

Perceived Stress Among Healthcare Workers At Jeddah Airport During Hajj Season Compared To Normal Working Days

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Abstract

Background: The Hajj pilgrimage imposes significant operational demands on healthcare systems, potentially elevating stress levels among healthcare workers (HCWs).

Objective: To assess perceived stress levels among HCWs at King Abdulaziz International Airport during the Hajj season compared to normal working days and to identify associated demographic and occupational factors.

Methods: A cross-sectional study was conducted using the 10-item Perceived Stress Scale (PSS-10). Data were collected during Hajj and post-Hajj periods. Statistical analyses included Wilcoxon signed-rank tests and subgroup analyses using Mann–Whitney U and Kruskal–Wallis tests.

Results: Among 184 participants, mean PSS-10 scores were significantly higher during Hajj (20.7 ± 6.3) compared to post-Hajj (16.5 ± 5.8 , $p < 0.001$). Subgroup analyses revealed higher stress levels among females, nurses, diploma holders, external support staff, younger age groups, less experienced workers, and first-time Hajj participants.

Conclusion: HCWs experience elevated stress during the Hajj season. Also, certain subgroups were more affected. Targeted interventions are recommended to mitigate stress and maintain healthcare service quality during mass gatherings.

Keywords: Hajj, Healthcare Workers, Perceived Stress, Mass Gathering, Occupational Health, PSS-10.

1. Introduction

Saudi Arabia hosts one of the largest mass gathering events in the world, an annual Hajj pilgrimage in Mecca, gathering more than two million pilgrims annually (Al Asmri, 2022). This vast migration puts significant pressure on the already existing medical system, especially in these important point of entries like the King Abdulaziz International Airport in Jeddah. All these stress factors combine in the case of healthcare workers (HCWs) who have to work under these challenging conditions and face a massive rise in workloads, extended hours, and occupational exposure to communicable diseases (Mirza et al., 2020; Akhtar et al., 2019). All these add up to create an increased risk of higher stress levels and consequent burnout in these individuals considered essential frontline officials (Rayan et al., 2019; Saleh et al., 2021).

The success of this healthcare system is central towards the safety and well-being of the pilgrims, and the health workers themselves.

Prior academic research has continued to stress how psychologically impacting mass events and stressful medical situations can be on medical personnel. As an example, empirical studies carried out during the COVID-19 pandemic clearly showed high levels of psychologically related distress among frontline healthcare workers, hence the strong need to build effective mental health support systems in times of such extraordinary situations (Saleh et al., 2021; Deng et al., 2020). Particularly to the Hajj, research studies have shown that a large percentage of nurses, such as 47% in a study, experienced moderate tension levels, with the remainder of 14% facing an extreme degree of stress (Akhtar et al., 2019). Given the undeniably and distinctively difficult situation of the Hajj season, there seems to be a particularly weak presence of detailed, context-specific data regarding the exact nature of stress levels and stress contributors among the HCWs actually working in the process of the Hajj pilgrimage in the major hubs of transits such as Jeddah Airport (Mirza et al., 2020). This literature gap warrants further in-depth examination on the causative factors of stress in such specific setting.

The Perceived Stress Scale (PSS-10) is a massively validated scale, which has been shown to be highly useful in measuring how someone has perceived stress within a previous month, that has shown high levels of reliability and validity with a variety of populations, including healthcare professionals (Cohen & Williamson, 1988; Harris et al., 2023). Such a powerful tool can be used to glean a subtle insight into the topic of subjective experience of stress among HCWs. This is further emphasized by existing literature, including a study determining that 56 percent of all nurses in the secondary study developed at least one kind of violence during Hajj (Rayan et al., 2019). The environment of Hajj is complex and includes a very high density of multicultural and multilingual patients, and successive through the night shifts, which only increases the intrinsic stressors to HCWs (Al Asmri, 2022; Akhtar et al., 2019). Consequently, a thorough examination based on a validated instrument is required to identify the particular stressors and engage appropriate intervention.

2. Rationale

In-depth knowledge of the exact causal factors that provoke stress among healthcare workers in the Hajj season is paramount to several crucial considerations. To begin with, on the scale of operational efficiency, high levels of stress are known to negatively impact cognitive processes, especially the effectiveness of critical decision-making and, therefore, poorer delivery of patient care performance in general (Al Asmri, 2022). As an illustration, researchers determined that working hours of longer duration and working conditions were proven to be associated with a higher rate of job demand among healthcare professionals in the context of Hajj (Mirza et al., 2020). Knowing exactly the antecedents of stress helps in providing strategic measures to counteract these adverse effects in a move that will protect the integrity and effectiveness of healthcare services delivery in this tough season.

Secondly, chronic stress is a condition that should be managed and alleviated to maintain or improve staff retention in the medical field. Under controlled or chronic work stress often leads to the phenomenon of professional burnout, which subsequently increases the turnover occurrence in HCWs dramatically (Saleh et al., 2021; Rugaana et al., 2023). As an example, a COVID ICU healthcare worker during Hajj showed 56, 82, and 72 percent of emotional exhaustion, depersonalization, and impaired personal achievement all are a sign of burnout (Rugaana et al., 2023). Due to the nature of the work of Hajj operations, experienced people are essential to keep the knowledge of the institution and the fluidity of operations. Finally, the lessons learned on the role of particular stressful factors among HCWs during Hajj can have a tremendous impact on refining public health preparedness plans to support mass event planning in the future in the form of creating more effective training routines, better resource distribution, and support structures (Banaser et al., 2020).

3. Methods

3.1 Study Design and Setting

The cross-sectional study design was adopted in King Abdulaziz international airport, Jeddah (Wang & Cheng, 2020). Such design was strong to compare the stress levels of the same people concerning two separate periods of time: the Hajj season (June 2024) and the life after Hajj (August 2024). This method considerably decreased the inter-individual variability. This gave more evidence of the effects of the Hajj season on stress. The research by Mirza et al. (2020) indicates that the cross-sectional design was practical in comparing the job satisfaction in the period of Hajj and outside, thus indicating its reliability. In which, would provide a measurable impact of hajj season on the perceived stress of health workers.

3.2 Participants

A total of 184 healthcare workers (HCWs) partook in the study and filled in the questionnaires in both rounds of data collection. The sample size was sufficient to allow the statistical power that will result to the identification of meaningful differences. One of such studies has been conducted by Akhtar et al. (2019) that conducted the research on 100 nurses who were assessed in terms of their stress levels. The inclusion criteria enabled inclusion of all the employees of the airports whether working on full time basis or as external support from other health institutions outside the airport health surveillance center. This ensured that a diverse mix of staff with different workload stresses could be represented in the study. Participants were selected using convenience sampling from HCWs stationed at the hajj season at the airport grounds only. Enhancing the repressiveness of the study population and supporting the generalizability of the results to the overall population of HCW during mass gatherings.

3.3 Instrument

The 10-item Perceived stress scale (PSS-10) was used to define perceived stress. PSS-10 is a widely recognized, valid, and reliable questionnaire that is applied to measure the levels of subjective perception of stress over the past month (Tsegaye et al., 2022). The data will be coherent and comparable to already published literature, owing to the context of application that it will have adopted in clinical practice. The subjective nature of PSS-10 in making a person assess the stress also fits perfectly in the objective of the study to comprehend the perceived stress.

3.4 Data Collection

The research subjects were asked to complete the PSS-10 questionnaire and the demographic questionnaire. Through this collection plan it was possible to capture crucial demographic and occupational variables such as age, gender, education, occupation, experience and work assignment and prior participation in Hajj. This all-inclusive form of data gathering is important to subgroup analyses, which can point out the vulnerable HCW populations that can be more vulnerable to stress, as in the case of the burnout-related study of Rugaana et al. (2023) among ICU workers during Hajj.

3.5 Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of Jeddah Health Affairs, Kingdom of Saudi Arabia. Participation was entirely voluntary, and informed consent was obtained from all healthcare workers prior to data collection. The purpose of the study, the anonymity of responses, and the confidentiality of data were explained clearly to participants. No identifying information was collected, and all data were stored securely and used solely for research purposes.

3.6 Statistical Analysis

Data analysis was conducted using SPSS. Given the typical non-normal distribution of psychological scale scores like the PSS-10, non-parametric tests were chosen. The Wilcoxon signed-rank test compared paired Hajj/post-Hajj data, while Mann–Whitney U and Kruskal–Wallis tests facilitated subgroup comparisons, effectively handling ordinal data. This approach is consistent with rigorous statistical practices in similar studies, for instance, Saleh et al. (2021) utilized non-parametric analyses to explore compassion fatigue among nurses during Hajj.

4. Results

Table 1: distribution of participant according to socio demographic characteristics

		Groups				Total		Chi-square	
		During Hajj		After Hajj					
		N	%	N	%	N	%	X ²	P-value
Age	<30	19	12.3%	4	5.5%	23	10.1%	2.860	0.414
	30-40	71	45.8%	37	50.7%	108	47.4%		
	40-50	41	26.5%	22	30.1%	63	27.6%		
	50-60	24	15.5%	10	13.7%	34	14.9%		
Gender	Female	43	27.7%	20	27.4%	63	27.6%	0.003	0.957
	Male	112	72.3%	53	72.6%	165	72.4%		
Educational Level	Diploma or less	70	45.2%	36	49.3%	106	46.5%	4.672	0.097
	Bachelor's	70	45.2%	24	32.9%	94	41.2%		
	Master's or higher	15	9.7%	13	17.8%	28	12.3%		
Occupation	Nurse	82	52.9%	45	61.6%	127	55.7%	2.333	0.506
	Physician	17	11.0%	9	12.3%	26	11.4%		
	Public Health Officer	31	20.0%	11	15.1%	42	18.4%		
	Other	25	16.1%	8	11.0%	33	14.5%		
Years of Experience	<5	14	9.0%	5	6.8%	19	8.3%	2.131	0.712
	5-10.	36	23.2%	18	24.7%	54	23.7%		
	10-15.	33	21.3%	14	19.2%	47	20.6%		
	15-20.	25	16.1%	17	23.3%	42	18.4%		
	>20	47	30.3%	19	26.0%	66	28.9%		
Work Assignment	Airport-based	122	78.7%	57	78.1%	179	78.5%	0.012	0.914
	External support	33	21.3%	16	21.9%	49	21.5%		
Previous Hajj Participation	First time	13	8.4%	6	8.2%	19	8.3%	0.020	0.990
	1–3 times	65	41.9%	30	41.1%	95	41.7%		
	More than 3 times	77	49.7%	37	50.7%	114	50.0%		
work place	Pilgrims' Terminal	78	50.3%	45	61.6%	123	53.9%	12.987	0.011*
	North Terminal	19	12.3%	5	6.8%	24	10.5%		
	Pilgrims' Terminal and North Terminal	0	0.0%	4	5.5%	4	1.8%		
	Terminal 1	51	32.9%	17	23.3%	68	29.8%		
	Other	7	4.5%	2	2.7%	9	3.9%		
	No	48	31.0%	21	28.8%	69	30.3%	0.114	0.736

Increased financial incentives	Yes	107	69.0%	52	71.2%	159	69.7%		
One day off every 7 days	No	107	69.0%	48	65.8%	155	68.0%	0.245	0.621
	Yes	48	31.0%	25	34.2%	73	32.0%		
Reduced working hours	No	112	72.3%	50	68.5%	162	71.1%	0.342	0.559
	Yes	43	27.7%	23	31.5%	66	28.9%		

Regarding socio demographic characteristics, this table shows that the highest proportion of participants age 30-40 years (50.7%) followed by 40-50 years of age (26.5%), while 50-60 were (15.5%) in the group during Hajj while after Hajj highest proportion of participants age 30-40 years (45.8%) followed by 40-50 years of age (30.1%), while 50-60 were (13.7%) while no significant relation were $P\text{-value}=0.414$, X^2 2.860. Regarding the gender the majority of participant during Hajj male were (72.3%), but female were (27.7%) while after Hajj the majority of participant male were (72.6%), but female were (27.4%) while no significant relation were $P\text{-value}=0.957$, X^2 0.003. Regarding the level of education the majority of participant diploma or less and bachelor's during Hajj (45.2%), after Hajj the majority of participant diploma or less and bachelors were (32.9%) while a significant relation were $P\text{-value}=0.097$, X^2 4.672. Regarding the Occupation the majority of participant during Hajj nurse were (52.9%), but other were (16.1%) while after Hajj the majority of participant nurses were (61.6%), while no significant relation were $P\text{-value}=0.506$, X^2 2.333. Regarding the years of experience the majority of participant >20 during Hajj (30.3%), after Hajj the majority of participant >20 were (26.0%) while no significant relation were $P\text{-value}=0.712$, X^2 2.131. Regarding the Work Assignment the majority of participant during Hajj Airport-based were (78.7%), but External support were (21.3%) while after Hajj the majority of participant Airport-based were (78.1%) followed by External support were (21.9%), while no significant relation were $P\text{-value}=0.914$, X^2 0.012. Regarding the Previous Hajj Participation the majority of participant More than 3 times during Hajj (49.7%) followed by 1-3 times were (41.9%), after Hajj the majority of participant More than 3 times were (50.7%) while no significant relation were $P\text{-value}=0.990$, X^2 0.020. Regarding the work place the majority of participant during Hajj Pilgrims' Terminal were (50.3%), but Terminal 1 were (32.9%) while after Hajj the majority of participant Pilgrims' Terminal were (61.6%) followed by Terminal 1 were (23.3%), while a significant relation were $P\text{-value}=0.011$, X^2 12.987. Regarding the Increased financial incentives the majority of participant Yes during Hajj (69.0%) followed by No were (31.0%), after Hajj the majority of participant Yes were (71.2%) while no significant relation were $P\text{-value}=0.736$, X^2 0.114. Regarding the One day off every 7 days the majority of participant during Hajj No were (69.0%), but Yes (31.0%) while after Hajj the majority of participant No were (65.8%) followed by Yes were (34.2%), while no significant relation were $P\text{-value}=0.0559$, X^2 0.342. Regarding the Reduced working hours the majority of participant No during Hajj (72.3%) followed by Yes were (27.7%), after Hajj the majority of participant No were (68.5%) while no significant relation were $P\text{-value}=0.559$, X^2 0.342.

Table 2: distribution of the Perceived Stress Scale -10 (PSS-10) to participants' feelings and thoughts during the past month during and after Hajj

		PSS-10										%
		Never		Almost never		Sometim es		Fairly Often		Very Often		
		N	%	N	%	N	%	N	%	N	%	
Over the past month, how often did you feel upset about	During Hajj	82	52.9 %	20	12.9 %	26	16.8 %	15	9.7%	12	7.7%	26.61
	After Hajj	34	46.6 %	19	26.0 %	13	17.8 %	5	6.8%	2	2.7%	23.29

something unexpected?												
Over the past month, how often did you feel unable to control important matters in your life?	During Hajj	73	47.1 %	23	14.8 %	14	9.0%	16	10.3 %	29	18.7 %	34.68
	After Hajj	39	53.4 %	13	17.8 %	10	13.7 %	4	5.5%	7	9.6%	25.00
Over the past month, how often did you feel stressed and overwhelmed?	During Hajj	48	31.0 %	30	19.4 %	24	15.5 %	22	14.2 %	31	20.0 %	43.23
	After Hajj	27	37.0 %	19	26.0 %	11	15.1 %	9	12.3 %	7	9.6%	32.88
Over the past month, how often did you feel confident in your ability to handle your own problems?	During Hajj	22	14.2 %	15	9.7%	23	14.8 %	21	13.5 %	74	47.7 %	32.26
	After Hajj	10	13.7 %	5	6.8%	6	8.2%	13	17.8 %	39	53.4 %	27.40
Over the past month, how often did you feel things were going your way?	During Hajj	17	11.0 %	21	13.5 %	33	21.3 %	26	16.8 %	58	37.4 %	35.97
	After Hajj	5	6.8%	9	12.3 %	11	15.1 %	21	28.8 %	27	37.0 %	30.82
Over the past month, how often did you find yourself unable to cope with all the things you had to do?	During Hajj	82	52.9 %	27	17.4 %	17	11.0 %	17	11.0 %	12	7.7%	25.81
	After Hajj	36	49.3 %	16	21.9 %	7	9.6%	8	11.0 %	6	8.2%	26.71
Over the past month, how often were you able to control the	During Hajj	17	11.0 %	19	12.3 %	17	11.0 %	29	18.7 %	73	47.1 %	30.32
	After Hajj	8	11.0 %	7	9.6%	9	12.3 %	21	28.8 %	28	38.4 %	31.51

things that upset you?												
Over the past month, how often did you feel in control?	During Hajj	19	12.3 %	18	11.6 %	20	12.9 %	27	17.4 %	71	45.8 %	31.77
	After Hajj	5	6.8%	8	11.0 %	7	9.6%	25	34.2 %	28	38.4 %	28.42
Over the past month, how often did you feel angry about things beyond your control?	During Hajj	54	34.8 %	32	20.6 %	30	19.4 %	15	9.7%	24	15.5 %	37.58
	After Hajj	24	32.9 %	16	21.9 %	13	17.8 %	11	15.1 %	9	12.3 %	38.01
Over the past month, how often did you feel like your challenges were piling up to the point where you could no longer overcome them?	During Hajj	74	47.7 %	34	21.9 %	21	13.5 %	16	10.3 %	10	6.5%	26.45
	After Hajj	38	52.1 %	10	13.7 %	14	19.2 %	8	11.0 %	3	4.1%	25.34

In the table 2 show regarding Over the past month, how often did you feel upset about something unexpected, how often did you feel unable to control important matters in your life, how often did you feel stressed and overwhelmed the highest proportion of participants in never during Hajj respectively were (52.9%,47.1%,31.0%) while after Hajj respectively were but the % during Hajj were (26.61%,34.68%, 43.23%),

Regarding Over the past month, how often did you feel confident in your ability to handle your own problems, how often did you feel things were going your way

the highest proportion of participants in Very Often during Hajj respectively were (47.7%, 37.0%) while after Hajj respectively were (53.4%, 37.0%) but the % during Hajj were (32.26%,35.97%),

Regarding Over the past month, how often were you able to control the things that upset you , how often did you feel in control, the highest proportion of participants in Very Often during Hajj respectively were (47.1%, 45.8%) while after Hajj respectively were (38.4%, 38.4%) but the % after Hajj were (31.51%, 31.77%)

Regarding Over the past month, how often did you find yourself unable to cope with all the things you had to do, how often did you feel angry about things beyond your control , how often did you feel like your challenges were piling up to the point where you could no longer overcome them, the highest proportion of participants in never during Hajj respectively were (52.9%, 34.8%,47.7%) while after Hajj respectively were (49.3%, 32.9%,52.1%) but the % after Hajj were (26.71%,38.01%,25.34%),

Table 3 Distribution of the participant to Perceived Stress Scale -10 (PSS-10) about groups during and after Hajj

		Groups				Total	
		During Hajj		After Hajj			
		N	%	N	%	N	%
PSS-10	Very Low	49	31.6%	30	41.1%	79	34.6%
	Low	25	16.1%	10	13.7%	35	15.4%
	Average	18	11.6%	8	11.0%	26	11.4%
	High	31	20.0%	14	19.2%	45	19.7%
	Very High	32	20.6%	11	15.1%	43	18.9%
Total		155	100.0%	73	100.0%	228	100.0%
Chi-Square	X ²	2.333					
	P-value	0.675					

Regarding during Hajj the majority of participants Very Low were (31.6%) followed by high and very high were (20.0%) but low and average respectively were (16.1%, 11.6%) while after Hajj Very Low were (41.1%) followed by high and very high respectively were (19.2%, 15.1%) but low and average respectively were (13.7%, 11.0%) and total were (100.0%) while heave no significant relation were P-value <0.675 and X² 2.333 .

Figure (1) Distribution of the participant to Perceived Stress Scale -10 (PSS-10) about groups during and after Hajj

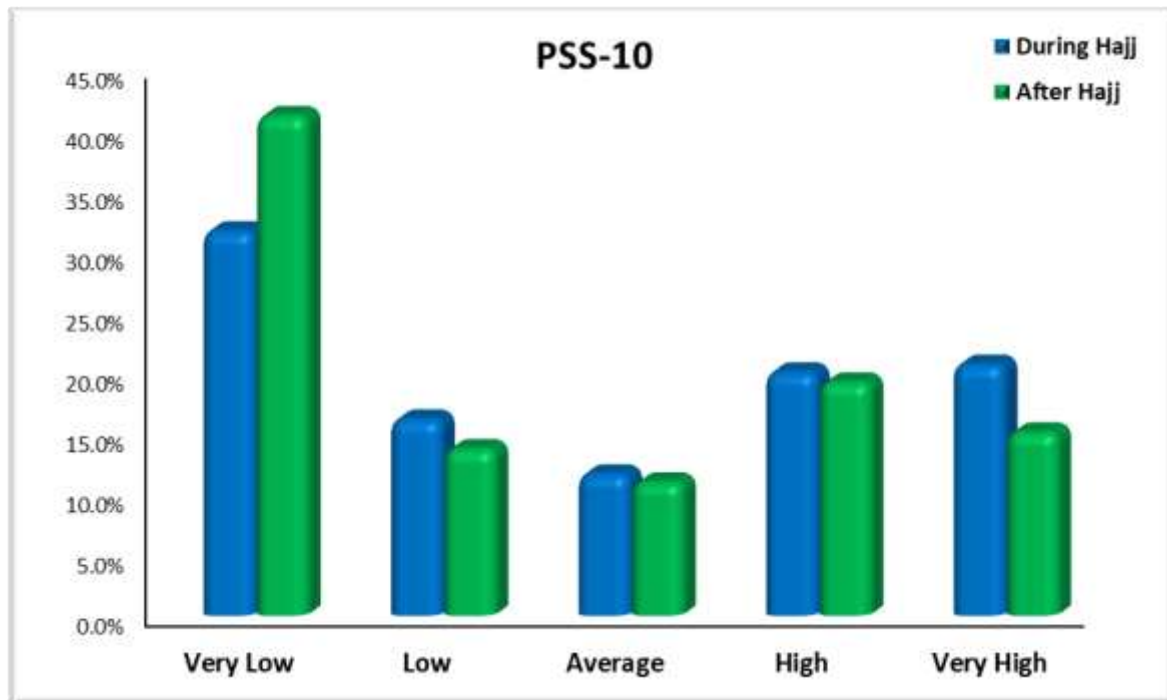


Table 4 Distribution of the relation of participant to Perceived Stress Scale -10 (PSS-10) and demographic data .

		N	PSS-10	Test	Mann-Whitney U or Kruskal-Wallis Test	
			Mean Rank		test value	P-value
Groups	During Hajj	155	117.38	Mann-Whitney U	5210.500	-0.963
	After Hajj	73	108.38			
Age	<30	23	106.04	Kruskal-Wallis Test	5.839	0.120
	30-40	108	125.56			
	40-50	63	103.25			
	50-60	34	105.91			
Gender	Female	63	132.14	Mann-Whitney U	-2.499	0.012*
	Male	165	107.76			
Educational Level	Diploma or less	106	105.45	Kruskal-Wallis Test	6.815	0.033*
	Bachelor's	94	116.65			
	Master's or higher	28	141.54			
Occupation	Nurse	127	107.41	Kruskal-Wallis Test	5.561	0.135
	Physician	26	135.37			
	Public Health Officer	42	126.31			
	Other	33	110.30			
Years of Experience	<5	19	103.37	Kruskal-Wallis Test	4.710	0.318
	5-10.	54	123.49			
	10-15.	47	126.29			
	15-20.	42	103.33			
	>20	66	109.06			
Work Assignment	Airport-based	179	116.37	Kruskal-Wallis Test	-0.820	0.412
	External support	49	107.66			
Previous Hajj Participation	First time	19	104.63	Kruskal-Wallis Test	0.859	0.651
	1–3 times	95	118.53			
	More than 3 times	114	112.79			
work place	Pilgrims' Terminal	123	117.34	Kruskal-Wallis Test	3.115	0.539
	North Terminal	24	106.15			
	Pilgrims' Terminal and North Terminal	4	62.88			

	Terminal 1	68	115.76			
	Other	9	111.44			

Table (4) Distribution of the relation of participant to Perceived Stress Scale -10 (PSS-10) and demographic data show that is regarding groups no significant relation between Perceived Stress Scale -10 and groups were (Mean Rank 117.38) during Hajj follow by after Hajj were (Mean Rank, 108.38) while Mann-Whitney U = 5210.500, were P-value=-0.963. Regarding age no significant relation between Perceived Stress Scale -10 and age increase in 30-40 years were (Mean Rank 125.56), follow by <30 age were (Mean Rank, 106.04) while 50-60 years were (Mean Rank 105.91) were (Kruskal-Wallis Test, 5.839) while were P-value=-0.120. Regarding gender a significant relation between Perceived Stress Scale -10 and gender increase in female were (Mean Rank 132.14), follow male were (Mean Rank, 107.76) were (Mann-Whitney U -2.499) while P-value=-0.012. regarding educational Level a significant relation between Perceived Stress Scale -10 and educational Level increase in Master's or higher were (Mean Rank 141.54), follow Bachelors were (Mean Rank, 116.65) were (Kruskal-Wallis Test 6.815) while P-value=-0.033. Regarding Occupation no significant relation between Perceived Stress Scale -10 and Occupation increase in Physician were (Mean Rank 135.37), follow Public Health Officer were (Mean Rank, 126.31) were (Kruskal-Wallis Test 5.561) while P-value= -0.135. Regarding Years of Experience no significant relation between Perceived Stress Scale -10 and Years Of Experience increase in 10-15 were (Mean Rank 126.29), follow 5-10 were (Mean Rank, 123.49) were (Kruskal-Wallis Test 4.710) while P-value=-0.318. regarding Previous Hajj Participation no significant relation between Perceived Stress Scale -10 and Previous Hajj Participation increase in 1-3 times were (Mean Rank 118.53), follow More than 3 times were (Mean Rank, 112.79) were (Kruskal-Wallis Test -0.859) while P-value= -0.651. regarding work place no significant relation between Perceived Stress Scale -10 and work place increase in Pilgrims' Terminal were (Mean Rank 117.34), follow Terminal 1 were (Mean Rank, 115.76) were (Kruskal-Wallis Test 3.115) while P-value=-0.539 .

5. Discussion

Hajj is the largest and the most diverse mass gathering of people in the world. This mass gathering entails some of the world's most important public health and infectious disease hazards. Many of these infections can be avoided or averted by adopting appropriate preventive measures. Prevention of these infections needs effort to raise awareness on the health hazards during Hajj among HCWs, especially those working with pilgrims to be able to conduct effectively preventive measures, such as immunization and health education.⁸

This study revealed that all study participants were Regarding socio demographic characteristics, this table shows that the highest proportion of participants age 30-40 years (50.7%) while no significant relation were P-value=0.414, X² 2.860. Regarding the gender the majority of participant during Hajj male were (72.3%), but female were (27.7%) no significant relation were P-value=0.957, X² 0.003. Regarding the level of education the majority of participant diploma or less and bachelor's during Hajj (45.2%), after Hajj the majority of participant diploma or less and bachelors were (32.9%) while a no significant relation were P-value=0.097, X² 4.672. Regarding the Occupation the majority of participant during Hajj nurse were (52.9%), but other were (16.1%) (See table 1)

This study rigorously demonstrates that healthcare workers (HCWs) at Jeddah Airport experience significantly elevated perceived stress during the Hajj season. The findings strongly support that increased patient load during Hajj causes higher perceived stress among healthcare workers. The Hajj pilgrimage draws over two million pilgrims annually (Al Asmri, 2022), creating an immense operational burden. Such findings are also supported by other studies suggesting that large numbers of patients accompanied by regular emergencies also lead to high pressure among medical personnel (Al Asmri, 2022; Akhtar et al., 2019).

In our study also over the past month, how often did you feel confident in your ability to handle your own problems, how often did you feel things were going your way the highest proportion of participants in Very Often during Hajj respectively were (47.7%, 37.0%) while after Hajj respectively were (53.4%, 37.0%) but the % during Hajj were (32.26%, 35.97%), regarding Over the past month, how often were you able to control the things that upset you, how often did you feel in control, the highest proportion of participants in Very Often during Hajj respectively were (47.1%, 45.8%) while after Hajj respectively were (38.4%, 38.4%) but the % after Hajj were (31.51%, 31.77%) (See table 2)

This study presents strong evidence that longer working shifts during the Hajj contribute to the increased level of perceived stress among healthcare staff. The stressful Hajj season could require back-to-back long shifts since it has been observed that nurses worked 12-hour shifts during Hajj (Al Asmri, 2022; Saleh et al., 2021). The findings report that the whereas the overall stress is significantly greater during Hajj,

In our study during Hajj the majority of participants Very Low were (31.6%) followed by high and very high were (20.0%) but low and average respectively were (16.1%, 11.6%) while after Hajj Very Low were (41.1%) followed by high and very high respectively were (19.2%, 15.1%) but low and average respectively were (13.7%, 11.0%) and total were (100.0%) while have no significant relation were P-value <0.675 and X² 2.333 (See table 3)

In our study distribution of the relation of participant to Perceived Stress Scale -10 (PSS-10) and demographic data regarding groups no significant relation between Perceived Stress Scale -10 and groups were (Mean Rank 117.38), regarding gender a significant relation between Perceived Stress Scale -10 and gender increase in female were (Mean Rank 132.14), follow male were (Mean Rank, 107.76) were (Mann-Whitney U -2.499) while P-value=-0.012. regarding educational Level a significant relation between Perceived Stress Scale -10 and educational Level increase in Master's or higher were (Mean Rank 141.54), follow Bachelors were (Mean Rank, 116.65) were (Kruskal-Wallis Test 6.815) while P-value=-0.033. (See table 4)

6. Conclusion

This study unequivocally demonstrates that healthcare workers at Jeddah Airport experience significantly higher perceived stress during the demanding Hajj season compared to normal working days. The data revealed a notable increase in PSS-10 scores, substantiating the acute psychological burden faced by these frontline personnel amidst mass gathering operations. Crucially, subgroup analyses identified specific vulnerabilities, with females, nurses, diploma holders, external support staff, younger, less experienced, and first-time Hajj participants exhibiting elevated stress levels. These findings underscore the urgent need for targeted interventions, including enhanced training, robust psychological support, and improved resource allocation, to mitigate stress and safeguard the well-being of healthcare workers, thereby ensuring the sustained quality of critical healthcare services during future Hajj pilgrimages and other large-scale events.

7. Limitations

Results are not compared to baseline stress levels in HCWs outside Hajj contexts (e.g., Saudi HCWs in regular hospitals), limiting depth.

Sample size is limited, cannot be generalized.

The study design does not implement causality as its nature is cross sectional

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