

Psychological Impact of COVID-19 on Emergency Medicine Trainee Residents in Saudi Arabia: A Cross-Sectional Quantitative Study

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Abstract

Background: Psychological stress has been high among healthcare workers on the frontlines fighting coronavirus disease 2019 (COVID-19). Emergency medicine (EM) residents are members of the frontline care teams in the fight against COVID-19, which puts them at a higher risk of psychological stress compared to other medical trainees. This study examined the psychological impact of this pandemic on EM trainee residents in Saudi Arabia.

Methods: This cross-sectional quantitative study used a survey sent to EM trainee residents throughout Saudi Arabia. The questionnaire collected demographic data and included questions evaluating stress, anxiety, depression, and burnout experienced while working during the pandemic.

Results: Of the 100 respondents eligible for inclusion, 85% were aged between 25 and 30, 32% were in the R1 training level, 52% were training in the Central region of Saudi Arabia, 92% were directly managing patients with COVID-19, 19% had been infected with COVID-19, 54% were satisfied with the personal protective equipment available, 52% were satisfied with the psychological support provided, and only 8% were aware of the psychological support program. Smokers (p -value=0.025) and those training in the Southern region (p -value=0.047) experienced the highest levels of anxiety. Those aged 31 to 35 (p -value=0.014), smokers (p -value=0.015), those in the R3 training level (p -value=0.036), and those with relatives who had contracted COVID-19 (p -value=0.02) reported the highest levels of depression. Those aged 36 to 40 (p -value=0.015), who were married (p -value=0.038), and those training in the Northern and Central regions (p -value=0.002) experienced the highest levels of stress. Those aged 31 to 35 (p -value=0.041), smokers (p -value=0.044), and those with relatives who had contracted COVID-19 (p -value=0.043) showed the highest levels of burnout.

Conclusion: EM trainee residents have been exposed to significantly high psychological affectation during the COVID-19 pandemic. Psychological support was underutilized if trainee residents were aware of it at all. Awareness workshops or on-the-job orientation for EM residents regarding psychological support is required.

Keywords: Emergency medicine; Trainee residents; COVID-19; Pandemic

Abbreviations

COVID-19: Coronavirus Disease 2019; EM: Emergency Medicine; SCHS: Saudi Commission of Health Specialties; SDS: Self-Rating Depression Scale.

Introduction

Coronavirus disease 2019 (COVID-19) is a novel coronavirus that was first identified at the end of 2019 in Wuhan city, China [1]. The virus spread rapidly throughout the Chinese population and then to other countries in the world, until a pandemic was ultimately declared in February 2020 by the World Health Organization [2]. Since then, the virus has spread worldwide, with an increasing number of daily cases and deaths [3].

Due to the rapid and high transmission rate of COVID-19, governments across the world became concerned about overburdening their healthcare systems with an increasing number of patients, which could lead to patients being unable to receive proper treatment and a collapse in the healthcare systems in even the most developed countries [4,5].

From a clinician's perspective, the collapse of a healthcare system can occur quickly due to the pressures imposed on the healthcare team [6]. These pressures include long working hours and caring for hundreds of patients in each hospital, as well as the psychological stress and anxiety suffered by clinicians due to the pandemic situation [7].

These psychological stressors may be related to various factors [8]. Clinicians may become stressed due to witnessing their colleagues becoming infected with COVID-19 and dying as a result of transmission

of the virus from their patients [9]. They may also fear getting infected themselves or transmitting the virus to their families [10]. Another important source of psychological stress could be the impact of the pandemic on the career progress and training of clinicians. This is particularly important in young residents [11].

Psychological stress has been high among healthcare workers on the frontlines fighting COVID-19 [12]. EM specialists, and particularly EM residents, are members of the frontline care teams in the fight against COVID-19, which puts them at a notably higher risk of psychological stress compared to other medical specialists [13].

Therefore, this study aimed to investigate the psychological impact of the COVID-19 pandemic on EM residents enrolled in a training program in Saudi Arabia.

Methodology

Study design

This is a cross-sectional, quantitative survey-based study. A pre-designated validated Survey Monkey questionnaire was used to assess

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the psychological wellbeing of Saudi Board of EM trainees during the COVID-19 pandemic to identify the impact of COVID-19 on their training using the Generalized Anxiety Disorder Scale, Perceived Stress Scale, Zung Self-Rating Depression Scale (SDS), and Oldenburg Burnout Inventory [14-17]. All of the questions in the questionnaire were validated.

Participation in the study was entirely voluntary, and all the participants provided their written consent to participate before completing the survey. The study protocol was approved by the Institutional Review Board of the Princess Nourah bint Abdulrahman University (IRB log number: 20-0269).

The questionnaire included seven domains:

1. Sociodemographic data (10 items): Including age, gender, specialty, place of residence, training region, level of residency, marital status, treating COVID-19 patients, previous infection with COVID-19, family members infected with COVID-19.

2. Exclusion criteria (4 items): Including questions about pre-existing mental illnesses, not working during the COVID-19 pandemic, and lockdown.

3. Anxiety assessment: according to the Generalized Anxiety Disorder Scale using a validated questionnaire (7 items).

4. Depression assessment: According to the SDS using a validated questionnaire (20 items).

5. Stress assessment: According to the Perceived Stress Scale using a validated questionnaire (10 items).

6. Burnout assessment: According to Oldenburg Burnout Inventory using a validated questionnaire (16 items).

7. Satisfaction with the psychological support program (DAEM): Received from the training hospital and the Saudi Commission of Health Specialties (SCHS).

Study setting

The study was conducted by the authors who are practicing at the King Abdullah Bin Abdulaziz University Hospital, Saudi Arabia. The program directors of all EM residency programs across the Kingdom that fall under the SCHS were contacted *via* email and were asked to send all residents the Survey Monkey link.

Eligibility criteria

All trainee residents in Saudi Board Emergency Programs under the SCHS were eligible for inclusion. However, service residents not enrolled in the Saudi Board Emergency Program, trainee residents diagnosed with mental illness, and trainee residents who were not working during the COVID-19 pandemic were excluded.

Statistical analysis

The internal consistency of the whole questionnaire and the specific items related to the psychological impact of COVID-19 were tested using a Cronbach's alpha test to validate it. The descriptive analysis included frequencies and percentages of all categorical variables. Items related to the psychological impact domains were analyzed using one-way ANOVA testing with a significance p-value of <0.05. Statistical analysis was performed using the Statistical Package for Social Sciences version 26.0 (SPSS Inc., Chicago, IL, USA).

Results

A total of 139 residents responded to the questionnaire, 100 of whom were EM trainee residents. Respondents who did not work during the COVID-19 pandemic and those who were on service jobs were excluded (N=39). The description of the included cohort is discussed below.

Demographic information

As shown in Table 1, age was subcategorized into three groups and 85% of the respondents were aged between 25 and 30 years old. Of the included cohort, 67% were males, 62% were single, and 41% were living with their parents. Regarding training level, 32% were in the R1 training level, and 52% were being trained in the Central region of Saudi Arabia.

		Count (N=100)	Percent (%)
Age group	25-30	85	85
	31-35	12	12
	36-40	3	3
Gender	Male	67	67
	Female	33	33
Marital status	Single	62	62
	Married	33	33
	Separated	5	5
Living with	Parent/s	41	41
	Spouse and children	27	27
	Alone	25	25
	Friend	7	7
Training level	R1	32	32
	R2	29	29
	R3	24	24
	R4	15	15
Training region	Central region	52	52
	West region	27	27
	East region	15	15
	South region	5	5
	North region	1	1

Table 1: Respondents' demographic data.

Working during the COVID-19 pandemic

As shown in Table 2, all of the respondents worked during the COVID-19 pandemic and 92% of them were directly managing patients with COVID-19. A total of 19% of the respondents were infected with COVID-19 and 26% had family members who were infected.

		Count (N=100)	Percent (%)
Managing patients with COVID-19	Yes	92	92
	No	8	8
Being infected with COVID-19	Yes	19	19
	No	81	81
Family members infected with COVID-19	Yes	26	26
	No	74	74

Table 2: Working during the COVID-19 pandemic.

Medical and social history

Of the included cohort, 48% were smokers, while 18% had a chronic medical condition. The most common medical condition was a chronic respiratory disease, occurring in 6% of respondents. Additionally, 14% had a psychiatric illness (Table 3).

Anxiety assessment

As shown in Table 4, respondents were asked a set of questions to evaluate their anxiety levels during the pandemic. They could choose between five responses, each of which was scored based on the severity of anxiety (for example, not at all=zero points, nearly every day=3 points).

To evaluate the validity of the questions, Cronbach's alpha was calculated for the questions and was above 0.7 for all of them, which demonstrates the validity of the items.

Over a third of the respondents mentioned that they were feeling nervous, were unable to control their worrying, had trouble relaxing, worried too much, felt restless and irritable, and felt afraid for several days.

Additionally, respondents were asked about the level of difficulty caused by their anxiety while performing daily tasks both at work and at home. More than half of the respondents found that it was somewhat difficult.

Depression assessment

A validated version of the SDS was used to evaluate the respondents' depression levels. The validity of the questions was tested using Cronbach's alpha and showed levels above 0.7. The respondents had to choose from four options and their responses were scored according to how much of the time they felt depressed (a little of the time=1, most of the time=4).

As shown in Table 5, more than one-third of the respondents showed

significant depression manifestations for a little of the time during the pandemic. Less than one-quarter of the respondents reported feeling that they are useful, finding their lives pretty full, and enjoying things they used to do a little of the time.

Perceived stress scale

The respondents' stress was evaluated using a set of 10 questions, which were validated using Cronbach's alpha, which showed values above 0.7 for all questions. The respondents had to choose from five responses (never=0, very often=4).

More than half of the respondents were sometimes unable to control irritations, felt that they were on top of things, were angered because of things out of their control, and felt difficulties were piling up so high that they could not overcome them, as shown in Table 6.

Burnout evaluation

Burnout was evaluated by a set of 16 questions validated by Cronbach's alpha showing levels greater than 0.7 for all questions. Respondents were asked to choose between strongly agree=1 and strongly disagree=4. More than half of the respondents agreed on all of the questions demonstrating high levels of burnout, as shown in Table 7.

Total psychological stress score

Finally, each section's total scores were calculated and a total score was calculated for the four sections together as a total psychological stress score. Mean, SD, minimum and maximum scores are detailed in Table 8.

		Count	Percent
Smoking	Yes	48	48
	No	52	52
Medical illness	No	82	82
	Chronic respiratory disease	6	6
	Thyroid disorder	3	3
	Hypertension	3	3
	Diabetes mellitus	2	2
	Migraine	2	2
	Chronic urticaria	1	1
	Fatty liver	1	1
	GERD due to paraoesophageal hiatus hernia	1	1
	Syringomyelia	1	1
Psychiatric illness	No	86	86
	Depression	5	5
	Generalized anxiety disorder	6	6
	Other	3	3

Table 3: Medical and social history.

	Not at all	Several days	More than half of the days	Nearly every day	Cronbach's alpha
Feeling nervous, anxious, or on edge	13	42	30	15	0.863
Not being able to stop or control worrying	25	45	18	12	0.863
Worrying too much about different things	19	32	27	22	0.862
Trouble relaxing	21	33	28	18	0.863
Being so restless that it's hard to sit still	38	37	20	5	0.863
Becoming easily annoyed or irritable	23	41	24	12	0.863
Feeling afraid as if something awful might happen	25	45	18	15	0.863

Table 4: Anxiety assessment.

	A little of the time	Some of the time	Good part of the time	Most of the time	Cronbach's alpha
I feel down-hearted and blue	44	28	23	5	0.964
Morning is when I feel the best	41	27	15	17	0.964
I have crying spells or feel like crying	61	22	14	3	0.964
I have trouble sleeping at night	39	28	18	15	0.964
I eat as much as I used to	34	21	16	29	0.964
I still enjoy sex	49	19	16	16	0.964
I notice that I am losing weight	72	16	6	6	0.964
I have trouble with constipation	63	20	12	5	0.964
I get tired for no reason	34	22	23	21	0.964
My mind is as clear as it used to be	53	28	9	10	0.968
I find it easy to do the things I used to	43	32	13	12	0.964
I am restless and can't keep still	59	19	19	3	0.964
I feel hopeful about the future	32	27	29	12	0.964
I am more irritable than usual	39	24	28	9	0.964
I find it easy to make decisions	26	35	32	7	0.968
I feel that I am useful and needed	25	28	26	21	0.964
My life is pretty full	22	35	23	20	0.964
I feel that others would be better off if I were dead	80	11	5	4	0.964
I still enjoy the things I used to do	23	43	18	16	0.964

Table 5: Depression assessment.

	Never	Almost never	Sometimes	Fairly often	Very often	Cronbach's alpha
How often have you been upset because of something that happened unexpectedly?	2	8	35	45	10	0.847
How often have you felt that you were unable to control the important things in your life?	5	11	37	41	6	0.847
How often have you felt nervous and stressed?	2	7	27	50	14	0.847
How often have you felt confident about your ability to handle your personal problems?	2	5	31	48	14	0.847
How often have you felt that things were going your way?	1	9	35	50	5	0.847
How often have you found that you could not cope with all the things that you had to do?	6	10	31	41	12	0.847
How often have you been able to control irritations in your life?	2	2	68	21	7	0.847
How often have you felt that you were on top of things?	2	9	67	18	4	0.847
How often have you been angered because of things that were outside your control?	4	9	57	22	8	0.847
How often have you felt difficulties were piling up so high that you could not overcome them?	1	15	66	10	8	0.847

Table 6: Perceived stress scale.

	Strongly agree	Agree	Disagree	Strongly disagree	Cronbach's alpha
I always find new and interesting aspects of my work	8	72	12	8	0.899
There are days when I feel tired before I arrive at work	17	65	13	5	0.899
It happens more and more often that I talk about my work in a negative way	9	60	22	9	0.899
After work, I tend to need more time than in the past in order to relax and feel better	16	66	12	6	0.899
I can tolerate the pressure of my work very well	9	68	18	5	0.899
Lately, I tend to think less at work and do any job almost mechanically	8	62	25	5	0.899

I find my work to be a positive challenge	13	72	9	6	0.899
During my work, I often feel emotionally drained	14	60	19	7	0.899
Over time, one can become disconnected from this type of work	6	63	27	4	0.899
After working, I have enough energy for my leisure activities	4	53	27	16	0.899
Sometimes I feel sickened by my work tasks	5	72	17	6	0.896
After my work, I usually feel worn out and weary	13	67	17	3	0.899
This is the only type of work that I can imagine myself doing	22	57	11	10	0.899
Usually, I can manage my amount of work well	13	74	5	8	0.899
I feel more and more engaged in my work	11	71	13	5	0.896
When I work, I usually feel energized	9	70	16	5	0.899

Table 7: Burnout assessment.

	Mean	SD	Minimum	Maximum
Anxiety assessment score	16.2	1.6	0	21
Depression (SDS)	53.1	2.8	0	80
Perceived stress scale	32.6	1.8	0	40
Burnout	51.3	2.6	0	64
Total psychological stress score	173.2	5.8	0	205

Table 8: Mean scores for each section (in points).

The satisfaction of respondents with the psychological support provided

As shown in Table 9, 54% of the respondents were satisfied with the personal protective equipment available, 52% were satisfied with the psychological support provided, and only 8% were aware of the DAEM offered by the SCHS for the training of healthcare workers.

Furthermore, respondent's satisfaction was evaluated across the different regions. The highest satisfaction rates with PPE was demonstrated in the East region (73%), the highest satisfaction with the psychological support was in the South region (80%), while only 9.6% in the Central region and 11.1% in the West region knew about the DAEM and used it, as shown in Table 10.

Comparison of mean scores across different demographic variables

To identify respondents who were the most psychologically affected during the pandemic, each section's mean score and the mean score for total psychological stress were compared across different demographic variables using one-way ANOVA at a level of significance with a p-value of <0.05.

Regarding anxiety levels, smokers (p-value=0.025) and residents trained in the South region (p-value=0.047) suffered significantly from anxiety compared to their peers. Concerning the depression scale, respondents aged between 31 to 35 (p-value=0.014), smokers (p-value=0.015), those in the R3 training level (p-value=0.036), and those with relatives who had COVID-19 (p-value=0.02) showed the highest levels of depression. Turning to stress, those aged between 36 to 40 (p-value=0.015), who were married (p-value=0.038), and training in the North and Central regions (p-value=0.002) showed the highest stress levels. Those aged 31 to 35 (p-value=0.041), smokers (p-value=0.044) and those with relatives infected with COVID-19 (p-value=0.043) showed the highest levels of burnout.

Finally, total psychological affectation was significantly higher among smokers (p-value=0.025), those in the R3 training level (p-value=0.046), and those infected with COVID-19 (p-value=0.035) while psychological affectation was significantly lower among non-smokers (52 respondents) (p-value=0.025), residents in the R2 training level (29 respondents) (p-value=0.046), and residents who were not infected with COVID-19 (81 respondents) (p-value=0.035), as shown in Table 11.

		Count	Percent
Satisfied with PPE availability in your hospital?	Yes	54	54
	No	46	46
Satisfied with the psychological support provided to you by your training hospital?	Yes	52	52
	No	48	48
Are you aware of the psychological support program (DAEM) offered by the SCHS for trainee healthcare workers?	Yes, I already use it	8	8
	I don't know about this program	38	38
	No, I did not try it	54	54

Table 9: Satisfaction of respondents.

	Region	Count	Percent
Satisfied with PPE availability in your hospital?	Central region	33	63.5
	East region	11	73.3
	North region	0	0
	South region	1	20
	West region	9	33.3
Satisfied with the psychological support provided to you by your training hospital?	Central region	27	51.9
	East region	8	53.3
	North region	0	0
	South region	4	80
	West region	13	48.1

Are you aware of the psychological support program (DAEM) offered by the SCHS for trainee healthcare workers?	Central region	Yes, I have already used it	5	9.6
		I don't know about this program	22	42.3
		No, I did not try it	25	48.1
		I don't know about this program	46.7	46.7
		No, I did not try it	53.3	53.3
	East region	No, I did not try it	1	100
	No, I did not try it	53.3	53.3	
	North region	No, I did not try it	1	100
	South region	I don't know about this program	1	20
	No, I did not try it	4	80	
West region	Yes, I have already used it	3	11.1	
	I don't know about this program	8	29.6	
	No, I did not try it	16	59.3	

Table 10: Satisfaction of residents in each region.

		Anxiety assessment score (Mean ± SD)	P-value	Depression scale (SDS) (Mean ± SD)	P-value	Stress scale (Mean ± SD)	P-value	Burnout (Mean ± SD)	P-value	Total psychological stress score (Mean ± SD)	P-value
Age group	25-30	12 ± 1.6	0.850	49 ± 2.2	0.014*	21 ± 1.4	0.015*	41 ± 2.3	0.041*	122 ± 5.1	0.116
	31-35	18 ± 2.1		64 ± 5.1		26 ± 3.2		52 ± 1.8		145 ± 9.5	
	36-40	13.3 ± 1.7		59 ± 1.2		34 ± 4.1		43 ± 9.2		183 ± 8.3	
Gender	Male	14.3 ± 0.8	0.151	69 ± 3.2	0.067	34.9 ± 1.9	0.728	51.8 ± 2.9	0.891	184 ± 3.2	0.541
	Female	19.2 ± 2		56 ± 1.7		30.8 ± 1.5		47.7 ± 2.3		164 ± 2.3	
Smoking	Yes	18.1 ± 1.9	0.025*	64.2 ± 3.5	0.015*	32.2 ± 2.2	0.152	57.2 ± 1.4	0.044*	162 ± 2.8	0.025*
	No	13.3 ± 1.4		52.1 ± 1.6		27.4 ± 1.3		49.4 ± 2.2		143 ± 3.9	
Marital status	Single	14.3 ± 1.5	0.170	51.8 ± 2.1	0.054	27.3 ± 1.2	0.038*	58.4 ± 2.3	0.797	154.1 ± 4.6	0.084
	Married	17.2 ± 1.9		62.1 ± 3.6		31.2 ± 2.6		52.4 ± 3.2		168.3 ± 7.6	
	Separated	12.9 ± 0.4		53.8 ± 2.3		22.5 ± 0.5		47.8 ± 2.1		142.5 ± 4.5	
Living with	Parent/s	16.2 ± 1.5	0.620	51.3 ± 2.4	0.920	28.3 ± 1.2	0.371	52.8 ± 2.4	0.773	146.6 ±	0.843
	Spouse and children	17.2 ± 1.7		60.4 ± 2.3		38.4 ± 2.3		41.8 ± 3.5		152.9 ±	
	Alone	12.3 ± 1.9		54.8 ± 3.8		32.1 ± 2.1		59.4 ± 2.3		162.3 ±	
	Friend	10.2 ± 0.5		68.8 ± 2.9		21.3 ± 0.3		46.9 ± 2.3		141.3 ±	
Training level	R1	15.6 ± 1.6	0.520	43 ± 2.3	0.036*	20 ± 0.9	0.627	48 ± 2.2	0.798	134 ± 4.8	0.046*
	R2	18.4 ± 1.8		51 ± 2.0		30 ± 1.9		39 ± 2.3		129 ± 5.9	
	R3	12.2 ± 1.6		71 ± 4.2		34 ± 2.5		53 ± 3.8		178 ± 7.8	
	R4	19.3 ± 1.5		62 ± 2.1		27 ± 1.8		42 ± 2.1		157 ± 4.2	
Training region	Central region	14.4 ± 1.7	0.047*	67 ± 3.3	0.844	30 ± 2.2	0.002*	53.4 ± 3.1	0.253	168.2 ± 3.2	0.260
	East region	16.2 ± 2.2		61 ± 2.4		24 ± 1.4		44.2 ± 1.9		162.3 ± 1.9	
	North region	13.8 ± 1.3		50 ± 1.6		36 ± 2.3		36.5 ± 2.3		175.5 ± 2.4	
	South region	18.3 ± 2.3		53 ± 1.9		14 ± 2.1		40.3 ± 1.3		154.8 ± 4.1	
	West region	11.1 ± 2.1		47 ± 2.8		21 ± 0.7		49.2 ± 2.1		150.7 ± 5.8	
Managing patients with COVID-19	Yes	18.3 ± 1.05	0.194	60.2 ± 2.3	0.946	32.1 ± 1.7	0.546	52.3 ± 2.8	0.865	160.3 ± 6.1	0.543
	No	12.5 ± 0.25		64.2 ± 2.4		24.3 ± 1.6		46.1 ± 2.1		142.3 ± 4.5	
Being infected with COVID-19	Yes	12.6 ± 0.8	0.671	64.2 ± 2.4	0.02*	32.1 ± 1.3	0.201	55.2 ± 2.2	0.043*	153.8 ± 5.2	0.035*
	No	16.8 ± 1.1		62.8 ± 2.3		27.2 ± 0.7		49.8 ± 1.7		148.6 ± 6.1	
An infected family member with COVID-19	Yes	16.8 ± 1.1	0.659	52.3 ± 2.1	0.195	29.3 ± 0.9	0.914	53.9 ± 2.3	0.244	152.3 ± 5.9	0.993
	No	12.2 ± 0.9		69.3 ± 3.1		28.2 ± 0.8		47.3 ± 1.6		158.2 ± 5.9	

Table 11: Comparison of the mean scores.

Discussion

BStress and anxiety can significantly impair the quality of life and the professional performance of healthcare professionals [18]. Due to the COVID-19 pandemic, healthcare workers working on the frontline have been exposed to unprecedented stressors that could influence the healthcare service provided to their COVID-19 patients and elevate their risk of infection due to a reduction in their immunity caused by stress and other concerns that they might have[19,20].

The present study aimed to evaluate the psychological impact of the COVID-19 pandemic on EM trainee residents in Saudi Arabia. It demonstrated that trainee residents are exposed to significant psychological risk due to increased stress, anxiety, burnout, and depression. It should be noted that smokers (p-value=0.025), residents in the R3 training level (p-value=0.046), and those infected with COVID-19 (p-value=0.035) were the most likely to be psychologically impacted by working during the pandemic.

Although the Saudi Board of EM has made DAEM available for all trainee residents, only 8% of the included cohort knew about it and used it and 38% did not know that the program existed. Levels of stress, anxiety, depression, and burnout differed among residents; however, the mean scores for the four assessments were above average, reflecting high levels of psychological affectation among all trainee residents during this exceptional situation.

The psychological impact of COVID-19 has been evaluated by different healthcare professionals. Kang et al. demonstrated that the most prevalent type of psychological disturbance among physicians was mild anxiety which was found in 34.4% of their respondents [21]. However, Kang et al. also demonstrated that 50.4% of the healthcare workers in their study had access to some psychological support materials through the media, which helped to reduce their stress [21].

Chung et al. compared the psychological and emotional stress that frontline physicians are exposed to with that experienced by other hospital staff [22]. They revealed that frontline physicians suffer higher levels of emotional stress because of their fears that they will transmit COVID-19 to their families.

Similarly, the present study demonstrated high levels of anxiety, depression, burnout, and stress among emergency medicine trainee residents working during the pandemic.

Furthermore, Li et al. assessed the psychological stress experienced by nurses working on the frontline and revealed that they had significantly lower stress compared to those working in non-frontline services (p value<0.001) [23]. This was due to the psychological training given to these nurses [23].

These findings were in line with those of Huang et al. who found higher anxiety among nurses than doctors (p value=0.039) [24]. Moreover, Huang et al. showed that females were at significantly higher risk of anxiety (p value<0.045) and that 16.09% of healthcare workers had mild anxiety, which was also supported by Lai et al. [24,25].

In the present study, a non-significant difference was detected between males and females in terms of anxiety, stress, burnout, depression, and total psychological impact. Factors related to training conditions (level of training and region of training) and being infected with COVID-19, however, showed a significant difference across the different aspects that were evaluated.

Another recent systematic review by Pappa et al. demonstrated that almost 20% of healthcare professionals suffered from anxiety and depression, which were more prevalent among females [26]. However, Wilson et al. described a depression prevalence of 11.4% and an anxiety prevalence of 17.7% among Indian healthcare professionals, with a higher incidence of symptoms among females [2]. A review article by Salari et al. described the incidence of anxiety as being as high as 31.9%, while the incidence of depression was 33.7%, among healthcare professionals [27].

Alamri et al. examined the effect of the COVID-19 pandemic on health professionals in Saudi Arabia and found that 17.1% had depression, 10% had anxiety, and 12% suffered from stress, which were all higher than in the general population [28]. Alamri et al. also showed that females were more affected than males [28]. In the present study, more than a third of the respondents demonstrated symptoms of anxiety and depression, while more than half of them demonstrated significant features of stress and anxiety. Though not significantly different, females had higher levels of anxiety than males, while males had higher levels of depression, stress, and burnout than females.

There were some limitations to the present study. First, the sample size was relatively small, which needs to be considered in future studies. Second, the study outcomes depended mainly on the responses of the respondents, which relied on their honesty and subjective opinions, which could influence the reliability of the findings. Third, there was only one respondent from the North region, which might have biased the results and the comparisons for the depression estimation among the different regions.

Conclusion

EM trainee residents in Saudi Arabia have been exposed to significant levels of psychological affectation, on both professional and social levels, during the COVID-19 pandemic. EM training has many aspects that require trainees to be attentive and focused in order to grasp important critical skills.

Although psychological support programs were available, awareness about them proved to be inadequate. Accordingly, through the present findings, we endorse awareness workshops or on-the-job orientation for EM residents about psychological support. Further studies are also required for other medical specialties and different healthcare professionals.

Declarations

Not Applicable

Ethics Approval and Consent to Participate

The study was approved by the Institutional Review Board of the Princess Nourah bint Abdulrahman University (IRB log number: 20-0269).

Consent for Publication

Not Applicable

Availability of Data and Materials

The dataset supporting the conclusions of this article is available upon reasonable request from the corresponding author.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

AK, OK, AAG and AAI conceived the study, designed the study, and obtained research IRB approval; OK, AK, GI, and AM supervised the conduct of the study and data collection. OK and GA managed the data, including quality control. AAI provided statistical advice on study design and analyzed the data. OK, AM, and MA drafted the manuscript, and all authors contributed substantially to its revision. AK takes responsibility for the paper as a whole.

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