

## Health Impact Of Work Stressors And Psycho-Social Perceptions Among Healthcare Workers

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### Abstract

*Healthcare workers have shown more psychological disorders such as anxiety and depression due to the nature of work, which can cause job burnout, decrease the quality of medical services, and even endanger medical safety. **This study aims:** To compare global health, mental health impact of work stressors and psychosocial perception of healthcare workers (HCWs) and non-HCWs in a hospital. **Methods:** A cross-sectional questionnaire study invited all professionals in Al-Adwani General Hospital in Taif, Makkah region in Saudi Arabia to respond to an electronic questionnaire. The survey was anonymous and confidentiality of information was assured. A validated version of the SATIN (Santé Au Travail Inrs université Nancy 2) questionnaire with adapted scoring was used to collect data on health and impact of work stressors. This questionnaire was sent to all healthcare workers (HCWs) at a hospital in February 2023 and was self-administered online. In a multinomial regression model, we included HCW status, age, gender and front-line worker. **Results:** Data from a total of 1405 participants were included. We found that being an HCW, male and front-line worker was a risk factor for negative perception of work demand (OR 7.35, 95% CI 4.2 to 11.47; OR 2.55, 95% CI 1.11 to 5.89; OR 1.78, 95% CI 1.04 to 3.06). Being an HCW was a predictive factor for stress (OR 1.47, 95% CI 1.04 to 2.08), poor global health (OR 1.71, 95% CI 1.14 to 2.55) and negative perception of work activity environment (OR 1.9, 95% CI 1.3 to 2.8). **Conclusion:** We have shown that all HCWs suffered from some health impact shortly. We underline some stressors with high impact, including work demand, work abilities and organizational context, and emphasize the need for risk management.*

**Keywords:** Work Stressors, Psycho-social Perceptions a Healthcare Workers

### Introduction

Healthcare professionals are in short supply, with high work intensity, heavy workload and high risk, requiring them to master the operation in various working environments, thus they are facing great pressure and job burnout<sup>(1,2)</sup>. Especially after the normalization of the outbreak epidemic, higher requirements are put forward for their physical and psychological quality. In the case of environmental changes and self-adjustment

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imbalances, they would have a lot of psychological disorders, such as anxiety and depression<sup>(2)</sup>. A recent survey of healthcare professionals indicated the incidence of anxiety and depression was 15–20%<sup>(3)</sup>. A survey of Tunisian residents found that 43.6% of participants had definite anxiety and 30.5% had definite depression<sup>(4)</sup>. A cross-sectional investigation of 1,679 healthcare workers at 27 hospitals found that their anxiety and depression levels were higher than those of the general population<sup>(5)</sup>. According to a study of psychiatrists, the prevalence of depression was 17.74%<sup>(6)</sup>. Anxiety and depression of the healthcare professionals may further lead to poor quality of life, and even suicide. Meanwhile, the work ability is greatly reduced, the job burnout is increased, the quality of medical service is lowered, and even the medical security is threatened<sup>(3, 5, 7)</sup>. Therefore, the current mental state of healthcare professionals and its occurrence mechanism under the normalization of the epidemic deserve more attention.

Anxiety and depression are common psychological disorders that are highly related and often comorbid<sup>(8, 9)</sup>. Anxiety was proven to be a predictor of depression and preceded the onset of depression<sup>(10)</sup>. Meanwhile, previous studies have demonstrated that the anxiety and depression of healthcare professionals were affected by perceived stress and resilience<sup>(11)</sup>. Perceived stress is a factor that causes anxiety and depression, and higher levels of perceived stress have a negative impact on mental health<sup>(12)</sup>. Many studies have documented the protective effect of resilience on mental health<sup>(13, 14)</sup>. Resilience can be effectively adjusted when individuals face setbacks or adversities, and have a positive impact on relieving anxiety and depression<sup>(15)</sup>. The Effort-Reward Imbalance (ERI) is one of the specific factors that affect the link between job stress and psychological health, and those who experience the high effort and low reward, as well as those with high over-commitment, have a much higher threat of depression at follow-up<sup>(16)</sup>.

Perceived stress is how much a person considers certain situations to be stressful, and it may help to explain the connection between job stress and psychological symptoms<sup>(17)</sup>. High perceived stress does lead to strong negative emotions among healthcare professionals<sup>(18)</sup>. The high perceived stress of healthcare professionals comes not only from life stressors, but also from occupational stressors, such as the effort-reward imbalance in job Surrounding<sup>(19)</sup>.

In the KSA, the ministry of health (MOH) implemented a uniform policy to follow in public and private health care facilities to provide a safe and healthy environment for the HCWs, patients, and visitors. Each type of healthcare facility enacted its vision, mission, and policies in alignment with the policy of the MOH<sup>(20)</sup>. The continuous assessment of occupational health hazards faced by the HCWs is essential for strengthening the public healthcare system in a country<sup>(21, 22)</sup>. This can be achieved by identifying the current prevalence and risk factors of health hazards acquired by the HCWs due to their workplace<sup>(22, 23)</sup>. A study conducted by Abdulmageed et al. in 2018 assessing the risk factors for biological hazards in tertiary care hospitals found that significant risk factors for needle stick injuries were extended workload and shift duties<sup>(24)</sup>.

Another study performed in Uganda by Ndejjo et al., (2015)<sup>(25)</sup> mentioned that work-related stress, type of health care facilities, and improper personal protective measures were significantly associated with a higher risk of developing biological and non-biological health hazards<sup>(25)</sup>. A study by Alenzi et al., (2020) in the KSA stated that stress and anxiety were significantly higher among the unmarried, elderly, nurses, and workers in radiology<sup>(26)</sup>. Studies on HCW well-being and mental health have regularly reported problems such as symptoms of post-traumatic stress, burnout, depression and anxiety associated with their occupational activities both during epidemics and at other times<sup>(27)</sup>.

In a community-based review, the pooled prevalence of depression among HCWs was 25%, and more precisely in a recent meta-analysis on more studies the pooled prevalence of depression was 25% among nurses, 24% among medical doctors and 43% among front-line professionals<sup>(28, 29)</sup>. A meta-analysis of 72 studies also found a pooled

prevalence of anxiety of 25% among HCWs, 27% among nurses, 17% among medical doctors and 43% among front-line HCWs<sup>(30)</sup>. In a recent updated meta-analysis of community-based studies, the prevalence of anxiety was 25%<sup>(31)</sup>. Not only front-line but also second-line HCWs reported mental health impact<sup>(27, 32)</sup>.

Few studies provide data on physical symptoms and/ or work stressors such as organization, work activity and activity management. Indeed, the majority of participants in these studies were HCWs, including physicians and nurses, and the comparisons focused on whether these HCWs were working in contact with patients or not. Santé Au Travail Inrs université Nancy (SATIN) is a transversal questionnaire developed for preventive medicine that targets well-being at work. It assesses physical and psychological health, work environment, and psycho-social factors. It was built based on theoretical models of occupational stress and has been validated in recent studies<sup>(33, 34)</sup>. The present study aimed to healthcare workers' overall health (mental and physical), impact of worker stressors on health and psychosocial perception.

## Methods

A cross-sectional questionnaire study invited all professionals in Al-Adwani General Hospital in Taif, Makkah region in Saudi Arabia to respond to an electronic questionnaire. The survey was anonymous and confidentiality of information was assured. The questionnaire was sent to each HCW by email through their professional address. Answers were all self-reported. A contact (phone and email) for information and questions about the study and the questionnaire was also sent. The survey was conducted from February to April 2023 and involved all workers employed in pre-mentioned setting. The total number of workers was 7299. The inclusion criteria were as follows: working in the hospital for more than 1 year, adults over 18 years and acceptance of participation in the study.

Questionnaire of the study: the SATIN questionnaire, created a specific questionnaire with all original questions and some additional questions on workplace and demographics. The first question asked participants to check if they have met the inclusion criteria and that they agree to be included in the survey. An open question for additional remarks was available at the end of the questionnaire. There were 86 questions divided into 6 parts: (1) personal and professional identification (10 questions); (2) health reports (16 questions); (3) work strain and capacities (8 questions); (4) work environment (39 questions); (5) work assessment (4 questions); and (6) supplementary questions for occupational physicians (9 questions).

Each question had five possible answers and each answer was linked to a specific score. The mean of the scores was calculated for each part of the questionnaire: health reports (physical health, self-evaluation of health and compared with the next year), mental health (self- evaluation of mental health, confidence in the future), physical symptoms (musculoskeletal disorders), psycho-somatic symptoms (headache, sleep problems, gastrointestinal problems), stress (feeling stressed, exhausted at work, crack-up because of the job), work strain (physical, emotional, concentration, knowledge), work abilities (physical, emotional, concentration, knowledge), work environment (physical environment), work activity (interest, variety, utility, responsibility, diversity, quality of social relations), framework of activities (clarity, consistency, latitude, support, interruptions), organizational context (number of hours, financial support, salary communication, job security, job career), and self- assessment of work conditions in their entirety.

The scores for each part were interpreted as follows: <2.5 for poor health or negative perception, 2.5–3.5 for mild health or perception, and >3.5 for good health or positive perception. Global health and general workplace environment self-evaluation were scored twice with, respectively, health reports and working environment scores. Demographic data were self-reported by the participants, including occupation, sex (male/female), age (<35, 35–44, 45–54, >55 years), years at workplace (<5, 6–15, 16–26,

>26 years), and shift work or night work (never, rarely, regularly, often/very often).

**Statistical analyses:** Data analysis was performed using SPSS software (version 28). The results for continuous variables are shown as median with IQR. Ranked data, which were ranked from each part of the questionnaire, are presented as number and percentage. Participants were divided into three groups according to the previously reported questionnaire cut-off (<2.5, 2.5–3.5, >3.5). Doctors, nurses, medical students, nurse assistants, midwife, paramedics, physiotherapists and radiographers were included in the subgroup "HCW"; other participants were included in the subgroup "non-healthcare worker".. A multinomial logistic regression analysis was performed and the associations between risk factors and outcomes are presented as OR and 95% CI after adjustment for confounders including, gender, age and years at workplace. Significant level was set at  $p=0.05$ .

## Results

**Table (1)** shows the demographic and occupational data of participants. In this study, 1405 HCWs completed the survey, including 931 HCWs (66.2%). A higher proportion of participants were women (1113, 79.2%), were aged 35–44 years (426, 30.2%), with experience in the hospital of about 6–15 years (516, 36.7%), never do night work (725, 51%) and always work on shift hours (435, 29.1%). We did not find significant differences between participants and the total population in terms of gender (female 74.4%, male 25.6%) and age (<25 years: 2.9%; 25–34 years: 30.6%; 35–44 years: 28.3%; 45–54 years: 25.8%; and <55 years: 12.4%). We did not have other data for shift work and years at workplace.

**Table (2)** shows the answers to the questionnaire and their scores. A high proportion of workers reported stress (32.66%), physical symptoms (31.38%) and negative perception of work demand (31.88%). For work environment, mild and low scores were reported by 67.26% for work activity environment and 82.26% for organizational context, as well as 61.94% for general health.

**Table (3)** shows the results of the multinomial regression in the multivariate analysis. Low is defined as a low score of <2.5 (bad health or negative perception) on the SATIN questionnaire, a medium score is between 2.5 and 3.5, and a high score is >3.5 (good health or positive perception). A subgroup of HCWs had an increased risk of self-reported stress (OR 1.47, 95% CI 1.04 to 2.08,  $p=0.04$ ), poor psychological health (OR 1.4, 95% CI 1 to 2,  $p=0.03$ ) and global health (OR 1.71, 95% CI 1.14 to 2.55,  $p=0.009$ ), negative perception of work demand (OR 7.35, 95% CI 4.2 to 11.47,  $p<0.0001$ ), abilities (OR 2.91, 95% CI 1.39 to 6.11), physical environment (OR 2.44, 95% CI 1.66 to 3.59,  $p<0.0001$ ), framework of activities (OR 2.02, 95% CI 1.4 to 2.92,  $p<0.001$ ), and organizational context (OR 2.04, 95% CI 1.41 to 2.96,  $p<0.001$ ). Male gender was associated with a negative perception of work demand (OR 2.55, 95% CI 1.11 to 5.89,  $p=0.02$ ), work activity (OR 2.85, 95% CI 1.01 to 8.02,  $p=0.01$ ), work activity environment (OR 1.9, 95% CI 1.3 to 2.8,  $p=0.0001$ ) and global work environment (OR 3.16, 95% CI 1.05 to 9.5,  $p=0.04$ ). It is also associated with better perception of stress (OR 0.42, 95% CI 0.22 to 0.8,  $p=0.008$ ) and less physical symptoms (OR 0.42, 95% CI 0.23 to 0.78,  $p=0.006$ ).

**Table (1):** Demographics and occupational characteristics of the participants

	n	%
Occupation Nurse	371	26.4
Nurse assistant	189	13.4
Administrative assistant	141	10
Doctor	141	10
Medical student	122	8.7

	n	%
Health supervisor	82	5.8
Radiographer	63	4.5
Laboratory technician	43	3.1
Health manager	28	2
Technicians	25	1.8
Physiotherapist	23	1.6
Midwife	16	1.1
Others (paramedic, research, maintenance and cook staff, psychologist)	155	11
<b>Age in years</b>		
<25	39	2.7
25–34	396	28.2
35–44	426	30.3
45–54	370	26.3
>55	174	12.4
<b>Night work</b>		
Never	725	51.6
Rarely	342	24.3
Regularly	92	6.5
Often/very often	81	5.7
<b>Shift work</b>		
Never	420	28.1
Rarely	313	20.9
Regularly	329	22
Often/very often	435	29.1
<b>Years at workplace</b>		
<1	334	23.8
16–25	319	22.7
26	144	10.2
6–15	516	36.7
1–5	257	18.3
<b>Work status</b>		
Non-healthcare	474	33.7
Healthcare	931	66.2
<b>Front-line worker</b>		
Yes	173	12.3
No	1232	87.7
<b>Gender</b>		
Female	1113	79.2
Male	292	20.8

**Table (2)** Severity categories of different questionnaire part in total participants

<b>Outcome</b>	<b>Class of SATIN questionnaire score</b>	<b>n</b>	<b>%</b>
<b>Physical health</b>	<2.5	867	61.7
	2.5–3.5	444	31.6
	>3.5	94	6
<b>Mental health</b>	<2.5	667	47.4
	2.5–3.5	498	35.4
	>3.5	240	17
<b>Physical symptoms</b>	<2.5	590	41.9
	2.5–3.5	374	26.6
	>3.5	441	31.4
<b>Psychosomatic symptoms</b>	<2.5	800	56.9
	2.5–3.5	479	34.1
	>3.5	126	8.9
<b>Stress</b>	<2.5	334	23.7
	2.5–3.5	612	43.5
	>3.5	459	32.7
<b>Work demand</b>	<2.5	166	11.8
	2.5–3.5	791	56.3
	>3.5	448	31.8
<b>Abilities</b>	<2.5	222	15.8
	2.5–3.5	1115	79.3
	>3.5	68	4.8
<b>Physical environment</b>	<2.5	397	28.2
	2.5–3.5	730	51.9
	>3.5	278	19.7
<b>Work activity</b>	<2.5	1093	77.8
	2.5–3.5	272	19.3
	>3.5	40	2.8
<b>Work activity environment</b>	<2.5	460	32.7
	2.5–3.5	695	49.4
	>3.5	250	17.8
<b>Organizational context</b>	<2.5	249	17.7
	2.5–3.5	788	56.1
	>3.5	368	26.2
<b>Global work environment</b>	<2.5	973	69.2
	2.5–3.5	390	27.7
	>3.5	42	2.9
<b>Global work assessment</b>	<2.5	1061	75.5
	2.5–3.5	272	19.4
	>3.5	72	5.2
<b>Global health</b>	<2.5	527	37.5
	2.5–3.5	672	47.8

Outcome	Class of SATIN questionnaire score	n	%
	>3.5	206	14.6

SATIN (Santé Au Travail Inrs université Nancy 2)

**Table (3):** Multivariate analysis adjustment for confounders including, gender, age and years at workplace

	Mental health		Physical symptoms		Stress	
	Medium/high	Low/high	Medium/high	Low/high	Medium/high	Low/high
<b>Age in years</b>						
<35	<b>0.52 (0.4 to 0.69)*</b>	<b>0.5 (0.35 to 0.71)*</b>	<b>0.48 (0.36 to 0.64)*</b>	<b>0.33 (0.24 to 0.44)*</b>	0.91 (0.64 to 1.27)	0.7 (0.49 to 1.02)
35–44	1	1	1	1	1	1
45–54	<b>1.6 (1.1 to 2.4)†</b>	1.21 (0.75 to 2.1)	<b>1.2 (0.7 to 2)†</b>	<b>2.7 (1.8 to 4)*</b>	1.34 (0.92 to 1.94)	1.33 (0.9 to 1.95)
>55	0.72 (0.5 to 1.04)	<b>0.6 (0.37 to 0.99)‡</b>	<b>0.6 (0.38 to 0.96)‡</b>	1.32 (0.9 to 1.92)	1.5 (0.94 to 2.4)	1.12 (0.68 to 1.86)
<b>Healthcare worker (ref=no)</b>	<b>1.33 (1.01 to 1.75)†</b>	<b>1.4 (1 to 2)‡</b>	1.18 (0.86 to 1.62)	1.3 (0.96 to 1.75)	1.04 (0.75 to 1.44)	<b>1.47 (1.04 to 2.08)‡</b>
<b>Gender (ref=female)</b>	0.92 (0.53 to 1.6)	<b>2.5 (1.2 to 4.19)†</b>	0.62 (0.35 to 1.11)	<b>0.42 (0.23 to 0.78)*</b>	<b>0.43 (0.25 to 0.75)*</b>	<b>0.42 (0.22 to 0.8)*</b>
	Work demand		Work abilities		Physical environment	
	Medium/high	Low high	Medium/high	Low/high	Medium/high	Low/high
<b>Age in years</b>						
<35	0.69 (0.44 to 1.08)	<b>0.54 (0.33 to 0.87)†</b>	<b>0.57 (0.39 to 0.84)‡</b>	<b>0.4 (0.19 to 0.84)†</b>	0.81 (0.59 to 1.12)	0.97 (0.52 to 1.13)
35–44	1	1	1	1	1	1
45–54	<b>1.6 (1.1 to 2.4)†</b>	1.21 (0.75 to 2.1)	<b>1.2 (0.7 to 2)†</b>	<b>2.7 (1.8 to 4)*</b>	1.34 (0.92 to 1.94)	1.33 (0.9 to 1.95)
>55	0.72 (0.5 to 1.04)	<b>0.6 (0.37 to 0.99)‡</b>	<b>0.6 (0.38 to 0.96)‡</b>	1.32 (0.9 to 1.92)	1.5 (0.94 to 2.4)	1.12 (0.68 to 1.86)
<b>Healthcare worker (ref=no)</b>	<b>1.33 (1.01 to 1.75)†</b>	<b>1.4 (1 to 2)‡</b>	1.18 (0.86 to 1.62)	1.3 (0.96 to 1.75)	1.04 (0.75 to 1.44)	<b>1.47 (1.04 to 2.08)‡</b>
<b>Gender (ref=female)</b>	0.92 (0.53 to 1.6)	<b>2.5 (1.2 to 4.19)†</b>	0.62 (0.35 to 1.11)	<b>0.42 (0.23 to 0.78)*</b>	<b>0.43 (0.25 to 0.75)*</b>	<b>0.42 (0.22 to 0.8)*</b>
	Work activity		Work activity environment		Organizational context	
	Medium/high	Low/high	Medium/high	Low/high	Medium/high	Low/high

Age in years						
<35	<b>0.59</b> (0.43 to 0.82)‡	0.6 (0.27 to 1.32)	0.92 (0.68 to 1.25)	<b>0.66 (0.44 to 0.99)‡</b>	0.69 (0.47 to 1)	0.61 (0.4 to 0.92)
35–44	1	1	1	1	1	1
45–54	1.1 (0.1 to 8.5)	1.3 (0.9 to 2)	1.26 (0.91 to 1.75)	<b>1.14 (0.75 to 1.72)‡</b>	1.11 (0.74 to 1.67)	1.05 (0.67 to 1.65)
>55	0.92 (0.61 to 1.4)	1.05 (0.42 to 2.64)	0.91 (0.61 to 1.36)	0.73 (0.43 to 1.26)	0.71 (0.45 to 1.14)	0.61 (0.35 to 1.05)
<b>Healthcare worker (ref=no)</b>	1.15 (0.83 to 1.59)	0.78 (0.35 to 1.73)	<b>1.33 (1.02 to 1.72)‡</b>	<b>2.02 (1.4 to 2.92)*</b>	1.27 (0.93 to 1.73)	<b>2.04 (1.41 to 2.96)*</b>
<b>Gender (ref=female)</b>	1.6 (0.91 to 2.83) 0.1	<b>2.85 (1.01 to 8.02)†</b>	1.2 (0.8 to 1.6)	<b>1.9 (1.3 to 2.8)*</b>	0.59 (0.33 to 1.05)	1.26 (0.64 to 2.47)
	<b>Global work environment</b>		<b>Global work assessment</b>		<b>Global health</b>	
	<b>Medium/high</b>	<b>Low/high</b>	<b>Medium/high</b>	<b>Low/high</b>	<b>Medium/high</b>	<b>Low/high</b>
Age in years						
<35	<b>0.51 (0.38 to 0.67)*</b>	<b>0.33 (0.13 to 0.81)†</b>	<b>0.58 (0.42 to 0.8)*</b>	0.58 (0.31 to 1.07)	<b>0.48 (0.37 to 0.63)*</b>	<b>0.26 (0.17 to 0.39)*</b>
35–44	1	1	1	1	1	1
45–54	<b>1.8 (1.2 to 2.7)†</b>	2 (0.6 to 6.4)	1.19 (0.87 to 1.67)	1.08 (0.62 to 1.89)	1.6 (1 to 1.89)	1.44 (0.98 to 2.41)
>55	1.11 (0.78 to 1.6)	1.64 (0.75 to 3.61)	0.68 (0.43 to 1.06)	1.21 (0.63 to 2.32)	0.91 (0.63 to 1.32)	0.78 (0.47 to 1.3)
<b>Healthcare worker (ref=no)</b>	<b>1.34 (1.03 to 1.76)†</b>	1.35 (0.67 to 2.68)	1.34 (0.96 to 1.87)	0.94 (0.31 to 2.81)	<b>1.33 (1.01 to 1.76)†</b>	<b>1.71 (1.14 to 2.55)*</b>
<b>Gender (ref=female)</b>	0.56 (0.3 to 1.04)	<b>3.16 (1.05 to 9.5)‡</b>	1.18 (0.62 to 2.21) 1 .75 (0.77 to 3.94)		<b>0.5 (0.3 to 0.84)*</b>	0.62 (0.28 to 1.33)
	<b>Psychosomatic symptoms</b>			<b>Physical health</b>		
	<b>Medium/high</b>	<b>Low/high</b>	<b>Medium/high</b>	<b>Low/high</b>	<b>Medium/high</b>	<b>Low/high</b>
Age in years						
<35	0.95 (0.73 to 1.55)	0.56 (0.34 to 0.92)		<b>0.42 (0.32 to 0.6)*</b>	0.73 (0.45 to 1.19)	
35–44	1	1		1	1	
45–54	1.29 (0.97 to 1.71)	1.09 (0.7 to 1.7)		1.2 (0.8 to 1.7)	1.6 (0.8 to 3)	
>55	<b>1.6 (1 to 2.5)‡</b>	0.8 (0.3 to 1.9)		0.95 (0.67 to 1.35)	1.06 (0.54 to 2.07)	



<b>Healthcare worker (ref=no)</b>	1.2 (0.93 to 1.55)	0.95 (0.63 to 1.44)	<b>1.42 (1.07 to 1.87)†</b>	1.59 (0.92 to 2.74)
<b>Gender (ref=female)</b>	<b>0.51 (0.29 to 0.88)†</b>	<b>0.21 (0.06 to 0.7)†</b>	<b>1.67 (1.01 to 2.76)‡</b>	1.69 (0.64 to 4.4)

Associations between risk factors and outcomes are presented as OR and 95% CI.

\*P<0.001. †P<0.01. ‡P<0.05. ref, reference.

## Discussion

The present study revealed that almost a third of the participants declared experiencing stress (32.6%), work demand (31.88%) and physical symptoms (31.38%). Our study indicated that being HCW and a male was a risk factor for a negative perception of work demand and work activity environment. Being female and HCW was a predictive factor for having a negative perception of stress. HCWs declared a significantly greater impact on overall and mental health and a negative perception of organizational context and work activity. Front-line workers reported significantly higher negative impact of work demand.

In the current study, found higher reported stress among HCWs and women than in other groups, but not for front-line workers. Social support had been noted as a protective factor in some previous studies. In this study participants, majority of whom were women and aged between 35 and 44. To confirm this aspect, one of the most frequently reported forms of support for HCWs in our hospital were new childcare services. Correspondingly, in a study on anxiety level among physician mothers in the USA, 18% reported severe anxiety<sup>(35)</sup>. In a study, front-line employees outside the hospital sector had a higher reported rate of fear about infection and transmission to the private sphere when they worked for an ambulance service or in eldercare and the authors pointed out differences in risk management to explain this<sup>(36)</sup>. These findings strongly underline that, during crises, communication and information are needed by all workers, both HCWs and non-HCWs, especially in hospitals.

In the present study, multivariate analysis showed that being an HCW was a risk factor for both mental and overall health burden. This had already been observed in previous studies, with higher reports of mental illness reported by second-line workers<sup>(37)</sup>. Uncertainty about working conditions, short-notice organizational modifications, and higher work demand due to higher number of staff off work or an increased number of hospitalized patients could impact all HCWs, not only front-line workers. The questions on psychosocial factors revealed that HCWs suffer from higher mental health impact and that the most common causes of psychosocial burden were job strain, especially work demand, organizational context and abilities.

A study completed by Abdulmageed et al., (2018) among HCWs in a University hospital, Jeddah<sup>(24)</sup> found results similar to the present study. In contrast, some other studies performed in KSA by Omar et al. found a lower prevalence of needle stick injuries<sup>(38, 39)</sup>. In their studies, the prevalence of needle stick injury was 24% and 22.5%, respectively. Interestingly, a study conducted in Alexandria, Egypt, found a remarkably high prevalence (67.9%) of needle stick injuries among the HCWs<sup>(40)</sup>. These differences in prevalence could be explained due to study settings such as types of inclusion of health care facilities and the types of HCWs. This study sampled all the HCWs of different types of health care facilities. The HCWs are exposed to several bacterial and viral respiratory infections, including serious illnesses like tuberculosis, and this scenario has worsened due to the COVID-19 pandemic<sup>(41, 42)</sup>. In another longitudinal study comparing the mental health of

non-HCW employees, no differences were found for anxiety, depression or stress<sup>(43)</sup>.

All HCWs, not only front-line workers, had a greater mental health burden in hospitals. Psycho-social factors such as work demand, abilities and organizational context were the most relevant factors to assess for risk management and prevention. Female gender was also a risk factor for self-reported stress. We can hypothesize that women have a greater overall mental load related to family life. Similarly, the large variations in activities within the services could weaken collective support. It should not however be forgotten that there is also a high impact on the mental health for workers whose work activities are reduced or who are at home due to health problems. Social support, information provided to employees at work and at home during crises, and action towards rebuilding collective support may be needed in such crises to prevent health impacts on hospital workers of all kinds.

**Conclusion:** the present study shown that all HCWs suffered from some health impact shortly. We underline some stressors with high impact, including work demand, work abilities and organizational context, and emphasize the need for risk management.

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