

The Prevalence of Post-traumatic Stress Disorder and Associated Factors among Staff in a Tertiary Hospital (Medical City) during COVID-19 Pandemic Crisis in Makkah, K.S.A., 2020

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Abstract Background: Living a pandemic disaster is associated with mental health consequences including post-traumatic disorder (PTSD). The primary objective of this study is to determine the prevalence of PTSD among tertiary hospital staff working in King Abdullah Medical City (KAMC) in Saudi Arabia and the secondary objective is to determine the factors associated with the risk of developing post-traumatic stress disorder. **Methods:** A descriptive cross-sectional design were used through an electronic survey questionnaire that sent to all KAMC staff who are working during early COVID-19 from June 2020 till June 2021. 118 from 235 were responded and included in the study. The Posttraumatic Diagnostic Scale (PDS-5) was used. It is a reliable and valid tool in measuring the PTSD symptoms and severity. **Results:** The prevalence of PTSD among KAMC staff were found 50.2 % (Moderate 35.6%, Moderate to severe 38.1%, and Severe 26.3%). The gender found near significant P value in the avoidance domain and Arousal and reactivity domain (0.066), (0.073) respectively. In regards to nationality, the Arousal and reactivity domain showed a significant P value (0.03) among Saudi and non-Saudi while the other domain showed no significant value. **Conclusion:** Our study highlights the importance of the psychological stress and traumatic events in staff working during a disaster such as COVID-19 pandemics and the results should be taken in consideration to focus on the importance of mental health condition of working staff in a tertiary hospital.

Keywords: PTSD, Mental Health, COVID-19, Tertiary Hospital, Staff, Medical City, KAMC, Makkah

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1. Introduction

Living a pandemic disaster is associated with mental health consequences and that including post-traumatic disorder (PTSD). [1] In March 2019, the WHO announced COVID-19 as a pandemic. [2] In March 2020, the Ministry of Health in Saudi Arabia announced for the first case of coronavirus, and subsequent social and health precautions were applied, [3] then the Complete lockdown and quarantine were performed in synchronization with increasing hospital capacity especially for Intensive Care

Units (ICU) beds and increasing the numbers of critical cases. [4,5] March 12/2020, is the date when the COVID-19 (coronavirus disease) has been declared a Pandemic by the World Health Organization (WHO). [2] Up to date, it is a fight against unknown as there is no clear sufficient information about COVID-19. [6] In addition, global rapid increasing in numbers of affected individuals, number of deaths, shortage of health care providers, shortage of the protective supplies, increasing the working load, social distancing, feeling of threatening and insecurity, isolation, and stigmatization of the illness, all can burden the health care providers with significant psychological stress, worries, fear and a

uniquely traumatic experience concerning to the exposure of the outbreak of highly contagious infectious disease COVID-19. [6,7] PTSD (Posttraumatic Stress Disorder) is a psychiatric disorder that affects individuals who have been through or witnessed a traumatic incident and can cause considerable distress on the affected individual and impair the social, educational and occupational performance that can lead to losing a job or working with difficulty. [8,9]

The prevalence of PTSD among adults in the United States is approximately 3.5 percent, with a lower rate in Europe and the majority of Asian, African, and Latin American countries ranging from 0.5 to 1 percent. [10] In China, the hardest-hit country by COVID-19 two studies were conducted regarding the prevalence of PTSD among 2091 and 285 adult individuals, and the prevalence was found 4.6% and 7% respectively. [11] The PTSD symptoms prevalence was found 63% among the staff of the tertiary hospital in the northeast of Italy during the COVID-19 pandemic. [12]

Till the moment of writing this research, there no published studies about the prevalence of post-traumatic stress disorder and associated factors in Saudi Arabia among tertiary hospital staff during the COVID-19 pandemic crisis.

This study aims to explore post-traumatic stress disorder (PTSD) among tertiary hospital staff working in a medical city in Saudi Arabia.

The primary objective of this study is to determine the prevalence of PTSD among tertiary hospital staff working in a medical city (KAMC). The secondary objective of this study is to determine the factors associated with the risk of developing post-traumatic stress disorder among tertiary hospital staff.

2. Method

2.1. Study Design and Participants

This study used a descriptive cross-sectional design through an electronic survey questionnaire. The survey was sent to all KAMC staff through email who are working during early COVID-19 from June 2020 till June 2021 and those who have a positive history of trauma. The researcher was committed to all ethical considerations required to conduct research; IRB committees at KAMC provided ethical approval to carry out the study with IRB reference number 20-631. Participants were contacted and asked for permission to participate in the survey, and they were granted the withdrawal right. A summary was provided to the participants that included an explanation of the purpose of this study, instructions for completing the survey, and the estimated time to complete the survey. Participants' privacy was maintained, and the responses were kept confidential.

2.2. Measures

The Posttraumatic Diagnostic Scale (PDS-5) was used. It is a reliable and valid tool in measuring the PTSD symptoms and severity. [13] The reliability and validity of the English version studied by Edna Foa on 242b

participants and the result showed excellent internal consistency ($\alpha = .95$) and test-retest reliability ($r = .90$), also showed good validity with PTSD checklist and the PTSD symptoms scale ($r = .90$), (PSSI-5; $r = .85$). [13] The reliability and validity of the Arabic version are assessed by Anne E. Norris and Karen J. Aoiانا in a study on 453 immigrant Arab women. The result showed Cronbach alpha value of (0.93) which supports the reliability and the validity were supported by the results of group comparisons. [14] The questionnaire was sent in both Arabic and English languages to participants. It included personal information like; gender (male/female), Nationality (Saudi/Non-Saudi), Occupation (Healthcare provider/ Non healthcare provider) and (Administrative/Physician/Nurse/Pharmacist/Laboratory Specialist/Anesthesiologist/ Dietitian/ Other) and Working area (Inpatient/OPD/Admin). It is also included the PDS-5 as a measurement scale for PTSD symptoms and severity which consistent with 24-item and is a self-reported measure based on DSM-5 criteria for the last month. Also, it is included the duration of PTSD symptoms and subscale questions about the PTSD domains. The rating of the PDS-5 scales ranges from 0 (Not at all) to 4 (6 or more times a week / severe) for frequency and severity of PTSD symptoms. [15]

2.3. Statistical Analyses

The data were analyzed using the SPSS Statistical Package of Social Science software (Version 24; IBM). To describe the basic sociodemographic characteristics of participants, clinical data (Trauma screen - scales PDS-5 - Symptom onset and duration) , and other related factors of sociodemographic using counts and percentages. Comparative analysis will be performed chi-square for categorical variables and Mann-Whitney U test for continuous variables. We also used correlation analysis to verify the relationship between variables. The significance level for all tests was set to $\alpha = .05$, and all tests were 2-tailed.

3. Results

All KAMC staff were targeted through the email including the study link. Among 235 respondents only 118 were included. (Table 1) shows the internal consistency of the questionnaire for the 4 domains of PTSD symptoms (re-experiencing symptoms, avoidance symptoms, cognition and mood symptoms, and arousal symptoms). The questionnaire showed acceptable reliability for all the domains (Cronbach's Alpha: 0.771% - 0.833%). To determine whether the research objectives are relevant and clear, the pre-and pilot tests utilized the following test techniques. After the general efficacy was validated, the pilot test findings were analyzed by a statistician. (Table 1) shows the results of the reliability test by using the (Cronbach's Alpha) method. The total Cronbach's alpha for the questionnaire for each domain was between 0.771% - 0.833%. The outcome ensures the questionnaire's reliability, implying that the instrument is reliable for measuring the study's objectives, which is high (>0.70) and acceptable for the researcher and we can rely on the results reached through it. Cronbach's Alpha, using

Pearson’s correlation, was used to examine the internal consistency of the PDS-5. According to the data analysis of participants found that females, with a slight difference, were the majority (53.4 %) and persons with Saudi nationality 66.9%. The health care providers were the main representatives in the sample with 61.1% for nurses, physicians, laboratory specialists, and pharmacists with (26.3%, 22.9%, 6.8%, and 5.1%) respectively while the administrative staff is (30.5%). (7.6%) represents porters, drivers, security, and paramedics. Regarding the Working area, the result showed a slight difference between the respondent in an inpatient setting 35.6%, administration area was 32.2%, and OPD 30.5% (Table 2). Table 3 shows the included participants who got one or more traumatic incidents in their life. The most prevalent types of traumas were the life-threatening illness and the physical assault-type with 96 (40.9%) for both among the whole participants (n=118). As seen in (Table 4), the correlation ratio among the four domains of PTSD in included participants yielded a strong positive correlation between each one of the clusters., that is +1, and the p-value is computed at .000, which is less than 0.05 which means significant. In this study the prevalence of post-traumatic disorder among KAMC staff were found 50.2 % calculated by the following equation:

Prevalence

$$= \frac{\# \text{ Of people in a sample with the characteristic}}{\text{Total \# of people in a sample}} \times 100$$

(Table 5) summarizes the symptom onset and duration of participants. There was a slightly different in the severity of the scoring symptoms (Moderate 35.6%, Moderate to severe 38.1%, and Severe 26.3%). Regarding the specifier of onset, the delayed onset showed 30.5% which is less than others without delayed onset 69.5%. (Table 6) showed that the association between gender and the level of severity of PTSD is near significant (0.065). 45.5 % of Male showed moderate severity while 39.7 % of females showed moderate to severe severity while other characteristics (Nationality, occupation, and working area) showed non-significant P-value. (Table 7) showed the

association between PTSD domains and characteristics (gender, nationality, occupation, and working area). In regards to gender, near significant P value in the avoidance domain and Arousal and reactivity domain (0.066), (0.073) respectively. The other domains (Re-experiencing and Cognition and mood) showed no significant p-value among gender. In regards to nationality, the Arousal and reactivity domain showed a significant P value (0.03) among Saudi and non-Saudi while the other domain showed no significant value. No significant P-value was revealed between the association of PTSD domains and Health care workers and non-healthcare workers. Also, no significant P-value was revealed between the association of PTSD domains and working areas.

Table 1. Statistics for the measurement scales PDS-5

Variable	Cronbach's Alpha
Re-experiencing symptoms	.833
Avoidance symptoms	.823
Cognition and mood symptoms	.771
Arousal and reactivity symptoms	.794

Table 2. Characteristics

Variable	n= 118
Gender	
Male	55 (46.6%)
Female	63 (53.4%)
Nationality	
Saudi	79 (66.9%)
Non-Saudi	39 (33.1%)
Occupation	
Administrative	36 (30.5%)
Nurse	31 (26.3%)
Physician	27 (22.9%)
Laboratory Specialist	8 (6.8%)
Pharmacist	6 (5.1%)
Other	9 (7.6%)
Working area	
Inpatient	42 (35.6%)
Admin	38 (32.2%)
OPD	36 (30.5%)

Table 3. Trauma screen

Variable	n= 118
Serious, life-threatening illness (heart attack, etc.)	96 (40.9%)
Physical Assault (attacked with a weapon, severe injuries from a fight, held at gunpoint, etc.)	96 (40.9%)
Sexual assault (rape, attempted rape, forced sexual act with a weapon, etc.)	93 (39.6%)
Military combat or lived in a war zone	90 (38.3%)
Natural disaster (severe hurricane, flood, earthquake, etc.)	89 (37.9%)
Accident (serious injury or death from a car, at work, a house fire, etc.)	87 (37%)
Child abuse (severe beatings, sexual acts with someone 5 years older than you, etc.)	85 (36.2%)
Other trauma	29 (12.3%)

Table 4. Correlation

Variables		Re-experiencing	Avoidance	Cognition and mood	Arousal and reactivity
Re-experiencing	Correlation	-	.751	.645	.621
	P-value		.000	.000	.000
Avoidance	Correlation	.751	-	.669	.638
	P-value	.000		.000	.000
Cognition and mood	Correlation	.645	.669	-	.637
	P-value	.000	.000		.000
Arousal and reactivity	Correlation	.621	.638	.637	-
	P-value	.000	.000	.000	

Table 5. Symptom onset and duration

Variable	n= 118
Severity	
Mild	0 (0%)
Moderate	42 (35.6%)
Moderate to severe	45 (38.1%)
Severe	31 (26.3%)
Onset of the trauma-related difficulties:	
< 6 months	82 (69.5%)
> 6 months	36 (30.5%)

Table 6. The study scales among characteristics

Variable	Moderate n=42	Moderate to severe n=45	Severe n=31	P-value
Gender				
Male	25 (45.5%)	20 (36.4%)	10 (18.2%)	.065
Female	17 (27%)	25 (39.7%)	21 (33.3%)	
Nationality				
Saudi	26 (32.9%)	29 (36.7%)	24 (30.4%)	.342
Non-Saudi	16 (41%)	16 (41%)	7 (17.9%)	
Occupation				
Healthcare provider	33 (78.6%)	29 (64.4%)	22 (71%)	.336
Non healthcare provider	8 (19%)	16 (35.6%)	9 (29%)	
Working area				
Inpatient	13 (31%)	17 (37.8%)	12 (38.7%)	.536
OPD	13 (31%)	12 (26.7%)	11 (35.5%)	
Admin	14 (33.3%)	16 (35.6%)	8 (25.8%)	

Table 7. The relation of characteristics to the study scales

Characteristics (n)	Re-experiencing		Avoidance		Cognition and mood		Arousal and reactivity	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	P
Gender								
Male (55)	1.6 (.7)	.119	1.6 (.9)	.066	1.5 (.6)	.502	1.5 (.6)	.073
Female (63)	1.7 (.7)		1.9 (1)		1.6 (.7)		1.8 (.8)	
Nationality								
Saudi (79)	1.7 (.7)	.993	1.8 (1)	.497	1.6 (.6)	.774	1.8 (.7)	.030
Non-Saudi (39)	1.7 (.7)		1.7 (.9)		1.5 (.7)		1.5 (.6)	
Occupation								
Healthcare provider (84)	1.6 (.6)	.135	1.6 (.6)	.343	1.5 (.6)	.482	1.6 (.7)	.193
Non healthcare provider (33)	1.8 (.8)		1.8 (.8)		1.6 (.7)		1.8 (.7)	
Working area								
Inpatient (42)	1.7 (.6)	.965	1.8 (1)	.705	1.6 (.7)	.776	1.7 (.8)	.906
OPD (74)	1.7 (.7)		1.8 (1)		1.6 (.7)		1.7 (.7)	

4. Discussion

This is one of the studies conducted within a Western region of Saudi Arabia to examine the implications of PTSD symptoms among staff working in a tertiary hospital represented by KAMC in Makkah during the early period of the COVID-19 pandemic.

The prevalence of PTSD in our study was 50.2 % which is much higher than those in the general population (1 % -3.5%). [10] Also was higher than the prevalence of PTSD that found in a study done in Wuhan city during the early COVID-19 Period (31.6%) [16], also it was higher than study conducted in South-East hospital of Ireland during the COVID-19 pandemic (41.3%) [17] and higher in a study conducted in Norway during COVID-19 Pandemic (28.9%) [18] but it was less than the study done in a tertiary hospital in the northeast of Italy during COVID-19 pandemic that was found (63%). [12]

It appears that the result is reasonable since the fear of being highly personally infected or that someone close to them may be infected, another reason is the consequences

of the recession that have been very negative for the economy. [19,20,21]

Saudi Arabia contained the Hajj pilgrims every year, during this mass gathering of millions which takes place under extremely cramped conditions, respiratory-borne infectious diseases can easily spread in situ, such as influenza. [22] It is also important to be aware that the Kingdom of Saudi Arabia is a monarchy and that its citizens share not just common religious ties, but also tribal ties and extensive family ties as well and this could play a factor in spreading the infections. [23] However the prevalence in our study is lesser than what has been found in Italy (63%) and this could be due to the sudden hit of coronavirus to Italy as the first western country that was affected with COVID-19 pandemic and there was not sufficient time for adequate preparation to such pandemic that caused heavy workload on medical staff and lead to exhaustion, increase the need for hospital capacity and especially intensive care units and inadequate equipment. All these factors are associated with increasing the level of acute and post-traumatic stress disorders and adverse

psychological impact as well in Italy. [12] Our study showed from 118 participants, the majority of working staff represented moderate to severe PTSD symptoms (38.1%) in less than 6 months duration (69.5%) while (30.5%) started the traumatic related difficulties in more than 6 months after the trauma (Table 5). PTSD tends to occur within a few months after a traumatic event in most cases; however, epidemiological studies suggest that about 25% of people suffer from delayed onset of six months or longer after the traumatic event. [24,25] of the overall participants in our study, no one showed mild PTSD severity and the majority were in the moderate to severe category (38.1%) (Table 6).

It's not surprising to find most of the PTSD symptoms in the moderate to severe category. Multiple risk factors can be playing a role and are associated. The nature of COVID-19 illness as an infectious disease and the rapid spreading as highly contagious, the effect of illness on respiratory functions and causing of acute stress syndrome and pneumonia, the complications that lead to death, the combination of COVID-19 symptoms as cough and fever on top of the social restrictions protocol as quarantine that associated with a feeling of loneliness, boring, anger, and stigma, the effect of the pandemic on the global economy. All that mentioned previously are risk and associated factors for shooting up the anxiety and increasing the PTSD symptoms to moderate to severer category. [26] The prevalence of PTSD in our study was 50.2 % which is much higher than those in the general population without the presence of infectious disease pandemics (1 % -3.5%). [10] Previous research has found that the combined prevalence of PTSD (23%) was much higher than the projected prevalence that pooled following other catastrophes, such as large traumatic events (20%) and floods (16%). [25] People who are exposed to infectious disease outbreaks are more likely to develop PTSD, which lasts for a long time and can be highly persistent. [25] 39.7% with moderate to severe PTSD symptoms were female while 36.4% were male with nearly significant P-value 0.065 (Table 6). After accounting for traumatic event exposure, females are four times more likely than males to acquire PTSD. [24] Females are at greater and higher risk for developing PTSD after pandemics which could be contributed to biological differences between males and females. [25,27,29] Health care providers represented 71 % of severe PTSD symptoms compared to non-healthcare providers 29 % (Table 6). These findings could reflect the need of paying more attention to the mental health wellbeing among staff especially during an unexpected disaster like facing the COVID-19 pandemic. In our study, the percentage of severe PTSD symptoms among females were (33.3 %) which is higher than the percentage among males (18.2 %) and health care providers were (71%) higher than non-healthcare providers (29%) and among staff working in inpatient area including ICU units were found (38.7%) which is higher than the percentage in OPD (35.5%) and the percentage in administrative staff (25.8%). Although p values were not found significant for PTSD about the occupation and working area (0.336) and (0.536) respectively (Table 6), the p values in other study found significant for both the occupation and place of working ($p < 0.001$) and in both intensive care units and sub-intensive COVID-19 units,

nurses and healthcare working staff was more likely to report traumatic events. [12] Health care providers especially nurses and who are working in the front line during pandemics need more focus and attention due to their vulnerability to PTSD symptoms that could be explained by uncomfortable working conditions during the pandemic, including quarantine experience and an extended period of intensive and often overburdened work due to the critical pandemic situation, a lack of knowledge about the disease and particular medications to treat it, as well as the unavoidable psychological trauma, caused by the deaths of patients infected with the disease, are key factors. [25] Trauma-related difficulties represented by domains (increase in arousal and reactivity and re-experience of symptoms, avoidance, mood, and cognition changes). In the association between PTSD domains and gender (Table 7), near significant P-value among males and females in the avoidance domain and Arousal and reactivity domain (0.066), (0.073) respectively. Avoidance: Male, $n=55$ Mean \pm SD 1.6 ± 0.9 , female $n=63$ Mean \pm SD 1.9 ± 1 . Arousal and reactivity: Male, $n=55$ Mean \pm SD 1.5 ± 0.6 . Female $n=63$ Mean \pm SD 1.8 ± 0.8 . Compared to the study done in Greek to measure the development of posttraumatic stress symptoms during the COVID-19 pandemic. In health care workers Avoidance domain showed a non-significant P-value among gender (0.093) but hypervigilance showed a near-significant P-value similar to our study (0.068). [28] In our study the other PTSD domains (Re-experiencing and Cognition and mood) showed no significant p-value among gender while in the study done in the Greek, the intrusion domain among gender showed a significant P-value (0.002). [28] In a study done in Wuhan, they found no significant association between the PTSD domains and gender with a similar finding in our study. Also, the same study revealed a significant association between the hyper arousal and the work location ($p = 0.01$). [16] Our study showed a significant P-value (0.030) in the association between the nationality and the Arousal and reactivity domain: Saudi $n=79$ Mean \pm SD 1.7 ± 0.7 , Non-Saudi $n=39$ Mean \pm SD 1.7 ± 0.7 and this result has no comparable finding with other studies (Table 7). COVID-19 pandemic invaded the world as an unexpected terrifying experience especially for health care workers who placed in this new situation facing a highly infected novel virus with limited resources and with considering this point regarding this stressful situation along with our study and other studies findings and results, the conclusion led to the importance of the screening for psychological consequences especially among working staff during COVID-19 pandemics in both short and long term effect that will help in designing the proper psychological interventions that will fit for health care worker need, decrease the associated stress and improve the individual coping with pandemics, job performance and maintain the mental health wellbeing. [17]

5. Conclusion

The high prevalence rate of PTSD (50.2%) and its severity: Moderate to severe symptoms (38.1%) in our study highlight the importance of the psychological stress

and traumatic events in staff working during a disaster such as COVID-19 pandemics and this result should be taken in consideration to focus on the importance of mental health condition of working staff in a tertiary hospital. Up to our knowledge, this is the first research in Saudi Arabia studying PTSD and its severity during the COVID-19 pandemic and this prompts the need for further studies and researches in this area with specific regards to the short and long-term consequences of COVID-19 pandemics.

6. Limitations

The study was performed during the early COVID-19 pandemic period in Saudi Arabia and we were facing difficulties in conducting working staff under quarantine where face-to-face communication was prohibited and the only method was through electronic links. Staff was under strict protocols with reduced work capacity as precautions during the pandemic. We received below-average expected responses with overall small sample size.

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