse Vs Others	1.000	0.935
Pharmacist Vs Others	1.000	1.000
Experience		
<5 Vs 5-10	1.000	0.526
<5 Vs >10	1.000	1.000
5-10 Vs >10	1.000	0.913
Working area (Posting)		
Quarantine Vs Isolation	1.000	1.000
Quarantine Vs ICU	1.000	0.397
Quarantine Vs Others	1.000	1.000
Isolation Vs ICU	1.000	0.106
Isolation Vs Others	1.000	1.000
ICU Vs Others	1.000	0.144

The source of distress was demonstrated in **table 3**. The fear of health of self and family members was found more in females as a source of distress 3.90 ± 1.00 . Such fear as a source of distress was found higher in the provinces Sanaa (4.75 ± 0.96), Lahij (4.57 ± 1.27), and Abyan (4.50 ± 2.12) as compared to other provinces. The higher level of source of distress was reported as an effect on daily activity in province number Hajjah (6.00). The transmission source of distress was highest in province Lahij (5.00 ± 1.00) followed by province Aldhaleh (4.67 ± 1.41) meanwhile lowest was of province Hajjah (3.00). Containment was reported highest in province Shabwah (5.27 ± 3.38) and in HCPs who have experienced between 5-10 years (5.10 ± 2.10) and the maximum between age variable between 30-40 (5.04 ± 1.80). However, the measures taken by the authority were highest in province 8 (4.50 ± 2.12) and HCPs who worked in ICU (4.00 ± 1.34).

Table 3 Source of Distress among Respondents

Variables	Health of self/family/loved-ones	Transmission	Containment	Measure taken by the authority	Effects on daily activities
Age (Years)					
20-30	3.77±0.99	4.10±0.99	4.41±1.03	3.54±0.86	4.25±1.10
30-40	3.66±0.96	4.11±1.17	5.04±1.80	3.66±1.01	4.27±1.15
>40	3.74±0.94	3.98±1.16	4.66±1.03	3.42±0.80	4.33±1.05
Gender					
Male	3.67±0.95	3.98±1.05	4.55±1.37	3.47±0.84	4.27±1.14
Female	3.90±1.00	4.29±1.06	4.72±0.98	3.70±0.95	4.27±0.99
Occupation					
Physician	3.67±0.91	4.17±1.06	4.62±0.98	3.37±0.71	4.22±1.09
Nurse	3.76±1.06	3.73±0.93	4.60±2.00	3.70±1.00	4.30±1.15
Pharmacist	3.89±0.98	4.39±1.10	4.33±1.07	3.80±1.00	4.39±1.10
Other HCPs	3.76±0.99	3.93±1.08	4.83±1.05	3.51±0.92	4.27±1.07
Experience (years)					
<5					
5-10	3.75±0.98	4.16±1.00	4.48±0.99	3.49±0.84	4.24±1.12
>10	3.84±1.00	3.90±1.04	5.10±2.10	3.68±0.90	4.26±1.18
	3.66±0.94	4.00±1.17	4.58±1.07	3.57±0.95	4.34±1.01
Province					
Aden	3.73±1.00	4.07±0.92	4.68±1.00	3.45±0.93	4.48±1.15
Hadramaut	3.56±0.94	3.86±1.17	4.42±1.05	3.48±0.83	4.15±1.09
Taiza	3.88±0.91	4.08±0.97	4.54±0.97	3.63±0.87	4.06±1.01
Aldhaleh	3.33±0.70	4.67±1.41	4.44±1.24	3.89±0.93	5.00±0.71
Sanaa	4.75±0.96	4.00±1.41	5.25±0.96	3.00±0.00	3.75±0.96
Ibb	3.50±0.75	4.12±0.83	4.25±0.89	3.37±0.52	4.12±1.12
Abyan	4.50±2.12	4.50±2.12	5.00±1.41	4.50±2.12	4.50±2.12
Hajjah	3.00	3.00	5.00	3.00	6.00
Lahij	4.57±1.27	5.00±1.00	5.16±1.17	4.14±1.46	4.86±1.21
Shabwah	3.45±0.82	4.00±1.00	5.27±3.38	3.27±0.47	4.27±1.10
Posting (Placement)					
Quarantine					
Isolation	3.63±1.08	3.78±1.01	4.48±1.01	3.55±0.80	4.07±1.07
ICU	3.42±0.70	4.02±1.12	4.35±1.00	3.63±0.87	4.05±0.92
Other	4.00±1.23	3.90±0.92	4.59±1.05	4.00±1.34	4.36±1.33
	3.85±0.95	4.20±1.07	4.75±1.44	3.41±0.75	4.40±1.10
Training (COVID-19)					
Yes					
No	3.75±0.98	3.93±1.06	4.47±1.06	3.62±0.90	4.18±1.08
	3.73±0.96	4.28±1.04	4.80±1.49	3.43±0.85	4.41±1.10

Table 4 indicates the coping strategies embraced by the respondents amid COVID-19 pandemic. The religious coping strategy was reported highest in province Aldhaleh (3.33 ± 0.87) followed by acceptance (3.14 ± 0.69) in province Lahij, and humor (3.00 ± 1.41 , 3.00 ± 0.82) in province Abye and Lahij respectively, whereas it was the lowest for behavioral disengagement (0.00 ± 0.00) in province Abye and active coping (0.00) in province Hajjah.

Table 4 Coping Strategies Adopted by the Participants

Variables	Self-distraction	Active coping	Denial	Substance use	Emotional support	Informational support	Behavioral disengagement	Venting	Positive reframing	Planning
Age (Years)										
20-30	2.28±1.04	1.89±1.75	2.26±1.98	2.49±1.96	1.50±1.75	2.54±1.15	1.63±1.66	2.54±1.13	1.77±1.63	2.41±1.1
30-40	2.45±1.02	2.18±1.88	2.18±1.78	2.54±1.78	1.45±1.62	2.52±1.28	1.68±1.88	2.75±1.18	1.73±1.47	2.52±1.1
>40	2.50±1.13	1.95±1.77	2.02±1.81	2.52±1.99	1.33±1.70	2.50±0.99	1.55±1.55	2.36±1.03	1.57±1.61	2.51±0.9
Gender										
Male	2.41±1.04	1.87±1.77	2.09±1.9	2.46±2.00	1.38±1.70	2.40±1.15	1.54±1.73	2.46±1.14	1.62±1.63	2.38±1.1
Female	2.27±1.07	2.19±1.79	2.40±1.86	2.40±1.86	1.63±1.700	2.81±1.08	1.81±1.08	2.74±1.07	1.93±1.46	2.64±1.0
Occupation										
Physician	2.51±1.04	1.93±1.80	2.34±1.95	2.16±1.78	1.16±1.55	2.44±1.09	1.51±1.58	2.48±1.13	1.54±1.58	2.44±1.0
Nurse	2.27±1.17	2.30±1.61	2.14±1.75	2.78±1.94	1.92±1.89	2.86±1.20	1.92±1.82	2.94±1.25	2.13±1.49	2.62±1.0
Pharmacist	2.08±0.97	1.75±1.90	1.94±1.80	2.61±2.09	1.61±1.50	2.55±1.16	1.54±1.70	2.19±1.04	1.47±1.50	2.08±0.9
Other HCPs	2.41±1.02	1.93±1.78	2.17±2.01	2.88±1.95	1.51±1.92	2.36±1.16	1.63±1.76	2.63±0.99	1.93±1.69	2.68±1.3
Experience (years)										
<5	2.31±1.04	1.83±1.77	2.82±1.93	2.45±1.89	1.34±1.61	2.84±1.13	1.56±1.64	2.47±1.09	1.65±1.51	2.41±1.1
5-10	2.32±1.01	2.16±1.82	2.00±1.86	2.74±1.89	1.68±1.72	2.61±1.28	2.03±1.97	2.93±1.18	2.00±1.79	2.61±1.1
>10	2.50±1.11	2.14±1.77	2.05±1.85	2.48±1.99	1.57±1.88	2.57±1.11	1.52±1.57	2.48±1.13	1.70±1.62	2.47±1.0
Posting										
Quarantine	2.15±1.03	2.03±1.87	2.00±1.66	2.52±1.93	1.22±1.45	2.52±1.15	1.30±1.32	2.44±1.19	1.52±1.40	2.22±0.8
Isolation	2.16±1.04	2.02±1.53	1.70±1.57	2.46±1.83	1.46±1.52	2.35±1.17	1.74±1.57	2.23±0.92	1.19±1.38	2.51±1.1
ICU	2.50±1.10	2.14±1.91	2.18±2.01	3.14±2.03	2.27±2.25	2.91±1.38	2.05±2.18	2.86±1.08	2.14±1.78	2.59±1.3
Other	2.48±1.05	1.89±1.84	2.45±2.02	2.39±1.93	1.34±1.68	2.52±1.07	1.57±1.69	2.63±1.18	1.62±1.66	2.47±1.1
Province										
Aden	2.32±1.03	1.98±1.84	2.36±2.06	2.45±2.08	1.04±1.36	2.70±1.29	1.49±1.55	2.50±1.13	1.59±1.72	2.25±1.0
Hadramaut	2.38±0.99	2.13±1.71	2.31±1.82	2.38±1.97	1.54±1.84	2.35±1.10	1.56±1.70	2.46±1.14	1.65±1.57	2.52±1.1
Taiza	2.32±1.06	2.25±1.80	2.22±1.75	3.10±1.76	2.07±1.73	2.83±1.07	1.98±1.71	2.86±1.10	1.97±1.47	2.64±1.1
Aldhaleh	1.67±1.00	0.89±1.27	1.00±2.12	1.33±2.06	0.78±1.39	2.11±0.78	0.55±1.01	1.67±0.71	0.67±1.32	1.78±0.6
Sanaa	2.75±0.50	3.00±1.82	2.00±1.82	1.75±1.26	0.50±0.58	2.00±0.00	0.75±0.50	2.50±1.00	2.50±2.08	2.75±0.5
Ibb	3.00±1.19	1.62±1.19	2.87±1.73	2.75±0.89	0.87±0.83	2.50±1.19	2.00±1.31	2.12±1.12	2.50±1.41	2.75±1.2
Abyan	2.00±1.41	0.00±0.00	0.50±0.71	0.50±0.71	0.00±0.00	1.50±0.71	0.00±0.00	2.00±0.00	0.50±0.71	1.50±0.7
Hajjah	1.00	0.00	3.00	3.00	1.00	1.00	1.00	1.00	1.00	2.00
Lahij	2.71±0.75	1.00±1.53	1.14±1.86	1.29±1.25	0.43±0.79	2.14±1.07	1.14±1.21	2.43±0.79	1.00±1.41	2.33±0.5
Shabwah	2.64±1.43	1.54±2.21	2.27±1.89	2.27±2.15	1.73±2.53	2.18±1.33	2.09±2.66	2.82±1.33	2.00±1.73	2.45±1.3
Training (COVID-19)										
Yes	2.23±1.03	1.71±1.67	2.02±1.85	2.27±1.91	1.41±1.80	2.35±1.11	1.59±1.74	2.45±1.12	1.53±1.52	2.32±1.0
No	2.55±1.06	2.33±1.88	2.43±1.94	2.84±1.89	1.52±1.57	2.77±1.15	1.67±1.60	2.69±1.12	1.99±1.64	2.65±1.2

Most of the coping strategies followed by the HCPs is vary from one province to another, in which maximum used strategy in most provinces in Yemen is faith-based religion, meanwhile, emotional support shows less strategy to be followed in many provinces.

Multiple comparisons of coping strategies among selected variables were illustrated in **table 5**. Bonferroni correction revealed no significant differences in coping style among age categories except in the age group of 20-30 years as compared to 30-40 years that was statistically significant in self-blame ($p=0.046$) as a coping strategy. While comparing coping strategies occupation-wise, a significant relationship was demonstrated only in nurse versus pharmacist comparison on venting ($p=0.026$). As compared to >10 years experienced HCPs, the HCPs with 5-10 years of experience showed high significance on self-blame ($p=0.034$). Furthermore, no statistically significant difference was reported in comparing posting areas regarding coping strategies among all HCPs.

Table 5 Multiple Comparisons of Coping Strategies among Selected Variable (Bonferroni Correction)

Variables	Self-distraction	Active coping	Denial	Substance use	Emotional support	Informational support	Behavioral disengagement	Venting	Positive reframing	Planning	Humor
Age (Years)											
20-30 Vs 30-40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.892	1.00	1.00	1.00
20-30 Vs >40	0.748	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30-40 Vs >40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.321	1.00	1.00	1.00
Occupation											
Physician Vs Nurse	1.00	1.00	1.00	0.587	1.00	0.388	1.00	0.214	0.350	1.00	1.00
Physician Vs Pharmacist	0.270	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.628	0.782
Physician Vs others	1.00	1.00	1.00	0.294	0.143	1.00	1.00	1.00	1.00	1.00	1.00
Nurse Vs Pharmacist	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.026	0.442	0.218	1.00
Nurse Vs Others	1.00	1.00	1.00	1.00	1.00	0.311	1.00	1.00	1.00	1.00	1.00
Pharmacist Vs Others	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.507	1.00	0.102	1.00
Experience (years)											
<5 Vs 5-10	1.00	1.00	1.00	1.00	0.981	1.00	0.505	0.130	0.857	1.00	1.00
<5 Vs >10	0.816	0.845	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5-10 Vs >10	1.00	1.00	1.00	1.00	1.00	1.00	0.518	0.216	1.00	1.00	1.00
Posting											
Quarantine Vs Isolation	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Quarantine Vs ICU	1.00	1.00	1.00	1.00	0.190	1.00	0.757	1.00	1.00	1.00	0.647
Quarantine Vs Others	0.897	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Isolation Vs ICU	1.00	1.00	1.00	1.00	0.419	0.379	1.00	0.195	1.00	1.00	1.00
Isolation Vs Others	0.606	1.00	0.714	1.00	1.00	1.00	1.00	0.279	1.00	1.00	1.00

	1.00	1.00	1.00	0.594	0.120	0.195	1.00	1.00	0.992	1.00	1.00
ICU Vs Others											

Discussion

From the various studies regarding mental health issues of people around the globe amid such pandemic, there is no doubt that HCPs are experiencing unparalleled extents of COVID-19 related psychological stress across the personal and professional spheres. This is why, this study was undertaken to interpret the quality assessment of psychological exhaustion of COVID-19 pandemic in Yemeni HCPs as well as their behavior to such pandemic [16-20].

A total of 197 HCPs from different provinces of the country participated in this study where a male to female ratio was found to be 2.18 with 68.5% male HCPs. Such findings of this study are in line with the study conducted in Nepal, where 54.2% of male participants were included [21]. Among the respondents, physicians were the majority HCPs whereas the nurses were found more vulnerable towards anxiety and depression. In gender-wise analysis, female HCPs were reported less in number as well as more depressed and anxious as compared to the male counterparts. This finding is in agreement with the outcome of a study conducted in Saudi Arabia by Al-Hanawi et al. (2020) [22]. The cultural perspective and the more concerns towards taking care of family members might be the contributing factors in this regard. More exposure towards the patients within the ward and workload are the leading cause of susceptibility of psychological stress among nurses [23].

Out of 22 provinces, the maximum number of HCPs participated from province Taiz (29.95%) as it is the largely populated province of Yemen. Though it was a nationwide survey, no HCPs participated from 11 provinces because of inaccessibility in getting contacted due to COVID-19 pandemic and civil war effects.

Our finding of anxiety and depression in both gender were found to be of mild category which is in line with other previous studies such as studies conducted by Shechter et al. (2020) in New York and Salman et al. in Pakistan (2020) [24, 25].

The majority of HCPs (59%) were already trained regarding COVID-19 management in our study. This finding contrasts with the previous result of Yemen where a majority of the respondents had never attended such kind of training [26]. Such finding possibly highlights the need to direct more attention toward developing educational courses and programmers related to COVID-19 [27]. Regarding the difference in depression with respect to age, experience, and working areas; our result did not reveal any significance, meanwhile, a significant statistical difference of depression score was reported in occupation-wise comparison between physician versus nurse ($p=0.017$). This may be due to the more knowledge of the intensive effect of COVID-19 by the physician as compared to the nurse which was previously revealed by a study in Yemen [26].

our finding showed no difference in the anxiety of HCPs in working areas, which also contrasts with the previous studies in China that had revealed almost twice the risk of anxiety in different working areas [27]. Some studies have compared the mental disorders experienced by HCPs in areas where the pandemic was widely experienced compared to other regions. Anxiety, fear, and depression were much higher in HCPs in those areas because the HCPs working there are always more susceptible to infection [27].

A stressor such as health of self/family/loved-ones, transmission, containment, a measure taken by the authority, and effects on daily activities was found varying from province to province. The highest measures taken by the authority were in province eight meanwhile the status of the other remaining provinces was poor. This may be attributed to the poor health care facilities in Yemen to tackle such pandemic, where majorities of health care centers are not provided with the proper preventive facilities [28].

Our finding highlighted the importance to provide adequate psychological support to HCPs, as well as implement preventive measures to control the stressor among HCPs. Such findings correlate with the findings from Si et al. (2020) in China [4].

The general preparedness and capability to tackle COVID-19 were reported very poor by the majority of HCPs in our study, which corresponds with the various studies conducted in Yemen by different researchers that demonstrated the fragile healthcare system of Yemen and difficulty in coping with the scenario by HCPs working therein [28-30].

Comparing coping behaviors in Yemen HCPs towards COVID-19, a significant association was notified between the level of performance of participants and their occupation ($p=0.023$), which is in line with our finding which shows a significant relationship in the only nurse versus pharmacist comparison on venting ($p=0.026$), meanwhile, the years of work experience showed no significance in our finding which contrasts the previous finding in Yemen ($p=0.011$) [19].

Eisenberg et al. (2012) had described two major elements of the coping strategies, namely "avoidant coping" and "approach coping" [31]. Avoidant coping was designated by the subscales of denial, behavioral disengagement, substance use, self-blame, venting, and self-distraction. Besides other subscales, religion and humor were regarded as adaptive coping. Similarly, approach coping was described by the subscales of active coping, positive reframing, acceptance, planning, informational support, and seeking emotional. Based on the avoidant, approach, and adaptive coping strategies; we assessed the type of wellness resources as a coping strategy in such COVID-19 adversity. We found the most respondents scored is adaptive coping based on faith-based religion, which is in contrast with a study conducted in New York by Shechter [24].

There were certain limitations in our study. Firstly, very few HCPs as respondents were available from some provinces due to the adverse scenario caused by COVID-19 as well as by the internal catastrophe of conflict. Secondly, the inherent selection bias cannot be ignored due to the exploratory kind of study. However, our finding has investigated the psychological impact, source of stress, and coping strategies of HCPs on COVID-19 from different health care institutions from various provinces of Yemen.

Conclusion

This study investigated the level of anxiety, stress, depression, and the coping behavior thereof in healthcare professionals in Yemen. COVID-19 pandemic has caused a mild impact on the mental health status of Yemeni healthcare professionals. The most frequently adopted coping strategies in most provinces in Yemen were found faith-based religion. The trained professionals demonstrated less level of psychological stress. Our findings indicate the requirement of adequate plans and policies from administrative to clinical and welfare viewpoint in preparedness and preventive behaviors from the regulatory body that alleviates the psychological stress of such professionals for the efficient provision of better healthcare services throughout the nation.

Abbreviations

ANOVA:	Analysis of variance
COVID-19:	Coronavirus disease-19
GAD-7:	Generalized anxiety disorder-7
HCPs:	Healthcare professionals
ICU:	Intensive care unit
IHR:	International Health Regulations
PHEIC:	Public Health Emergency of International Concern
PHQ-9:	Patient health questionnaire-9
PPE:	Personal protective equipment
SD:	Standard deviation
SPSS:	Statistical package for social sciences
WHO:	World Health Organization

Declarations

Ethics approval and consent to participate

The research has been performed in accordance with the Declaration of Helsinki. The ethics approval was granted by the Humans Ethics Committee (HEC), University of the Punjab, Lahore. Informed consent to participate in the study was obtained from participants.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study will be available from the corresponding author on reasonable request.

Competing interests

The authors declare no competing conflict of interest.

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Authors' contributions

NMAM: Conceptualization, Methodology, Data collection, Data curation, and Writing - Original draft preparation. **MS:** Conceptualization, Resources, Supervision, and Writing-Reviewing and editing. **SK:** Methodology, Formal analysis, and Writing- Reviewing and editing. **MAAMA:** Data collection, Visualization, and Writing- original draft preparation. **MMSSK:** Data collection, Visualization, and Writing- original draft preparation. **MAJA:** Data curation, Formal analysis, and Validation.

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