Effects on Mental Health of Health Care Workers Due to CovID-19

Qazi Danish Ayub
Department of Computer Science
Information Technology University
Lahore, Pakistan
msds20075@itu.edu.pk

Muhammad Mubashir Ali
Department of Computer Science
Information Technology University
Lahore, Pakistan
msds20085@itu.edu.pk

Abdullah Aziz
Department of Computer Science
Information Technology University
Lahore, Pakistan
msds20052@itu.edu.pk

***Abstract*—CovID19 a pandemic which have affected 54 million people and 1.4 million deaths around the globe and with the second wave is being the deadliest pandemic of the century during this pandemic health care worker due to lack of resources have been traumatized and were in continuous mental health issues according to the survey conducted in the 3 cities of Pakistan.**

Keywords—SARS1, SARS2, CovID19, DASS21, pandemic.

I. Introduction

The pandemic that affected around the world. The second wave shown some immense change in the geo graphical region of South Asia have completely countered the smart lock down conflicting previous wave. And so, the most vulnerable people that were in contact with the virus were the paramedic staff of medical facilities. The research gives a brief statistical analysis on the impact of it on mental health of medical staff.

II. Literature Review

The CovID 19 pandemic has caused a lot of distress among people in many areas of life. The research conducted during the SARS outbreak more than 10 years ago suggested that the health care workers were suffering from depression anxiety and stress [1]. The same is being anticipated currently for the coronavirus pandemic. For previous studies conducted between Jan 2020 to Aug 2020 it is quite clear that the method to collect data has mostly been through surveying frontline healthcare workers during this pandemic. These were done physically, with participation rate 68.7% [2] or through online survey forms [3]. The main objective of these studies is to find the relationships between CovID 19 and psychological related variables.

The questionnaires that were observed during this literature review consist of 2 sections one part takes input of the personal information such as age, gender, role, marital status, experience, education, and the other part is mostly based on professionally developed self-assessment questionnaires. Such as the Insomnia Severity Index (ISI) or the Depression, Anxiety, and Stress Scale (DASS)-21 for example [4]. The DASS Scale 21 consist of three sub items to calculate Anxiety, Stress and Depression. To calculate each section, consist of 7 question. The rating of DASS sub items such as depression, anxiety, and stress can be rated as normal, mild, moderate, and extremely severe. Each item is scored in a self-rated Likert scale from 0 to 3. The DASS scale has shorter version and longer version (comprising of 21 and 42 items, respectively). In DASS-21, the final score of each item is multiplied by two to obtain the final score [5].

The average age of the participants ranged between 26-40 years. Most of the participants were females [6]. suggests that different age groups show worry for different reasons. For example, age group (31-40) years was always worried if they might infect their families. Age group > 50 years felt stress after a patient they were looking after died [7].
A study Conducted in India and found that the healthcare workers were suffering from worries related to personal matters like being a source of infection for family and other health workers [7]. Possibility of being quarantined. Anxiety of household problems related to lockdown [8]. also found that health care workers were worrying because they had to contact different confirmed cases.

Another study found out that the frontline workers had trouble sleeping(insomnia) at night which made their worries worse [9]. It is essential to consider timely therapeutic treatment for stress management with healthcare workers [10].

III. Data Collection

This was a cross sectional web-based survey conducted between December 1 and December 18, 2020, using an online questionnaire spread via social media platforms. Some responses were collected manually by visiting public hospitals. The questionnaire survey was also translated into Urdu for participants that were not English literate. This was conducted at a time when second wave of this pandemic was at its peak. To compare the inter-regional differences of mental health outcomes among health care workers in Pakistan. The major cities considered for this study were Islamabad/Rawalpindi, Multan, Karachi, and Lahore AJK. A total of 132 responses were collected. The web-based questionnaire was very simple to fill. The link of the survey was shared with social media groups (Facebook, WhatsApp groups) consisting of doctors. The participants were informed about the survey and the intention behind this study. They were also provided with a website link for DASS research, based on which a major portion of this survey was designed. It was a simple google form. Upon clicking the link participants were directed to the form, where they could choose the options for each question. The survey * consists of two sections. The first section gathers the demographic information about the individual participant for example, gender, age category, marital status, education level, designation etc.

*https://forms.gle/w26bigW1K8QpvTWZ8

The second section is based on the DASS21 questionnaire, which is a shorter version of DASS, the Depression Anxiety Stress Scales. It is made up of 21 questions which are divided into 3 categories i.e., depression, anxiety, and stress. The 3 fundamental indicators of a disturbed mental health. The objective of this assessment is to isolate and identify the aspects of emotional disturbance. Each question is scaled from 0 to 3. Following instructions were provided to every participant to choose their option.
Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.
The rating scale is as follows:
0 Did not apply to me at al
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree or a good part of time.
3 Applied to me very much or most of the time
Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items.

Level	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extreme Severe	28	20	34

Table 1

IV. Methodology

The questionnaire through which this survey has been designed was based on the DASS 21. It is an evaluation form that contains 21 questions and is a shorter version of the actual DASS evaluator, as described earlier. The questionnaire was filled using different online means as well as physically by visiting different hospitals. The data is collected from major cities in Pakistan. Once the data was collected, it was compiled together in the form of a dataset. The dataset was then further analyzed with the help of python library pandas.

Preprocessing: During the preprocessing of the data dataset we removed the Timestamp attribute in the beginning because as the survey was conducted in between in two weeks so there was no need to use that attribute in this type of statistical analysis. Moving to the city of work attribute After analyzing the City of work column in our dataset it is found that different people used different spellings to spell their cities. Some paramedics used short form spellings of their cities. So it was normalized and standard spellings were used for each city. Second the we converted city name in way that we created a threshold that we have to cover the big cities and so we used a radius of 80 kilometers that the cities in this radius will be named as their nearest big city Table 2 represents the conversion we made including the extra spaces added by persons and the misspelling of them.

Cities	**Label**
multan, mulltan, Layyah, Kahror Pacca	Multan
lahore, Lahorw, Lhr, Lahore	Lahore
Rawalpindi, Rawalpindi, Rawal pindi ,rawalpindu, Rwp, Rawalpi di, Pindi, Chakwal ,rawat	Rawalpindi
Islambad , Islamabad , Isb,islamabad	Islamabad
mirpur azad kashmir , Bhimber AJK	AJK
Sialkot ,Gujrat	Sialkot
Khushab , Sargodha	Sargodha
Karachi	Karachi

Table 1 1

Moving to the conversion of the questions and classifying them to the category of the Stress Anxiety and depression the following table represent the classification of the questions.

Question	**Label**
I found it hard to relax after a long day.(S)	S1
I was aware of dryness of my mouth.(A)	A1
I couldn't seem to experience any positive feeling at all. (D)	D1
I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion).(A)	A2
I found it difficult to work up the initiative to do things.(D)	D2
I tended to over-react to situations.(S)	S2
I experienced trembling (e.g. in the hands)(A)	A3
I felt that I was using a lot of nervous energy.(S)	S3
I was worried about situations in which I might panic and make a fool of myself.(A)	A4
I felt that I had nothing to look forward to.(D)	D3
I found myself getting agitated.(S)	S4
I found it difficult to relax.(S)':'S5', 'I felt down-hearted and sad.(D)	D4
I was intolerant of anything that kept me from getting on with what I was doing.(S)	S6
I felt I was close to panic.(A)	A5
I was unable to become enthusiastic about anything.(D)	D5
I felt I wasn't worth much as a person.(D)	D6
I felt that I was rather touchy.(S)	S7
I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)(A)	A6
I felt scared without any good reason.(A)	A7

Table 3

Age

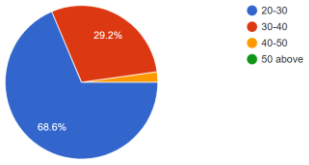

Figure 1

The profession like Doctors normally belong to the younger group especially when it comes to the people who were directly handling the covid patients and isolation wards

there were mostly young doctors but because of the statistical point of view we categorized ages into different groups so according the survey conduction on 137 people from different cities figure 1 represents the classification of the age group that the people belong to.

Gender

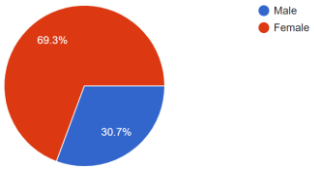

Figure 2

The distribution of gender is illustrated in Figure 2 that were the part of research.

Marital Status

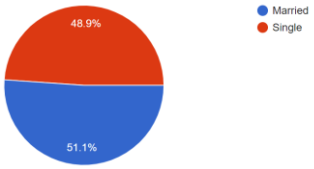

Figure 3

Since a married doctor after working on isolation wards have also been interacting with the family and thus it is an important thing to ask about the marital status of the person so the figure 3 represents the classification of the Marital status of the people.

Education

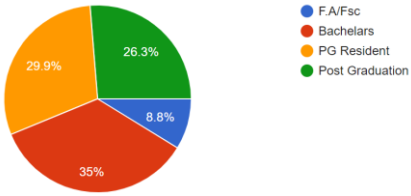

Figure 4

The paramedics consist of people from different educational groups and according the survey conduction on 137 people of different Educational backgrounds figure 4 represents the classification of the education groups division of those people in which they belong to.

Staff Type

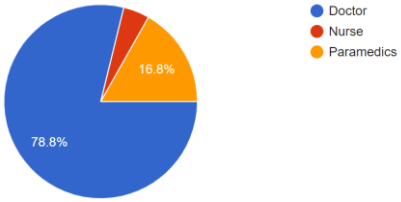

Figure 5

As the survey was only conducted on the people belonging to the paramedics' staff and as we know that the paramedics consist of different groups and so Figure 5 represents the staff type of the people who give their reviews in the survey.

Current working department

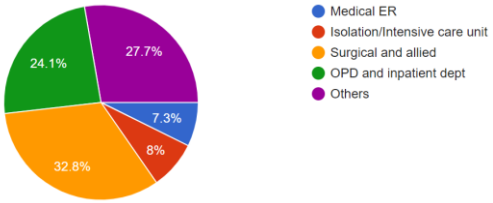

Figure 6

The paramedics staff of a hospital works on different situation and so figure 6 represents the classification of working department of paramedics.

Living situation

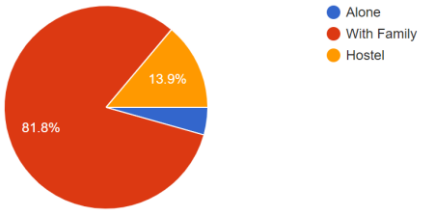

Figure 7

The living situation was also a main point in calculation of mental stress of a person and so it is represented in the figure 7.

The columns are analyzed thoroughly, the data type mostly being categorical and ordinal, since it was a questionnaire where we have to already define the options so that the user can easily fill them out. Once the columns are renamed, we can perform the scoring mentioned by DASS21 paper. That is to add all the scores of the questions belonging to the same category and multiply them by 2. By multiplying the sum of all the columns with 2 we get the scores to a standard so that the responses can be classified into their severity. They could belong to any of the following categories (Normal, Mild, Moderate, Severe, Extremely Severe) depending on the scoring.

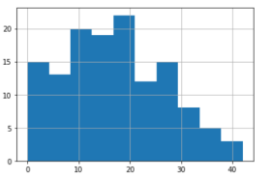

Figure 8

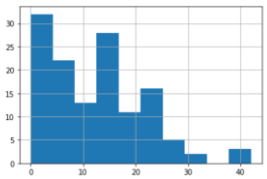

Figure 9

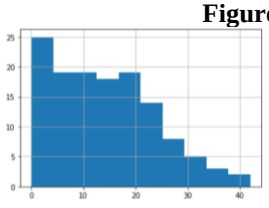

Figure 10

Now that we have summarized the data collected by questionnaire and transformed all the questions into three attributes. These attributes are scores of anxiety, stress and depression, calculated on the bases of responses submitted by health care workers and compiled by using the DASS scoring mechanism. Now the data is analyzed to be approximately uniformly distributed. This was decided by unpleasing the histograms of the scores. Looking at the figure 8, 9, 10 we can clearly see the distribution but the histograms were a little misleading, so we analyzed the box plot graph, but in the end, we concluded that the distribution is uniform because the mean and median of the attributes are nearly equal. For stress we have the following values (mean = 17.62, STD = 9.709, median=16.0), for anxiety we get the following values (mean = 12.63, STD = 9.06, median =12.0) Sand for depression we get the following values (mean= 14.43, STD = 9.39, median=14.0).

Once the data was thoroughly analyzed it was concluded that the data distribution represented was nearly normal, and further tests were designed accordingly. Since the population mean and population standard deviation were not known. It was best to estimate the mean parameter by using confidence interval. The confidence interval estimates a range of the population by finding the T-scores using sample data. The confidence interval calculated based on two different significance values. The two significant values being alpha=0.05 and alpha= 0.1.

The scores were calculated in the end and it was found out to which category the score belonged. The categories and scoring system is standard that comes with DASS 21 guidelines. The confidence intervals were found on the complete dataset to estimate the mental conditions of health care workers in the entire country. Then later the confidence interval was calculated for different categories such as cities, genders, education levels, age, living conditions, marital status, department, rank(staff) etc. These confidence intervals give us a general idea about the mental state of the health care workers in Pakistan. The values obtained for anxiety, stress and depression among all the different categories where compared pairwise using the two-t test and results were recorded. Since the data is assumed to be normally distributed, we are left with limited number of tests to perform on our dataset.

The necessary step that the research followed right from the beginning till the end of the research can be easily represented by the figure 11.

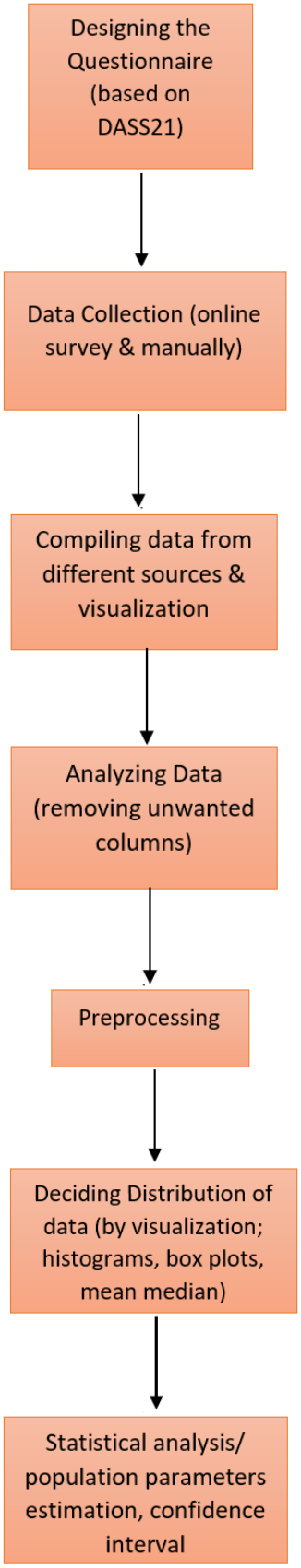

Figure 11

V. REFERENCES

[1] K. K. Wu, S. K. Chan, and T. M. Ma, "Posttraumatic stress after SARS," *Emerg. Infect. Dis.*, vol. 11, no. 8, pp. 1297–1300, 2005.

[2] J. Lai *et al.*, "Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019," *JAMA Netw. open*, vol. 3, no. 3, p. e203976, Mar. 2020.

[3] R. Rossi *et al.*, "Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy," *JAMA Netw. Open*, vol. 3, no. 5, pp. e2010185–e2010185, May 2020.

[4] S. S. Chatterjee, R. Bhattacharyya, S. Bhattacharyya, S. Gupta, S. Das, and B. B. Banerjee, "Attitude, practice, behavior, and mental health impact of COVID-19 on doctors," *Indian J. Psychiatry*, vol. 62, no. 3, pp. 257–265, May 2020.

[5] F. Shahzad *et al.*, "Perceived Threat of COVID-19 Contagion and Frontline Paramedics' Agonistic Behaviour: Employing a Stressor–Strain–Outcome Perspective," *Int. J. Environ. Res. Public Health*, vol. 17, no. 14, p. 5102, Jul. 2020.

[6] H. Cai *et al.*, "Psychological impact and coping strategies of frontline medical staff in Hunan between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID) in Hubei, China," *Med. Sci. Monit.*, vol. 26, pp. e924171-1, Apr. 2020.

[7] R. Mohindra, R. R, V. Suri, A. Bhalla, and S. M. Singh, "Issues relevant to mental health promotion in frontline health care providers managing quarantined/isolated COVID19 patients," *Asian J. Psychiatr.*, vol. 51, p. 102084, 2020.

[8] L. Kang *et al.*, "The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus," *The Lancet Psychiatry*, vol. 7, no. 3. Elsevier Ltd, p. e14, 01-Mar-2020.

[9] "(PDF) Effect of covid 19 on health care workers." [Online]. Available: https://www.researchgate.net/publication/343222483_Effect_of_covid_19_on_health_care_workers. [Accessed: 14-Nov-2020].

[10] Y. T. Xiang *et al.*, "Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed," *The Lancet Psychiatry*, vol. 7, no. 3. Elsevier Ltd, pp. 228–229, 01-Mar-2020.