COVID -19 Pandemic Induced Anxiety, Knowledge, and Preventive Measures Practices among Non-medical Healthcare Workers in Quarantine Hospitals

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Abstract

Background: Healthcare workers are the most vulnerable to COVID-19 because of the nature of their work, which exposes them to COVID-19-infected people on a daily basis. Because anxiety affects everyone, whether they are frontline health workers or hospital administrative and support staff. **The aim of this study** was to assess COVID- 19 pandemic induced anxiety, knowledge, and preventive measures practices among non-medical healthcare workers in quarantine hospitals. **Methods:-**Cross-sectional descriptive design was used to attain the aim of the study. **Setting**: This study was carried out at four quarantine hospitals in Shebin El-Kom and Elshohadaa city, Menoufia Governorate, Egypt. Three out of four quarantine hospitals were selected from Shebin El-Kom city, and one out of two quarantine hospitals were selected from Elshohadaa city, using a simple random sample technique. **Subjects**: A simple random sample of 340 non-medical healthcare workers from quarantine hospitals was chosen from four different profession categories including patient affairs office, security officer, receptionists, and accountants. **Tools for data collection:** A constructed interview questionnaire involved socio-demographic information; COVID-19 pandemic induced anxiety scale, COVID-19 pandemic knowledge questionnaire and preventive measures practices toward COVID-19 pandemic questionnaire. **Results:-**The current study's findings found that 51.8% of the studied non-medical healthcare workers had COVID-19 pandemic induced anxiety, 62.4% had better knowledge about COVID-19 pandemic, and more than half (58.8%) had good preventive measures practices about COVID-19 pandemic. Furthermore, there was a significant positive correlation between non-medical healthcare workers knowledge and preventive measures practices, while there was no significant correlation between anxiety and COVID-19 pandemic knowledge and preventive measures practices among non-medical healthcare workers. **Conclusion**: COVID-19 pandemic induced anxiety was experienced by more than half of the non-medical healthcare workers in the study. Good preventive measures practices were associated with increased knowledge toward COVID-19 pandemic. All non-medical healthcare workers in health facilities should receive educational as well as psychological intervention to raise their awareness of COVID-19 pandemic and assist them in overcoming anxiety.

Keywords:-COVID-19 anxiety, Non-medical healthcare workers, Knowledge, Preventive measures practices.

Introduction:-

The coronavirus disease pandemic of 2019 (COVID-19) has fast spread around the world. This inimitable condition poses a serious threat to the community and healthcare system **(Cai et al, 2020; Que et al, 2020)** Healthcare workers (HCWs) are on the front lines of the pandemic's fight and the most vulnerable to COVID-19 because of the nature of their work, which exposes them to COVID-19-infected persons on a daily basis **(Liu et al, 2020; Wang**

et al, 2020).The World Health Organization (WHO) has defined HCWs as "All individuals engage in actions whose foremost goal is to improve health." Doctors, nurses, midwives, paramedics, hospital administrators and support staff, as well as community workers, are all at danger of getting COVID-19, and dying in the worst-case scenario **(Bandyopadhyay et al, 2020)**. The WHO estimated that 80 000 to 180 000 health and care workers died from COVID-19 between January 2020 and May 2021, with an average of 115 500 deaths **(World Health Organization, 2021)**.

The COVID-19 pandemic was a health-care disaster that resulted in significant morbidity and mortality among the general public and health-care workers, as well as economic effects, physical and psychological impacts **(Gupta et al, 2021)**. During the COVID-19 public health crisis, anxiety is one of the most common psychological impacts experienced by healthcare personnel **(Mohd Noor et al, 2021)**. The worry could be a global response to the COVID-19 outbreak among hospital employees. Anxiety is unrelated to whether or not a hospital employee is directly involved in COVID-19 patient care or the number of COVID-19 patients admitted to the hospital. Employees at the hospital were worried because they were confronted with a new circumstance as well as an unknown hazard, both of which disrupted their work and daily procedure. Hospital employees' anxiety levels were significantly higher than the general population's during the COVID-19 pandemic **(Mattila et al, 2021)**.

Healthcare workers in quarantine hospitals may experience increased psychological distress as a result of their fears of becoming infected and spreading disease to vulnerable family members or coworkers, as well as a work overload and the need to perform with strict safety precautions during the pandemic **(Cai et al, 2020; Stojanov et al, 2021)**. Furthermore, a scarcity or complete lack of many forms of safety equipment may contribute to the anxiety and distress **(Lai et al, 2020)**. Psychological anxiety is a serious health concern that is linked to stressful situations that are difficult to handle in everyday life and can

result in physical or mental harm to persons. The inability to cope with stressful events can lead to depression, anxiety, stress, exhaustion, and mental illness, among other undesirable outcomes **(Alenazi et al, 2020)**.

The COVID-19 epidemic appears to have elevated anxiety in hospital employees who had never been diagnosed with a mental disease before **(Ho et al, 2020)**. According to the findings of **(Mattila et al, 2021)**; who conducted a study to examine COVID-19 anxiety and associated factors among hospital workers, according to this study, 60 percent of the participating hospital personnel reported an increase in work-related anxiety during the COVID-19 outbreak. Several studies have found that during the COVID-19 pandemics, healthcare professionals were more anxious than non-medical healthcare workers **(Lai et al, 2020; Que et al, 2020; Preti et al, 2020; Pappa et al, 2020).**

According to the findings of **(Mohd Noor et al, 2021)** both frontline and non-frontline healthcare personnel experienced anxiety. Non-frontline healthcare workers were more anxious than frontline healthcare workers. Other research conducted among medical and non-medical healthcare professionals **(Tan et al, 2020) and (Chew et al, 2020)** discovered that non-medically employees working in healthcare facilities have a higher rate of anxiety than medical health care workers. This may be due to a lack of formal psychological support, a lack of firsthand health information about the global epidemic, and inadequate training in the use of safety equipment and infection-control measures **(Tan et al, 2020)**. Healthcare workers' compliance with COVID-19 preventive activities is influenced by their knowledge and practices **(Ejeh et al, 2020)**. As a result, HCWs must have a comprehensive understanding of COVID-19 prevention policies in order to engage in positive activities that reduce infection risk **(Polychronis, & Roupa, 2021)**. Assessing HCWs' COVID-19 knowledge and practices can aid pandemic prevention strategies by identifying important gaps that must be filled through training programs. Knowledge and practices toward COVID-19 among HCWs in Africa has been assessed in a few studies. While

some of these studies revealed that HCWs have satisfactory COVID-19-related knowledge and practices **(Kassie et al, 2020; Kanu et al, 2021)**. Others have observed significant gaps **(Lake et al, 2021; Asemahagn, 2020)**.

The World Health Organization**(WHO, 2020)**emphasized the necessity of taking immediate precautions to prevent and treat psychological problems among HCWs. Protecting health professionals from physical and mental hazards in order to ensure the sustainability of health services supplied to patients is critical to health systems' success in dealing with long-term disasters like pandemics **(Elbay et al, 2020)**. Screening staff psychological health and identifying sources of psychological distress among them in order to facilitate effective implementation of psychological interventions in the workplace **(Goldmann, & Galea, 2014)** is an effective technique for providing mental health services to HCWs. Mental health support is crucial in lowering psychological concerns among healthcare personnel as the world continues to deal with the COVID-19 pandemic **(Walton et al, 2020)**. Despite the importance of this issue, little research has been done on hospital worker anxiety during the pandemic **(Raoofi et al, 2021)**. Furthermore, because anxiety affects everyone, whether they are front line health workers or hospital administrative and support staff, the study's goal is to assess COVID-19 induced anxiety, knowledge, and preventive practice among non-medical healthcare workers in quarantine hospitals,

Significance of the study

In response to the COVID-19 pandemic, Egypt developed a unique style of care under WHO guidance, in which specific hospitals are designated as "quarantine hospitals" for COVID-19 patients **(Youssef et al, 2020)**. As quarantine hospitals are a major source of infection for both medical and non-medical healthcare workers. According to the findings of a systematic review and meta-analysis studies, a large percentage of healthcare workers experienced negative psychological effects from COVID-19, such as depression and

anxiety **(Sun et al, 2021)**. On the other hand, other employees in health-care facilities have been demonstrated to be more vulnerable to psychological anxiety than medically trained employees **(Tan et al, 2020; Chew et al, 2020)**. Also, studies on the impact of coronavirus epidemics on non-medical health workers in Egypt are lacking. Therefore, there is an urgent need to assess COVID-19 pandemic induced anxiety, knowledge, and practice among non-medical healthcare workers in quarantine hospitals.

The Aim of the Study

Assess COVID-19 pandemic induced anxiety, knowledge and preventive measures practices among non-medical healthcare workers in quarantine hospitals.

Subjects and methods
Research Questions
1. What is the percentage of COVID- 19 pandemic induced anxiety among non-medical healthcare workers?

2. What is the level of knowledge and preventive measures practices among non-medical healthcare workers?

3. Is there a relationship between non-medical healthcare workers' socio-demographic variables and COVID-19 pandemic induced anxiety?

4. Is there a relationship between non-medical healthcare workers' socio-demographic variables and COVID-19 pandemic knowledge and preventive measures practices?

5. Is there a correlation between COVID-19 pandemic induced anxiety, knowledge and preventive measures practices among non-medical healthcare workers?

Research Design:

Cross-sectional descriptive design was used to attain the aim of the study.

Research Setting:-
The data was collected from four quarantine hospitals at Shebin El- Kom city and Elshohadaa city, Menoufia governorate, Egypt. The quarantine hospitals were selected by using

simple random sample technique, 3 out of 4 quarantine hospitals were selected from Shebin El- kom city and one out of two quarantine hospitals was selected from Elshohadaa city. To select four quarantine hospitals, the researchers wrote the names of Shebin El- kom city's quarantine hospitals in a piece of papers, then put them in the container and selected one paper through sample random selection. The selected quarantine hospitals from Shebin El- Kom city were National liver institute; Shebin El- Kom teaching hospital and Meet Khalaf fever hospital as well as Elshohadaa central hospital from Elshohadaa city.

Subjects:-

A simple random sample of 340 of non-medical healthcare workers from quarantine hospitals was selected from four different profession categories including patient affairs office, security officer, receptionist and accountant. Using hospital non-medical health workers rosters, the researchers wrote every profession categories non-medical healthcare workers' names from each hospital in a piece of papers, then put them in the container and selected one paper through simple random sample technique.

Tools of the Study:-

Four tools were used for data collection: A self-designed questionnaire was prepared to collect demographic details of the participants; COVID-19 pandemic induced anxiety scale, preventive measures practices toward COVID-19 pandemic questionnaire and knowledge about COVID-19 pandemic. The questions were established on the basis of the authors' experience. After the preparation of the questionnaire, it was sent to group of 5experts (three professors in Family and community health nursing and two professors in Psychiatric &mental health nursing)to consult their opinions regarding the validity of the questionnaire followed by a small pilot study (34) to test its simplicity and difficulty. However, the results of the pilot study were not included in the actual samples used for the study.

Tool (1) A constructed interview questionnaire to assess socio-demographic such as age, gender, marital status, residence, educational level, occupation, years of experience, number of children and monthly income.

Tool (2) A COVID-19 Pandemic induced anxiety scale: It was developed by the researchers to assess COVID-19 pandemic induced anxiety among non-health care workers in quarantine hospitals. It consisted of 24 items and each item had a possible response of (0) disagree, (1) not sure and (2) agree. A COVID-19 pandemic induced anxiety items' total score was 48. The score from 0-29 indicated absent anxiety and 30-48indicated present anxiety. It was tested for its validity by a panel of experts. The reliability of the tool was done using test-retest reliability and proved to be reliable; a Cronbach's alpha coefficient was 0.70.

Tool (3) Preventive measures practices toward COVID-19 questionnaire: It was developed by the researchers to assess participants' preventive measures practices toward COVID-19 pandemic. It consisted of 25items about preventive measures practices responding to the COVID-19 pandemic, and each item was responded as "*No*" and "*Yes*" (e.g., Do you use tissues or handkerchiefs during coughing/sneezing?). Preventive measures practices items' total score was 25. The score from 0-15 indicated poor preventive measures practices towards the COVID-19 pandemic; while the score from 16-25indicated good preventive measures practices towards the COVID-19 pandemic. It was tested for its validity by a panel of experts. The reliability of the tool was done using test-retest reliability and proved to be reliable;; a Cronbach's alpha coefficient was 0.628.

Tool (4) knowledge about COVID-19 pandemic. It was developed by the researchers to assess participants' knowledge about COVID-19 pandemic. It consisted of 19 items and each question had a possible response of "*Yes*", "*No*" and "*Not sure*" (e.g., *Is COVID-19 a dangerous disease*?). The correct answer (*Yes*) was coded as 1, while the wrong answer (*No/ Not sure*) was coded as 0. The total score was 19.The

score from 0-11 indicated poor knowledge about the COVID-19 pandemic; while the score from 12-19indicated good knowledge about the COVID-19 pandemic. It was tested for its validity by a panel of experts. The reliability of the tool was done using test-retest reliability and proved to be reliable; a Cronbach's alpha coefficient was0.598.

Ethical Considerations:

This study was approved by the Ethical Committee for Scientific Research Review, Faculty of Nursing, Menoufia University, Egypt. Also, the informed consent was taken from the non-medical healthcare workers after giving adequate information regarding the research, voluntary nature of participation & the right to withdraw at any time without penalty and confidentiality of the study.

Official approval: - was taken from the manager of the selected quarantine hospitals. The researchers collected data from the first of July to the end of September 2020. A pilot study was conducted to test the precision of the instruments. All non-medical healthcare workers included in the pilot study were excluded from the study. The researchers using protective measures such as wearing face mask, gloves during data collection. The researchers explained the aim of the study; questionnaires were collected individually from each non-medical healthcare worker during their work hours. The time taken to fill questionnaire ranged from 20-25 minutes.

Data Analysis:-
Data were collected, tabulated, statistically analyzed using an IBM personal computer with Statistical Package of Social Science (SPSS) version 19(SPSS, Inc, Chicago, Illinois, USA), where the following statistics were applied:

• Descriptive statistics: in which quantitative data were presented in the form of mean, standard deviation (SD), range and qualitative data were presented in the form numbers and percentages.
• Analytical statistics: used to find out the possible association between studied factors and the targeted disease. The used tests of significance included:
• Chi-square test (χ^2): was used to study association between two qualitative variables.
* Pearson correlation: used for correlation of two quantitative variables
P value of >0.05 was considered statistically non-significant.
P value of <0.05 was considered statistically significant.

P value of <0.001 was considered statistically highly significant.

Results

Table 1: Shows 40.9% of the non-medical healthcare workers their age ranged from 20 – 30 years, 58.8% of them were females, 46.5% complete university degree, 82.9% were married, 34.7% were patients officer, 51.5% of them had experience more than 5 years, and 43.8% had less than 3 children.

Figure 1: Shows that, 62.40% of non-medical healthcare workers had good knowledge about COVID-19 pandemic while more than one third (37.60%) had poor knowledge.

Figure 2: Shows that more than half (58.8%) of non-medical healthcare workers had good preventive measures practices about COVID-19 pandemic, while 41.20% have poor preventive measures practices.

Figure 3: Illustrates that 51.80% of non-medical healthcare workershad COVID-19 pandemic induced anxiety.

Table 2: Shows that the mean anxiety score was 29.3 ranged from 7 – 45, mean preventive measures practices was 15.6 ranged from 0 – 25 and mean knowledge score was 11.4 ranged from 0 – 19.

Table 3 and figure 4: Show that there was a significant positive correlation between knowledge and preventive measures practices of non-medical healthcare workers (P = 0.001). This indicates that increasing knowledge total score are associated with increasing total score of preventive measures practices (r=0.563, P=0.001). Additionally, there is no significant correlation between anxiety and preventive measures practices and knowledge (P = >0.05).

Table 4:Shows that there was a significant relation between anxiety and educational level of the studied participants, 54.9% of participants who did not have anxiety complete the university, while 40.3% participants who had anxiety had technical educational level (P = 0.001). Also, there was a significant relation with occupation; 45.7%of participants who did not have anxiety were patient officers (P = 0.001). There was a significant relation between anxiety and years of experience, the higher the experience the lower the anxiety (P = 0.008). However there was no significant relation between

anxiety and age, sex, marital state, income and number of children (P > 0.05).

Table 5:Shows that there was a significant relation between preventive measures practices and sex group, the good preventive measures practices are present more in males (65.5%) than in females (34.5%) (P = 0.003). Also, there was a significant relation with years of experience, good preventive measures practices present in participants with higher experience level(P = 0.006). There was a significant relation between good preventive measures practices

and number of children (P = 0.022). However, there was no significant relation between preventive measures practices and age, marital state, educational level, occupation and income (P => 0.05).

Table 6:Shows that there was no significant relation between non-medical healthcare workers' knowledge and socio demographic characteristics (P > 0.05).

Table (1): Distribution of Socio-demographic Characteristics among Non-Medical Healthcare Workers (N= 340)

| Socio-demographic characteristics	No.	%
Age / years		
20 –	139	40.9
31 –	94	27.6
> 40	107	31.5
Sex		
Male	140	41.2
Female	200	58.8
Educational level		
Technical education	107	31.5
Technical institute	75	22.0
University	158	46.5
Marital status		
Single	35	10.3
Married	282	82.9
Divorced	16	4.70
Widow	7	2.10
Occupation		
Security officer	31	9.10
Receptionist	83	24.4
Account office	108	31.8
Patient affairs office	118	34.7
Experience year		
Less than one year	33	9.70
1 – 5 years	132	38.8
> 5 years	175	51.5
Monthly income		
Not enough	260	76.5
Enough	80	23.5
Number of children		
No	57	16.8
1-2	149	43.8
≥Three	134	39.4
Helping from others as family or friends to face life difficulties		
Yes	163	47.9
No	177	52.1
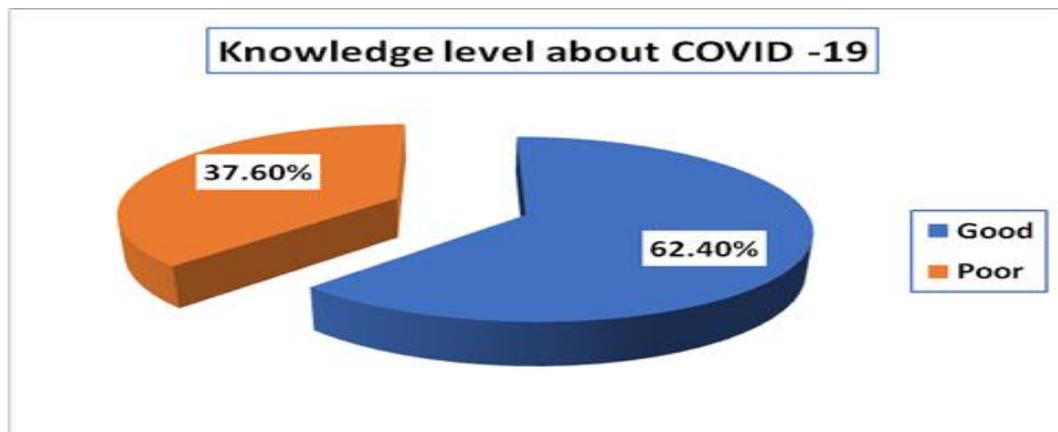
Figure (1): Distribution of Knowledge Level about COVID-19 Pandemic among Non-Medical Healthcare Workers(N= 340)
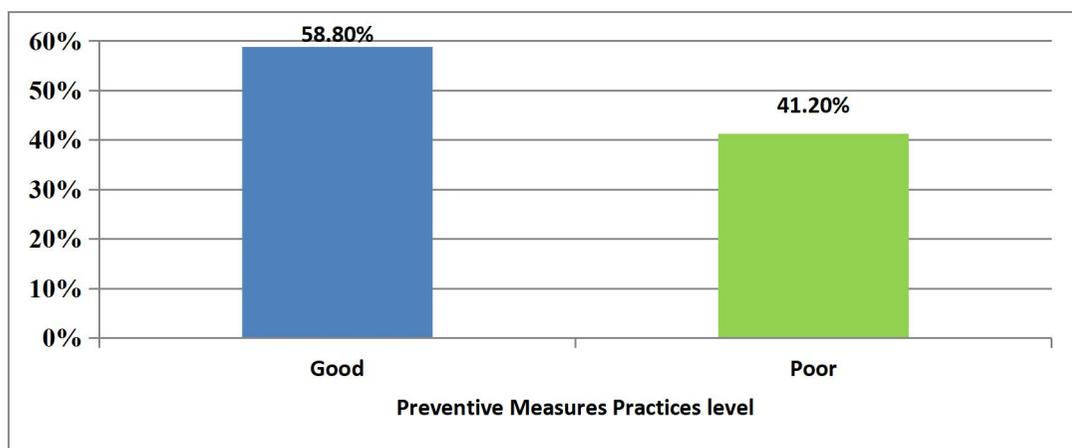

Figure (2): Distribution of Preventive Measures Practices Level Regarding COVID-19 Pandemic among Non-medical Healthcare Workers (N= 340)
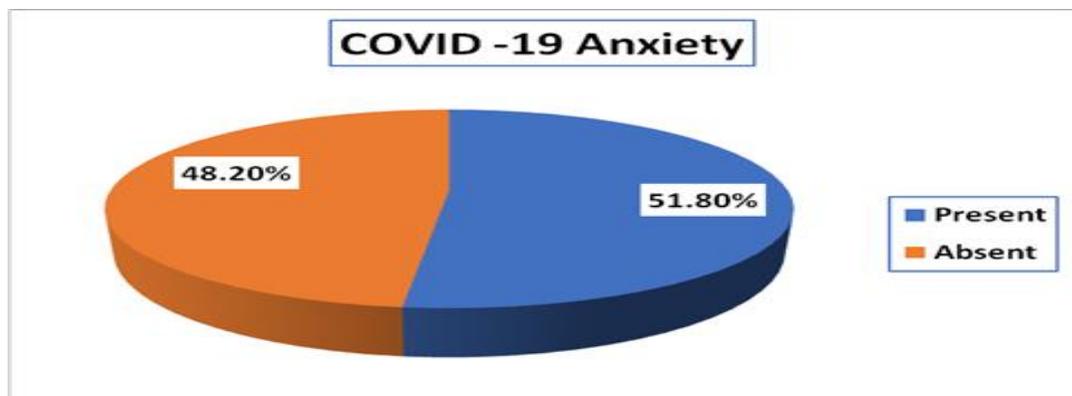

Figure 3: Distribution of COVID-19 Pandemic Anxiety among Non- medical Healthcare Workers (N= 340)
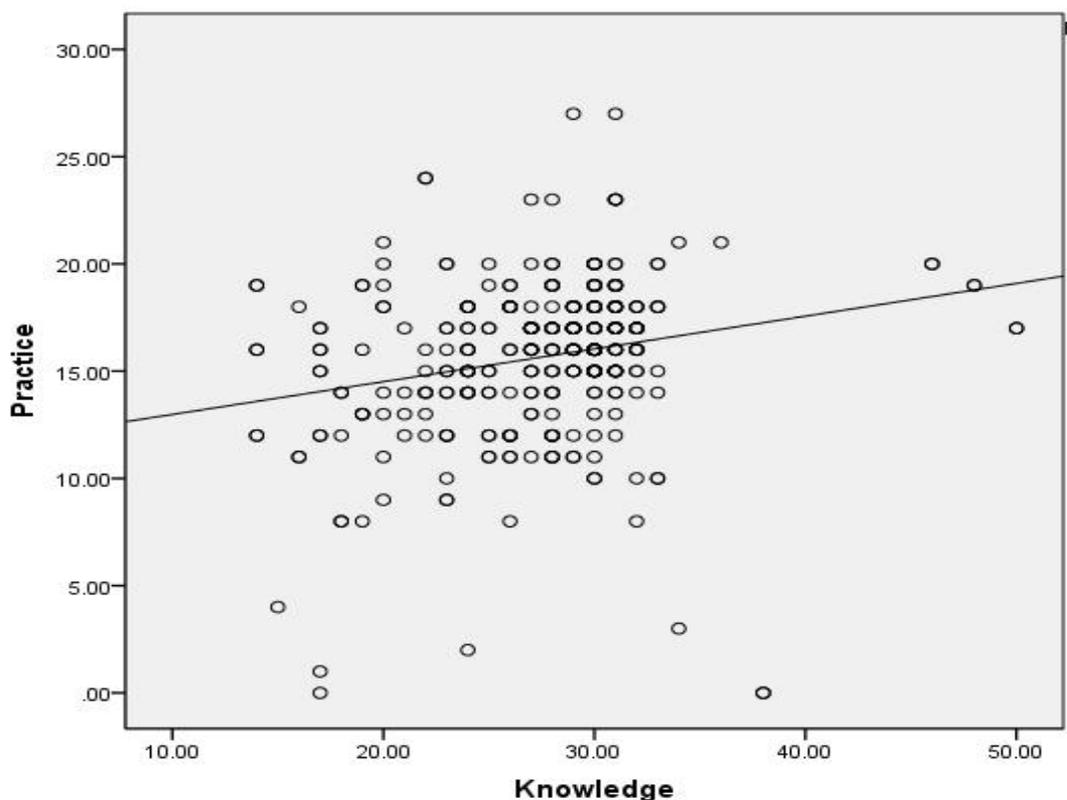
Table (2): Distribution of Mean Score of COVID-19 Pandemic Anxiety, Preventive Measures Practices and Knowledge among Non-Medical Healthcare Workers (N= 340)

Items	Mean	SD	Range
COVID-19 Pandemic Anxiety	29.3	6.75	7 - 45
Preventive Measures Practices	15.6	3.66	0 – 25
Knowledge			
	11.4	3.88	0 - 19

Table (3): Correlation between COVID-19Pandemic Induced Anxiety and Preventive Measures Practices and Knowledge of Non-medical Healthcare Workers (N=340)

Items	COVID-19induce anxiety		Preventive measures practice			knowledge
	r	P value	r	P value	r	P value
Preventive Measures Practices	0.032	0.563	--	--	0.316	**0.001****
Knowledge	0.071	0.192	0.316	**0.001****	--	--
Anxiety	--	--	0.032	0.563	0.071	0.192

**High significant

Figure 4: Correlation between COVID-19 PandemicPreventive Measures Practice and Knowledge of Non- medical Healthcare Workers

Table (4): Relation between Socio-demographic Characteristics and COVID-19 Pandemic Anxiety among Non-medical Healthcare Workers (N= 340)

Socio-demographic characteristics	COVID-19 pandemic induced anxiety		X²	P value
	Present (n = 176)	Absent (n= 164)		
	N (%)	N (%)		
Age / years				
20	69(39.2)	70(42.7)		
31	54(30.7)	40(24.4)	1.68	0.431
> 40	53(30.1)	54(32.9)		
Sex				
Male	74(42.0)	66(40.2)	0.114	0.736
Female	102(58.0)	98(59.8)		
Educational level				
Technical education	71(40.3)	36(22.0)		
Technical institute	37(21.0)	38(23.2)	14.1	**0.001****
University	68(38.6)	90(54.9)		
Marital state				
Single	19(10.8)	16(9.80)		
Married	146(83.0)	136(82.9)	0.582	0.901
Divorced	7(4.00)	9(5.50)		
Widow	4(2.30)	3(1.80)		
Occupation				
Security officer	15(8.50)	16(9.80)		
Receptionist	51(29.0)	32(19.5)	18.9	**0.001****
Account office	67(38.1)	41(25.0)		
Patient affairs office	43(24.4)	75(45.7)		
Experience year				
Less than one year	22(12.6)	11(6.70)		
1 – 5 years	77(43.7)	55(33.5)	9.44	**0.008****
> 5 years	77(43.7)	98(59.8)		
Monthly income				
Not enough	138(78.4)	122(74.4)	0.762	0.383
Enough	38(21.6)	42(25.6)		
Number of children				
No	30(17.0)	27(16.5)		
1-2	76(43.2)	73(44.5)	0.06	0.968
≥Three	70(39.8)	64(39.0)		
Helping from others as family or friends to face life difficulties				
Yes	88(50.0)	75(45.7)	0.620	0.431
No	88(50.0)	89(54.3)		

*significant**   **High significant*

Table (5): Distribution of Socio demographic Characteristics of Non-medical Healthcare Workers according to Preventive Measures Practices Level about COVID -19 Pandemic (N= 340)

Socio-demographic characteristics	Preventive measures practices about COVID -19 pandemic		X^2	P value
	Good (n = 200)	Poor (n= 140)		
	N (%)	N (%)		
Age / years				
20 – 30	84(42.0)	55(39.3)		
31 – 40	51(25.5)	43(30.7)		
> 40	65(32.5)	42(30.0)	1.12	0.570
Sex				
Male	131(65.5)	71(50.7)	8.93	**0.003****
Female	69(34.5)	69(49.3)		
Educational level				
Technical education	64(32.0)	43(30.7)	1.91	0.384
Technical institute	39(19.5)	36(25.7)		
University	97(48.5)	61(43.6)		
Marital state				
Single	26(13.0)	9(6.40)		
Married	161(80.5)	121(86.4)	7.09	0.069
Divorced	11(5.50)	5(3.60)		
Widow	2(1.00)	5(3.60)		
Occupation				
Security officer	22(11.0)	9(6.40)	5.80	0.121
Receptionist	46(23.0)	37(26.4)		
Account office	70(35.0)	38(27.1)		
Patient affairs office	62(31.0)	56(40.0)		
Experience year				
Less than one year	25(12.5)	8(5.70)	11.1	**0.006****
1 – 5 years	65(32.5)	67(47.9)		
> 5 years	110(55.0)	65(46.4)		
Monthly income				
Not enough	47(23.5)	107(76.4)	0.001	0.998
Enough	153(76.5)	33(23.6)		
Number of children				
No	40(20.0)	17(12.1)		
1-2	76(38.0)	73(52.2)	7.62	**0.022***
≥Three	84(42.0)	50(35.7)		
Helping from others as family or friends to face life difficulties				
Yes	104(52.0)	59(42.1)	3.20	0.079
No	96(48.0)	81(57.9)		

*significant   **High significant*

Table (6): Distribution of Socio demographic Characteristics of Non-medical Healthcare Workers according to Knowledge Level about COVID-19 Pandemic (N= 340)

Socio-demographic characteristics	Knowledge about COVID -19 pandemic		X^2	P value
	Good (n = 212)	Poor (n= 128)		
	N (%)	N (%)		
Age / years				
20 –	90(42.5)	49(38.3)		
31 –	63(29.7)	31(24.2)	3.58	0.166
> 40	59(27.8)	48(37.5)		
Sex				
Male	83(39.2)	57(44.5)	0.954	0.329
Female	129(60.8)	71(55.5)		
Educational level				
Technical education	62(29.2)	45(35.2)		
Technical institute	55(25.9)	20(15.6)	5.07	0.079
University	95(44.8)	63(49.2)		
Marital state				
Single	26(12.3)	9(7.00)		
Married	172(81.1)	110(85.9)	3.75	0.289
Divorced	11(5.20)	5(3.90)		
Widow	3(1.40)	4(3.10)		
Occupation				
Security officer	21(9.90)	10(7.80)		
Receptionist	59(27.8)	24(18.8)	5.22	0.156
Account office	66(31.1)	42(32.8)		
Patient affairs office	66(31.1)	52(40.6)		
Experience year				
Less than one year	25(11.8)	8(6.30)	2.82	0.244
1 – 5 years	81(38.2)	51(39.8)		
> 5 years	106(50.0)	69(53.9)		
Monthly income				
Not enough	103(80.5)	157(74.1)	1.82	0.177
Enough	25(19.5)	55(25.9)		
Number of children				
No	39(18.4)	18(14.1)		
1-2	94(44.3)	55(42.9)	1.59	0.452
≥Three	79(37.3)	55(43.0)		
Helping from others as family or friends to face life difficulties				
Yes	107(50.5)	56(43.7)	1.44	0.229
No	105(49.5)	72(56.3)		

Discussion:-

The COVID19 pandemic is a global occurrence that has a significant impact on the social and psychological well-being of healthcare workers in quarantine and non-quarantine hospitals **(Youssef et al, 2020)**. Due to the risk of infection, increased stress at work and the worry of spreading to their family members, healthcare workers are a particularly vulnerable population **(Xiang et al, 2020)**. Healthcare workers must deal with the COVID-19 pandemic, which is a recent and new

phenomena that has an impact on their mental well-being **(Zhang et al, 2020; Tan et al, 2020)**. Non-medical health care workers are the most vulnerable to psychological distress and anxiety during the COVID-19 pandemic, according to **(Tan et al, 2020)**. As a result, there is a pressing need to understand COVID-19induced anxiety, knowledge, and preventive practices among non-medical healthcare workers. As a consequence, the goal of this study was to assess COVID-19 pandemic induced anxiety, knowledge, and preventive measures practices among non-medical healthcare workers in quarantine hospitals.

In terms of COVID-19 anxiety, the current study found that fifty-two percent of non-medical healthcare workers had COVID-19 anxiety. Security officers are the first to come into touch with patients and their families before healthcare professionals, raising the risk of cross-infection among community and hospital employees. This could be because they lack a medical background and are unaware of the COVID-19 outbreak. Furthermore, because they are less skilled and are unaware of the hazards of COVID-19 transmission in the hospital, they are more likely to become infected and infect their family, increasing to their anxiety. This result was consistent with **(Alrubaiee et al, 2020)** studied knowledge, attitudes, anxiety, and preventive behaviors towards COVID-19 among health care providers in Yemen. This study revealed that nearly half of the respondents had a moderate level of anxiety regarding the COVID-19 outbreak. Likewise, **(Mattila et al, 2021)** studied "COVID-19 anxiety among hospital staff and associated factors". This result showed that fifty-five percent of finish hospital workers had normal anxiety levels, but thirty percent had mild anxiety, and ten percent suffered from moderate anxiety levels and only five percent of Finnish hospital workers had suffered from severe anxiety during the COVID-19 pandemic.

Moreover, **Li et al (2020)** discovered that the general public and non–front line nurses had significantly higher vicarious traumatization scores than front-line nurses. This view may stem from the fact that front-line nurses are voluntarily selected and given

adequate psychological training, whereas the general public and non-frontline nurses had less access to formal psychological support, less first-hand medical information about the outbreak, and less intensive training on personal protective equipment and infection control measures.

On the other hand, the present study result found that non-medical healthcare workers experienced a larger rate of anxiety than a study conducted by **(Tan et al, 2020)** in the midst of the Singaporean healthcare worker pandemic. This result revealed that twenty –one percent of nonmedical healthcare personnel suffered from anxiety. They showed that the prevalence of anxiety was higher among nonmedical healthcare workers than medical personnel. On the contrary, the present finding revealed a lower rate of anxiety among non-medical healthcare workers than a study conducted by **Roy et al (2020)** studied knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. This finding revealed that about seventy-two percent of participants expressed being worried for themselves and their close ones during the ongoing pandemic. This difference could be due to discrepancies in sample sizes, scales used for measuring anxiety, policies of various countries as well as time of conducting study during the pandemic.

In terms of non-medical healthcare workers' COVID-19 preventive measures practices, the current study found that more than half of non-medical healthcare workers had good COVID-19 preventive measures practices. This could be due to the fact that fifty-two percent of study participant had more than five years of experience and forty-seven percent had university education, allowing them to improve their knowledge of COVID-19 prevention strategies and implement preventive devices, as well as the work place condition, where every worker employed in a hospital with COVID-19 patients must take extra precautions to control the infection. This result was in the same line with **Gebremeskel et al (2021)**; who assessed "knowledge and practices toward COVID-19 prevention among healthcare workers in Tigray,

north Ethiopia. This result revealed that more than half of health workers had good practice toward COVID-19 prevention.

On the contrary; **Sharma et al (2021)** conducted a pre experimental study with one group pre and post-test to compare the difference in the level of knowledge and practice about COVID19 prevention before and after instructional module among security officers working in a tertiary care teaching institute. This study revealed that only two out of three security staff followed good practices for COVID-19 prevention. This revealed that many security personnel did not follow precautionary measures to prevent COVID-19 infection, such as incomplete steps in hand hygiene, touching their face and hairs; their findings suggested that the country's public health policymakers re-identify target groups such as security officers, police officers, and housekeeping staffs and train them on COVID-19 prevention. Also, **Bekele et al (2021)** studied "knowledge and practice towards COVID-19 pandemic prevention among residents of Ethiopia". This study revealed that about seventy-seven percent of the respondents did not follow government COVID-19 prevention guidelines, while only about twenty-three percent of the respondents were follow government restrictions on COVID-19 prevention. These discrepancies may be due to different measuring tools for practice toward COVID-19 prevention and characteristics of the studied sample.

In relation to non-medical healthcare workers' COVID-19 knowledge, the current finding revealed that approximately sixty –three percent of non- medical health care workers had good knowledge about COVID-19 with a mean knowledge score was 11.4 ± 3.88. This could be due to that the majority of study participants had more than five years of experience and had university education which empower them to strengthen their knowledge and practice as well as easy access to information through internet services, social media or new technology that are easily accessible by most people at home and in the workplace or may be due to the government policies and mass media highlighting more on the preventive measures.

The present finding was in the same line with **Teng et al (2021)** revealed that about sixty-three percent of quarantine hotel workers have adequate knowledge about COVID-19 and the mean COVID-19 knowledge score for quarantine workers was 9.78 ± 1.61. Likewise; **Alrubaiee et al (2020)** revealed large number of Yemen healthcare personnel were considered to have gained sufficient knowledge about COVID-19. Similarly, **Roy et al (2020)** studied "knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic". This study showed that the participants had a moderate level of knowledge about the COVID-19 infection and adequate knowledge about its preventive aspects.

Regarding the correlation between knowledge and preventive measures practices of non-medical healthcare workers about COVID -19, the present result revealed a significant positive correlation between knowledge and preventive measures practices of non-medical healthcare workers about COVID -19.This means increasing knowledge level were associated with increasing practical level, implying that increasing awareness of COVID-19 had a positive impact on their practical levels. The present finding was in the same line with **Yesse et al (2021)**; they showed a significant association between knowledge of COVID-19 with good preventive measures practices of health care workers. Health care workers who had good knowledge on COVID-19 were two times more likely implement good preventive measures practices than who had poor knowledge. Moreover, **Gabr (2020)** conducted a cross-sectional descriptive study to assess "knowledge, attitudes, and practices toward COVID-19 at Menoufia Governorate, Egypt". This study concluded that there was a significant positive correlation between knowledge and practice of Egyptian population toward COVID-19. Likewise, **Alrubaiee et al (2020),** revelad a significant positive relationship between knowledge and preventive behavior of health care providers in Yemen. Similarly, other studies conducted in Northwest Ethiopia **(Kassie et al, 2020)**; Vietnam **(Huynh et al, 2020)** and Iran **(Bandyopadhyay et al, 2020)** showed that healthcare professionals with

good awareness and a good attitude had associated with practices concerning COVID-19 infection at occupation may assist in managing workers' anxiety and inhibit psychological consequences among healthcare professionals.

Concerning correlation between anxiety and preventive measures practices as well as knowledge about COVID-19; the current result revealed that there was no significant correlation between anxiety and preventive measures practices as well as knowledge about COVID-19. This result was consistent with **(Lin et al, 2020)** who assessed "knowledge, attitudes, impact, and anxiety regarding COVID-19 infection among the public in China". This discovered that knowledge of COVID-19 had no effect on anxiety among the public in China. Similarly findings of **(Nemati et al, 2020)** who discovered that most Iranian nurses expressed anxiety and that of their families as a result of COVID-19, despite the fact that the awareness they had obtained about COVID-19 was adequate. On the contrary; **(Alrubaiee et al, 2020)** revealed a significant positive relationship between knowledge, preventive behaviors and anxiety among Yemen healthcare providers.

Concerning relationship between socio-demographic characteristics of non-medical healthcare workers and their anxiety levels; the current study revealed a significant relationship between anxiety and educational level, with more than half of those who did not have anxiety had university educational level, while forty percent of participants who did have anxiety had technical educational level (P = 0.001).This result was in the same line with [34]revealed that there was a significant positive association between the respondents' anxiety and their educational level. In contrast; **Şahin & Kulakaç (2021)** found no significant relationship between anxiety level and educational status (p > 0.05). This discrepancy may be due to different sample size or may due to difference in workplace circumstances.

Moreover, the present finding revealed that there was a significant relation between anxiety and their occupation; where the majority of participants who had anxiety were patients affairs office and account office (P = 0.001). This may be due to that they more contact with patients families during hospital admission processes and payments requirements so they worries from being infected or may be due to excessive working hours and workload which make it difficult for them to rest as well as physical and psychological fatigue. Moreover, the current study exhibited that there was significant relation between anxiety and years of experience, where the higher experience induce lower anxiety level.This finding was supporting by **Alnazly et al (2021)** showed that there was a significant relationship between psychological distress and clinical experience.

Furthermore, the present finding found that female non-medical health care workers had experienced more anxiety than males but the difference was not statistically significant. In contrast; **Motahedi et al (2021)** conducted a cross-sectional study to assess "anxiety and depression among healthcare workers during COVID-19 pandemic". This study displayed that the female gender among health care workers was significant associated with higher anxiety levels. Also, the present finding contradicted with other studies done in Iran by **Hassannia et al (2020)** and in Yemen by **Alrubaiee et al (2020)** showed that female health care workers experienced more anxiety during the COVID-19 pandemic. This inconsistency could be attributed to differences in the samples size and working circumstances in other studies.

Regarding relation between socio-demographic characteristics of non–medical healthcare workers and their preventive measures practices toward covid-19 prevention, the current study revealed that there was a significant relation between preventive measures practices toward COVID-19 prevention and sex group. Males exhibited more good preventive measures practices than females (P = 0.003). This may be due to gender difference in related activities or could be attributed to the fact that women experience higher family pressure in their role of caring for families than males. This result was consistent with **Gebremeskel et al (2021)** revealed that

males were two times more likely to have good practices to prevent COVID-19 than females. On the other hand, the present finding was inconsistent with **Singh et al (2022)** showed that there was a significant difference among the gender categories with a higher female practice score. In addition; **Sharma et al (2021)** revealed that the mean practice score of COVID-19 infection prevention among security officers was 6.25 ± 0.43, where the female security officers of age between 21 and 40 years followed good practices such as regularly performing hand hygiene, only touching their face after doing hand hygiene and maintaining social distance on duty. This difference may be due to different sample size and sociocultural characteristics of the studied sample.

The current study revealed a significant relationship between years of experience and preventive measures practices score, where good practice being found in participants with higher experience level (P=0.006). This result was congruent with **Alrubaiee et al (2020)** revealed that there was a significant positive association between the respondents' level of performance in preventive behaviors towards COVID-19 and their years of work experience.

Furthermore, the present study displayed that there was no significant relation between preventive measures practices toward covid-19and educational level as well as occupation. This finding was incongruent with **Alrubaiee et al (2020)** exhibited a significant positive association between the respondents' level of performance in preventive behaviors towards COVID-19 and their occupation and educational level. In addition, the present result was inconsistent with **Yesse et al (2021)** revealed that level of education was significantly associated with practice of health care workers toward COVID-19; this discrepancy may be due to difference in studies area.

As regarding to relation between non-medical healthcare workers' knowledge toward COVID-19 and their socio demographic characteristics, the current study revealed that there was no significant relation between non-medical healthcare workers' knowledge and

their socio demographic characteristics as age, educational level, experience year occupation and monthly income (P>0.05). This result was consistent with **Teng et al (2021)**, who found that there were no significant differences in knowledge toward COVID-19 scores for the demographic variables (age, education and monthly income). On the contrary, the present result were contradicted with other studies conducted by **Zhong et al (2020)** and **Abdelhafiz et al (2020)** revealed that knowledge towards COVID-19 was significantly differed across age, education level, and monthly income. Moreover, existing finding was disagreement with **(Alrubaiee, et al., 2020)** found that level of education and occupation significantly associated with the healthcare workers knowledge towards COVID-19. Furthermore, the current study was contradicted with **Kassie et al (2020) and Yesse et al (2021)**; they reported that educational level of health care workers had strongly associated with level of knowledge on COVID-19. Moreover, this result was disagreement with **Gallè et al (2021)** found that there was a relationship between level of knowledge about COVID-19 and age and years of experience. In contrast, **Teng et al (2021)** showed that female quarantine hotel workers were more likely to have adequate knowledge compared to men. In addition, **Singh et al (2022)** demonstrated that knowledge & awareness scores about COVID-19 were significant high in female gender, working participants and individuals with higher education. This discrepancy could be due to a different sample size, questionnaire used to assess participants' knowledge of COVID-19 or an increase public awareness regarding the global disaster of the COVID-19 pandemic.

Conclusion:-

The current study's findings found that more than half of the studied non-medical healthcare workers had COVID-19 pandemic anxiety, less than two thirds of non-medical healthcare workers had good knowledge about COVID-19pandemic, and more than half had good preventive measures practices about COVID-19. Furthermore, there was a

significant positive correlation between non-medical healthcare workers knowledge and preventive measures practices, but there was no significant correlation between non-medical healthcare workers anxiety and preventive measures practices and knowledge about COVID-19 pandemic.

Recommendations:-

Based on the findings of this study we suggested that:-

• All non-medical healthcare workers in health facilities should receive educational as well as psychological intervention to raise their awareness of COVID-19 pandemic and assist them in overcoming anxiety.

• Safety precautions and regulation strategies must be implemented to control the emotional status among non-medical healthcare workers.

Conflicts of interest

The authors declare no conflicts of interest

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References

Abdelhafiz, A. S., Mohammed, Z., Ibrahim, M. E., Ziady, H. H., Alorabi, M., Ayyad, M., & Sultan, E. A. (2020). Knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19). *Journal of community health*, *45*(5), 881-890.doi: 10.1007/s10900-020-00827-7

Alenazi, T. H., BinDhim, N. F., Alenazi, M. H., Tamim, H., Almagrabi, R. S., Aljohani, S. M., ...&Alqahtani, S. A. (2020). Prevalence and predictors of anxiety among healthcare workers in Saudi Arabia during the COVID-19 pandemic.*Journal of infection and public health*, *13*(11), 1645-1651.DOI: 10.1016/j.jiph.2020.09.001

Alnazly, E., Khraisat, O. M., Al-Bashaireh, A. M., & Bryant, C. L. (2021). Anxiety, depression, stress, fear and social support during COVID-19 pandemic among Jordanian healthcare workers. *Plos one*, *16*(3), e0247679.https://doi.org/10.1371/journal.pone.0247679

Alrubaiee, G. G., Al-Qalah, T. A. H., & Al-Aawar, M. S. A. (2020). Knowledge, attitudes, anxiety, and preventive behaviours towards COVID-19 among health care providers in Yemen: an online cross-sectional survey. BMC Public Health, 20(1), 1-11.https://bmcpublichealth.biomedcentral.com/track/pdf/10.1186/s12889-020-09644-y.pdf

Asemahagn, M. A. (2020). Factors determining the knowledge and prevention practice of healthcare workers towards COVID-19 in Amhara region, Ethiopia: a cross-sectional survey. *Tropical medicine and health*, *48*(1), 1-11. https://doi.org/10.1186/s41182-020-00254-3

Bandyopadhyay, S., Baticulon, R. E., Kadhum, M., Alser, M., Ojuka, D. K., Badereddin, Y., &Khundkar, R. (2020). Infection and mortality of healthcare workers worldwide from COVID-19: a systematic review. *BMJ global health*, *5*(12), e003097.doi:10.1136/ bmjgh-2020-003097

Bekele, D., Tolossa, T., Tsegaye, R., &Teshome, W. (2021). The knowledge and practice towards COVID-19 pandemic prevention among residents of Ethiopia. An online cross-sectional study. *PLoS One*, *16*(1), e0234585.https://doi.org/10.1371/journal.pone.0234585

Cai, Q., Feng, H., Huang, J., Wang, M., Wang, Q., Lu, X., & Liu, Y. (2020). The mental health of frontline and non-frontline medical workers during the coronavirus disease 2019 (COVID-19) outbreak in China: A case-control study. *Journal of affective disorders*, *275*, 210-215. https://doi.org/10.1016/j.jad.2020.06.031.

Cai, W., Lian, B., Song, X., Hou, T., Deng, G., & Li, H. (2020). A cross-sectional study on

mental health among health care workers during the outbreak of Corona Virus Disease 2019.*Asian journal of psychiatry*, *51*, 102111. DOI: 10.1016/j.ajp.2020.102111

Chew, N. W., Ngiam, J. N., Tan, B. Y. Q., Tham, S. M., Tan, C. Y. S., Jing, M., & Sharma, V. K. (2020). Asian-Pacific perspective on the psychological well-being of healthcare workers during the evolution of the COVID-19 pandemic.*BJPsych open*, *6*(6). doi: 10.1192/bjo.2020.98.

Ejeh, F. E., Saidu, A. S., Owoicho, S., Maurice, N. A., Jauro, S., Madukaji, L., &Okon, K. O. (2020). Knowledge, attitude, and practice among healthcare workers towards COVID-19 outbreak in Nigeria. *Heliyon*,   *6*(11), e05557.doi: 10.1016/j.heliyon.2020.e05557

Elbay, R. Y., Kurtulmuş, A., Arpacıoğlu, S., &Karadere, E. (2020). Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. *Psychiatry research*, *290*, 113130.

Gabr, H. M., Seif, A. S., &Allam, H. K. (2020). Knowledge, attitudes, and practices toward COVID-19 at Menoufia Governorate, Egypt. *Kasr Al Ainy Medical Journal*, *26*(1), 21.https://applications.emro.who.int/imemrf/ 525/Kasr-El-Aini-Med-J-2019-26-1-21%E2%80%9326-eng.pdf

Gallè, F., Veshi, A., Sabella, E. A., Çitozi, M., Da Molin, G., Ferracuti, S., ...& Napoli, C. (2021). Awareness and behaviors regarding COVID-19 among Albanian undergraduates. *Behavioral Sciences*, *11*(4), 45. DOI: 10.3390/bs11040045

Gebremeskel, T. G., Kiros, K., Gesesew, H. A., & Ward, P. R. (2021).Assessment of knowledge and practices toward COVID-19 prevention among healthcare workers in Tigray, north Ethiopia. *Frontiers in public health*, 745. https://doi.org/10.3389/fpubh.2021.614 321

Goldmann, E., &Galea, S. (2014). Mental health consequences of disasters.*Annual review of public health*, *35*, 169-183.https://doi.org/10.1146/annurev-publhealth-032013-182435

Gupta, N., Dhamija, S., Patil, J., &Chaudhari, B. (2021). Impact of COVID-19 pandemic on healthcare workers.*Industrial Psychiatry Journal*, *30*(Suppl 1), S282.doi: 10.4103/0972-6748.328830

Hassannia L., Taghizadeh F., Moosazadeh M., Zarghami M., Taghizadeh H., Dooki A.F., et al. medRxiv; 2020. Anxiety and Depression in Health Workers and General Population during COVID-19 Epidemic in IRAN: A Web-Based Cross-Sectional Study. DOI: 10.1002/npr2.12153

Ho, C. S., Chee, C. Y., & Ho, R. C. (2020). Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic.*Ann Acad Med Singapore*,   *49*(1),   1-3.https://annals.edu.sg/pdf/special/COM200 43_HoCSH_2.pdf

Huynh, G., Nguyen, T. N. H., Vo, K. N., &Pham, L. A. (2020). Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City.*Asian Pacific Journal of Tropical Medicine*, *13*(6), 260. doi: 10.2147/RMHP.S268876

Kanu, S.; James, P.B.; Bah, A.J.; Kabba, J.A.; Kamara, M.S.; Williams, C.E.E.; Kanu, J.S.(2021). Healthcare Workers' Knowledge, Attitude, Practice and Perceived Health Facility Preparedness Regarding COVID-19 in Sierra Leone.*J. Multidiscip. Healthc*,   *14*,   67–80.doi: 10.2147/JMDH.S287156

Kassie, B. A., Adane, A., Tilahun, Y. T., Kassahun, E. A., Ayele, A. S., &Belew, A. K. (2020). Knowledge and attitude towards COVID-19 and associated factors among health care providers in Northwest Ethiopia. *PloS one*, *15*(8), e0238415.https://doi.org/10.1371/journal.po ne.0238415

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., ...& Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA network open*, *3*(3), e203976-e203976. doi:10.1001/jamanetworkopen.2020.3976

Lake, E. A., Demissie, B. W., Gebeyehu, N. A., Wassie, A. Y., Gelaw, K. A., &Azeze, G. A. (2021). Knowledge, attitude and practice towards COVID-19 among health professionals in Ethiopia: A systematic

review and meta-analysis. *PLoS One*, *16*(2), e0247204.https://doi.org/10.1371/journal.po ne.0247204

Li, Z., Ge, J., Yang, M., Feng, J., Qiao, M., Jiang, R., ...& Yang, C. (2020). Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. *Brain, behavior, and immunity*, *88*, 916-919.doi: 10.1016/j.bbi.2020.03.007

Lin, Y., Hu, Z., Alias, H., & Wong, L. P. (2020).Knowledge, attitudes, impact, and anxiety regarding COVID-19 infection among the public in China.*Frontiers in public health*, *8*, 236.doi: 10.3389/fpubh.2020.00236

Liu, Q., Luo, D., Haase, J. E., Guo, Q., Wang, X. Q., Liu, S., ...& Yang, B. X. (2020). The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *The Lancet Global Health*, *8*(6), e790-e798.https://doi.org/10.1016/S2214-109X(20)30204-7

Mattila, E., Peltokoski, J., Neva, M. H., Kaunonen, M., Helminen, M., &Parkkila, A. K. (2021). COVID-19: anxiety among hospital staff and associated factors. *Annals of Medicine*, *53*(1), 237-246. DOI:10.1080/07853890.2020.1862905

Mohd Noor, N., CheYusof, R., &Yacob, M. A. (2021).Anxiety in frontline and non-frontline healthcare providers in Kelantan, Malaysia.*International journal of environmental research and public health*, *18*(3), 861.DOI: 10.3390/ijerph18030861

Motahedi, S., Aghdam, N. F., Khajeh, M., Baha, R., Aliyari, R., &Bagheri, H. (2021). Anxiety and depression among healthcare workers during COVID-19 pandemic: A cross-sectional study. Heliyon, 7(12), e08570.DOI: 10.1016/j.heliyon.2021.e0857 0

Nemati, M., Ebrahimi, B., &Nemati, F. (2020).Assessment of Iranian nurses' knowledge and anxiety toward COVID-19 during the current outbreak in Iran.*ArchClin Infect Dis*, *15*(COVID-19), e102848. https://doi.org/10.5812/archcid.102848

Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsi, E., &Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, behavior, and immunity*, *88*, 901-907.DOI: 10.1016/j.bbi.2020.05.026

Polychronis, G., &Roupa, Z. (2021). Health Workers' knowledge and perception regarding the risk of spread of COVID-19 during the pandemic: A systematic review. *Journal of Public Affairs*, *21*(4), e2558. DOI: 10.1002/pa.255

Preti, E., Di Mattei, V., Perego, G., Ferrari, F., Mazzetti, M., Taranto, P., &Calati, R. (2020). The psychological impact of epidemic and pandemic outbreaks on healthcare workers: rapid review of the evidence. *Current psychiatry reports*, *22*(8), 1-22. DOI: 10.1007/s11920-020-01166-z

Que, J., Le Shi, J. D., Liu, J., Zhang, L., Wu, S., Gong, Y., ...& Lu, L. (2020). Psychological impact of the COVID-19 pandemic on healthcare workers: a cross-sectional study in China. *General psychiatry*, *33*(3).DOI: 10.1136/gpsych-2020-100259

Raoofi, S., Kan, F. P., Rafiei, S., Khani, S., Hosseinifard, H., Tajik, F., ...&Ghashghaee, A. (2021). Anxiety during the COVID-19 pandemic in hospital staff: systematic review plus meta-analysis. *BMJ Supportive & Palliative Care*.doi: 10.1136/bmjspcare-2021-003125.

Roy, D., Tripathy, S., Kar, S. K., Sharma, N., Verma, S. K., &Kaushal, V. (2020).Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian journal of psychiatry*, *51*, 102083.https://doi.org/10.1016/j.ajp.2020.10 2083 PMID: 32283510

Şahin, C. U., &Kulakaç, N. (2021).Exploring anxiety levels in healthcare workers during COVID-19 pandemic: Turkey sample. *Current Psychology*, 1-8. DOI: 10.1007/s12144-021-01730-7

Sharma, R., Rohilla, K. K., Chadha, L., Malhotra, P., Sharmila, S., & Jelly, P. (2021). Strategy to prevent infection from Covid-19 among security officers of tertiary care centre: A preexperimental study. *Journal of Family Medicine and Primary Care*, *10*(9), 3257-3261. doi: 10.4103/jfmpc.jfmpc_2609_20

Singh, P. K., Anvikar, A., &Sinha, A. (2022). COVID-19 related knowledge, attitudes, and practices in Indian Population: An online national cross-sectional survey. *PloS one*, *17*(3), e0264752. https://doi.org/10.1371/journal.pone.026 4752

Stojanov, J., Malobabic, M., Stanojevic, G., Stevic, M., Milosevic, V., &Stojanov, A. (2021).Quality of sleep and health-related quality of life among health care professionals treating patients with coronavirus disease-19.*International Journal of Social Psychiatry*, *67*(2), 175-181. DOI: 10.1177/0020764020942800

Sun, P., Wang, M., Song, T., Wu, Y., Luo, J., Chen, L., & Yan, L. (2021). The psychological impact of COVID-19 pandemic on health care workers: a systematic review and meta-analysis. *Frontiers in psychology*, *12*, 626547.https://doi.org/10.3389/fpsyg.2021.626 547

Tan, B. Y., Chew, N. W., Lee, G. K., Jing, M., Goh, Y., Yeo, L. L., ...& Sharma, V. K. (2020). Psychological impact of the COVID-19 pandemic on health care workers in Singapore.*Annals of internal medicine*, *173*(4), 317-320.DOI: 10.7326/M20-1083

Teng, Y. M., Wu, K. S., Wang, W. C., &Xu, D. (2021, June).Assessing the knowledge, attitudes and practices of COVID-19 among quarantine hotel workers in China.In Healthcare (Vol. 9, No. 6, p. 772). Multidisciplinary Digital Publishing Institute.doi: 10.3390/healthcare9060772

Walton, M., Murray, E., & Christian, M. D. (2020).Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic.*European Heart Journal: Acute Cardiovascular Care*, *9*(3), 241-247. https://doi.org/10.1177/2048872620922795

Wang, J., Zhou, M., & Liu, F. (2020).Reasons for healthcare workers becoming infected with novel coronavirus disease 2019 (COVID-19) in China.*J Hosp infect*, *20*(10.1016).doi: 10.1016/j.jhin.2020.03.002

World Health Organization.(2020). COVID 19 Public Health Emergency of International Concern (PHEIC). Global research and innovation forum: towards a research roadmap. https://www.who.int/blueprint/priority-diseases/key-action

World Health Organization. (2021). The impact of COVID-19 on health and care workers: a closer look at deaths. *World Health Organization*.https://apps.who.int/iris/handle/1 0665/345300. License: CC BY-NC-SA 3.0 IGO

Xiang, Y. T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The lancet psychiatry*, *7*(3), 228-229.doi: 10.1016/S2215-0366(20)30046-8.

Yesse, M., Muze, M., Kedir, S., Argaw, B., Dengo, M., Nesre, T., ...&Ayelign, H. (2021). Assessment of knowledge, attitude and practice toward COVID-19 and associated factors among health care workers in Silte Zone, Southern Ethiopia. *PloSone*, *16*(10), e0257058.https://doi.org/10.1371/journal.pone. 0257058

Youssef, N., Mostafa, A., Ezzat, R., Yosef, M., & El Kassas, M. (2020).Mental health status of health-care professionals working in quarantine and non-quarantine Egyptian hospitals during the COVID-19 pandemic.*EastMediterr Health J*, 1155-1164.doi: 10.26719/emhj.20.116.

Zhang, W. R., Wang, K., Yin, L., Zhao, W. F., Xue, Q., Peng, M., ...& Wang, H. X. (2020). Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China.*Psychotherapy and psychosomatics*, *89*(4), 242-250.doi: 10.1159/000507639.

Zhong, B. L., Luo, W., Li, H. M., Zhang, Q. Q., Liu, X. G., Li, W. T., & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. International journal of biological sciences, 16(10), 1745. doi: 10.7150/ijbs.45221