

Knowledge, attitude, practices and perceived job stress among physical therapists in the kingdom of Saudi Arabia during the COVID-19 pandemic: a cross-sectional study

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Abstract. *Aim:* The objective of this study was to assess the level of knowledge, attitude and practice (KAP) and perceived job stress among physical therapists (PTs) during the COVID-19 pandemic in the Kingdom of Saudi Arabia (KSA). *Methods:* A cross-sectional study design was adopted; 300 PTs working within the KSA were randomly selected, and the KAP questionnaire was distributed through email using a Google form during the first quarter of 2022. The questionnaire consisted of demographic information, KAP, and perceived stress level at the job. Data analysis was carried out using SPSS 20.0. *Results:* Most PTs are knowledgeable about the management of COVID-19 patients, where their overall correct response to the items of the knowledge-related questionnaire was 87%. Most PTs had positive attitudes toward successful control of COVID-19 (83%) and took necessary precautions, such as frequent handwashing (97.2%) and adherence to the Centers for Disease Control & Prevention (CDC) guidelines (91.5%) during practice. The overall job stress level of the PTs was 'Moderate' (76.5%). This study showed a significant association between the level of job stress experienced by the PTs and selected demographic variables. *Conclusion:* PTs have adequate knowledge, exhibit a positive attitude and adhere to CDC guidelines while managing patients during the COVID-19 pandemic. Most PTs are prone to moderate job stress while managing patients during the COVID-19 pandemic, and appropriate strategies must be devised to alleviate their job stress and improve their efficiency. (www.actabiomedica.it)

Key words: COVID-19, KAP, Perceived Job Stress, Physical therapist, Kingdom of Saudi Arabia

Introduction

COVID-19, the novel coronavirus disease, is a highly contagious viral pandemic (1) that has emerged as a major health problem for our generation. According to the World Health Organization (WHO) declaration, countries worldwide, including the Kingdom of Saudi Arabia (KSA), have been working on pandemic response plans to contain the virus (2). Physical therapists (PT), mainly respiratory PT, are among healthcare professionals (HCPs) that promote the

management and care of COVID patients. They play an indispensable role in non-invasive treatment such as postural positioning mobilization while weaning patients from invasive mechanical ventilator support (3). To perform these functions effectively, basic infection prevention and control (IPC) principles such as hand hygiene, compliance with personal protective equipment (PPE), and screening for the N95 mask fit are more generally understood and applied by PTs in KSA (4,5). However, due to the rapid growth of available literature and daily updates of new knowledge on

the pandemic, PTs find it challenging to stay up with the latest expertise, affecting their activities and procedures during patient care.

Due to the highly contagious nature of COVID-19 and limited knowledge, HCPs are under intense physical and psychological stress while on duty (6). In particular, PTs are a critical component of the HCP population, are more likely to be affected by COVID-19 outbreaks, and report a higher level of perceived stress (7). PTs in hospitals and clinic settings have longer contact times and more regular physical contact with patients, resulting in a heavy workload and a high risk of cross-transmission. However, very few studies have been conducted on the status of HCPs, especially perceived job stress levels by PTs during the COVID-19 outbreak.

Above and beyond, the knowledge, attitudes, and practices (KAP) of HCPs are essential in the management of viral diseases (8), and this pandemic is no exception. Understanding the importance of the level of knowledge of HCPs about the virus, the age groups of individuals, causes, mode of transmission, incubation period, ways to strengthen the immune system, and existing prevention and treatment options is essential for the management of COVID-19 (9). Therefore, the first step in preventing COVID-19 infection and disease among HCPs, especially PTs, is to estimate their KAP against COVID-19 infections. To assess the attitudes and practices of PTs on COVID-19, several elements such as the nature of the infection, prevention of spread, transmission mode, rate of reinfection in humans, availability of the vaccine, community risks, CDC guidance practice, and patient care are considered. Furthermore, adherence criteria included patient encounters, participation in seminars and workshops on COVID-19, hand washing before and after patient care, infection prevention, the correct sequence of wearing and removing (donning) PPE kit, and a surface disinfectant to contain and remove COVID-19 virus clusters (9).

KAP studies offer researchers a starting point for deciding what kind of intervention is needed to change people's perceptions of the virus (10). A thorough exploration of the literature revealed that several studies had been conducted to determine the KAP of healthcare workers during the COVID-19 pandemic globally (11,12). Although several studies have already been conducted to determine the KAP

of healthcare workers, research focused specifically on PT is often limited. Therefore, assessing KAP related to COVID-19 among PTs in Saudi Arabia would help provide better insight to address their current knowledge about the disease. Furthermore, to our knowledge, no prior studies were conducted on the job stress experienced by physical therapists during the pandemic in the Saudi Arabian context. The objective of this study was to understand the existing knowledge and awareness of PTs working in KSA about COVID-19 and the attitude and practice adopted by them while managing patients during the COVID-19 pandemic. The study also aimed to determine the job stress perceived by the PTs during the COVID-19 pandemic and the association of job stress with their demographics.

Methods

Study design and administration of the tool

A cross-sectional study design was adopted to reveal KAP and job stress among the PTs (N = 1179) (4), working in government and private healthcare organizations (HCO) in KSA, including academic medical centers. This study was conducted between January and March 2022. The KAP assessment tool was distributed to participants using 'Google' forms. The authors took the utmost care to obtain a complete representation of samples from all regions of the KSA. A KAP survey link and the objective of conducting the survey were sent to all those PTs by email. All participating PTs were asked to respond after filling out the informed consent form. The ethical clearance for this study was obtained from the Institutional Research Board (IRB) of Imam Abdulrahman Bin Faisal University (IAU), KSA (*RefNo: IRB-2022-20-048*). Participants are mandated to complete the informed consent form before starting the survey.

KAP assessment tool

The KAP assessment tool for PTs is a semi-structured questionnaire consisting of 46 items relating to various aspects of the KAP to manage COVID-19 patients and the resulting job stress during the pandemic in their respective hospitals.

The initial section of the KAP tool consisted of 9 items that captured the demographic information. The second part of the questionnaire consisted of items to retrieve PT's knowledge about COVID-19 by counting the correctness of their responses to each item of the questionnaire using the dichotomous response option ['Yes' or 'No'] (11 items). Furthermore, in the third section of the questionnaire, PT's attitude toward the management of COVID-19 patients was covered through 10 items with the Likert scale options ('Strongly agree', 'Agree', 'Neutral', 'Disagree', and 'Strongly disagree'). All the items in the attitude scale were structured as direct-worded questions except those capturing the therapist's attitude toward acquiring COVID-19 disease while getting involved in inpatient care, which was considered reverse-worded items (namely, items 1 and 9). Similarly, the fourth section of the KAP tool captured the practice adopted by the PTs (6 items) using the five-point scale and consisted of 'Always', 'Usually', 'Sometimes', 'Rarely', 'Never'. The last and fifth sections of the KAP tool consisted of 10 items designed to explore the job stress experienced by PTs during the COVID-19 pandemic. Items included in the perceived job stress tool were also in the form of a five-point Likert scale such as 'Never' (Score 0), 'Almost Never' (Score 1), 'Sometimes' (Score 2), 'Fairly Often' (Score 3), and 'Very Often' (Score 4). The maximum perceived stress score for the job was considered the sum of all items (a total score of 10 items). The individual scores on the perceived stress scale (PSS) range from 0 to 40, with higher scores indicating higher perceived stress (13).

Knowledge of PTs in KSA about COVID-19 disease was analyzed using a simple frequency count of those who opted for 'Yes' or 'No'. Additionally, the attitude and practices adopted by the PTs in their respective hospitals toward the management of COVID-19 patients were determined using the simple percentage of those who opted for various Likert Scale options in Sections 2 and 3 of the KAP tool. Specifically, responses for each attitude-related item were measured as the percentage of those who opted for 'Strongly agree' and 'Agree' concerning direct-worded items and 'Neutral', 'Strongly disagree' and 'Disagree' with respect to reverse-worded items.

Statistical analysis

To obtain a 95% CI with a 5% margin of error, a population size of 300 PTs was selected using simple random sampling methods. The chi-square statistics were applied to determine whether there were significant differences between the job stress experienced by the PT and other demographic variables. A p-value less than 0.05 was considered significant. SPSS 20.0 was used for the analyses.

Results

Demographics of participating PTs

Of the 300 questionnaires administered, 281 completed questionnaires were returned, demonstrating a 94% response rate. Among those who responded, 74% of the participating PTs have direct interaction or contact with patients with COVID-19. Table 1 shows the demographic characteristics of the participants.

Knowledge of participating PTs about the COVID-19 virus

Table 2 shows the knowledge of the participants about the type, mode of spread, incubation, and survival period of the COVID-19 virus. Among the respondents, 83.3% correctly identified the type of virus that causes COVID-19 infection. Additionally, 88.6% and 95% of the PTs responded to questions related to the virus spread and incubation periods, respectively. About 75.1% of them identified signs and symptoms of COVID-19, and 75.4% had the necessary knowledge of the measures to be taken while receiving patients diagnosed with COVID-19 infection. In addition, 93.6% of respondents were aware of the treatment techniques available to manage COVID-positive patients, and 87.9% of them had required knowledge to improve their immune system against this infectious disease. 85.4% of PTs were also observed to have received training related to COVID-19 related topics in their respective hospitals.

Table 1. Demographic characteristics of participants (N = 281).

Characteristic		Number	Percentage (%)
Gender	Male	182	64.8
	Female	99	35.2
Nationality	Saudi	240	85
	Non-Saudi	41	15
Age	18 - 29	74	26.3
	30 - 39	90	32
	40 - 49	87	31
	50 - 59	28	10
	60 and above	2	0.7
Marital Status	Married	200	71.2
	Not married	81	28.8
What is your Highest Qualification?	Ph.D. (Doctor of Philosophy)	40	14
	Postgraduate (Master degree)	70	25
	Bachelor degree	168	60
	Diploma	3	1
Occupation	Clinical Versus	196	70
	Academic setup	85	30
Where are you currently working?	Government	225	80
	Private	56	20
How long have you been working in this hospital?	Less than 1 year	48	17
	1 to 5 years	78	28
	6 to 10 years	107	38
	11 or more years	48	17
Do you typically have direct interaction or contact with patients?	YES, I typically have direct interaction or contact with patients	208	74
	NO, I do NOT have direct interaction or contact with patients	73	26

The attitude of participating PTs to the management of COVID-19

Table 3 shows the attitude of the participating PTs toward the management of patients with COVID-19 in their respective hospitals. Of the total of 281 respondents, only 63.7% came across a patient with COVID-19 disease. Nevertheless, 96% of PTs felt that COVID-19 is contagious and a threat to the community. 97.5% of them agreed that the transmission of this virus could be from animals to humans and vice versa. Over 85.8% of PTs agreed that this virus could affect humans more than once.

However, 75.8% of them disagreed with the notion that they acquire COVID-19 disease when involved in managing patients during their routine work schedules. On the contrary, 85.1% of them felt that one of their family members might get an infection, as their professional nature involves direct contact with the patients. Around 91.5% of the respondents agreed that they followed the CDC guidelines during patient care, and 96.1% felt that they could avoid this infection if they followed these guidelines. In particular, 97.2% of practicing PTs felt that this infection could be prevented by washing hands with soap frequently.

Table 2. Physical Therapists knowledge about COVID-19 Virus and the adoption of preventive strategies to overcome them.

#	Question	Correctness of Response	
		Yes	No
1	What is the virus for COVID-19?	234 (83.3%)	47(16.7%)
2	How does the COVID-19 spread?	249(88.6%)	32(11.4%)
3	What is the incubation period of COVID-19?	267(95%)	14(5.0%)
4	Are you aware of how many days COVID-19 survive outside?	243(86.5%)	38(13.5%)
5	Which age group is affected by COVID-19?	243(86.5%)	38(13.5%)
6	Which of the following are signs and symptoms of COVID-19?	211(75.1%)	70(24.9%)
7	Which of the following measures are not recommended upon arrival of a patient suspected to have COVID-19 infection?	212(75.4%)	69(24.6%)
8	What are all the most effective recommended ways to prevent the incidence of COVID-19?	277(98.6%)	4(1.4%)
9	Which one of the following treatment methods is currently available to manage COVID-19 patients?	263(93.6%)	18(6.4%)
10	How to improve your immune system against COVID-19?	247(87.9%)	34(12.1%)
11	Have you received training on the following topics?	240(85.4%)	41(14.6%)

Table 3. Physical Therapists attitude towards managing COVID-19 patients in Saudi Arabia.

#	Questions (Attitude)	Correctness of Response	
		PTs opted Strongly agree & Agree	PTs opted Neutral, Disagree & Strongly Disagree
1	Coronavirus transmits from animals to humans and vice versa.	274(97.5%)	7(2.5%)
2	COVID-19 is a contagious disease.	270 (96.1%)	11 (3.9%)
3	Coronavirus can affect humans more than once	241(85.8%)	40(14.2%)
4	I consider the coronavirus a threat to our community.	271 (96.4%)	10 (3.6%)
5	I am reluctant to manage COVID-19 patients, and I have come across a patient with COVID-19 disease.	179(63.7%)	102(36.3%)
6	I follow Centers for Disease Control and Prevention (CDC) guidelines for patient care	257 (91.5%)	24(8.5%)
7	I can prevent the spread of COVID 19 disease if proper preventive guidelines are followed while managing COVID-19 patients.	270(96.1%)	11(9.5%)
8	Transmission of COVID-19 can be prevented by washing hands with soap frequently.	273(97.2%)	8(2.8%)
9	I always worry about acquiring COVID-19 disease while getting involved in inpatient care.	68 (24.2%)	213(75.8%)
10	Being a healthcare professional having direct contact with patients, I am worried one of your family members may get an infection.	239(85.1%)	42(14.9%)

Practices adopted by participating PTs in the management of patients with COVID-19

Table 4 shows the practices adopted by PTs in managing COVID-19 patients in their respective hospitals in KSA. In particular, 89% of the PTs often wear N-95 masks during patient contact, and 80.1% of them expressed that these three-layered bags were used to collect waste from the COVID-19 isolation wards. In addition, 91.8% of PTs dispose of masks in separate yellow containers with biohazard symbols at home. Although 72.2% of PTs agreed that PPEs are always available in their respective institutions according to guidelines, only 57.6% knew the correct sequence to remove PPE kits.

Job stress perceived by participating PTs during the COVID-19 pandemic

Table 5 shows the job stress perceived by the PTs during the COVID-19 pandemic. Among the respondents, more than 30% of the PTs have often been upset because something unexpected happened at their workplace, and they could not control the important things. In addition, 37.7% felt nervous and stressed at

their workplace, and 18.5% of those who participated in this study reported that they could not cope with everything they had to do at their workplace. On the other hand, 73.7% of the respondents felt confident about handling their problems at the workplace during the COVID-19 pandemic, and as such, 67.9% of PTs could control their jobs effectively, and 68.7% of them provided positive feedback about their workplaces. Most PTs felt moderate (76.5%) to high stress (17.8%) during the COVID-19 pandemic in Saudi Arabia.

Association of demographics of the participants and perceived job stress

Table 6 shows the association between demographic variables and the job stress perceived by PTs working in government and private hospitals in KSA. Chi-square statistics reveal a significant association between the job stress experienced by PTs and selected demographic variables such as sex, marital status, educational qualification, type of occupation (employed in a clinical or academic setting) and type of patient interaction ($p < 0.05$). On the other hand, other variables such as age ($p = 0.823$), nationality ($p = 0.143$), duration of employment ($p = 0.076$), and type of workplace

Table 4. Physical Therapists practices towards managing COVID-19 patients in Saudi Arabia.

#	Practices	Always	Usually	Sometimes	Rarely	Never
1	I wear N-95 masks during patient care will prevent the transmission of the disease.	8 (2.8)	79(28.1)	20(7.1)	171(60.9)	3(1.1)
2	In our hospital, double-layered bags are used to collect waste from COVID-19 isolation wards.	125(44.5)	100(35.6)	42(14.9)	11(3.9)	3(1.1)
3	At home, we use yellow-colored containers with biohazard symbols should be used for the disposal of masks and gloves.	175(62.3)	83(29.5)	16(5.7)	5(1.8)	2(0.7)
4	We adopted the procedure of handwashing for 20 seconds, then wearing goggles, masks, gloves, and the gown while wearing (donning) Personal Protective Equipment (PPE) kit.	143(50.9)	85(30.2)	31(11)	15(5.3)	7(2.5)
5	While removing the PPE kit, I follow the procedure of removing gown, gloves, mask, goggles, and then handwashing for 20 seconds	99(35.2)	63(22.4)	54(19.2)	38(13.5)	27(9.6)
6	PPE is available in your institution as per the guidelines.	122(43.4)	81(28.8)	52(18.5)	19(6.8)	7(2.5)

Table 5. Job Stress perceived by the physical therapists during COVID-19 pandemic in Saudi Arabia.

#	Question	Never	Almost Never	Sometimes	Fairly Often	Very Often
1	How often have you been upset because of something that happened unexpectedly at your workplace?	39(13.9%)	20(7.1%)	134(47.7%)	65(23.1%)	23(8.2%)
2	How often have you felt difficulties that were piling up so high that you could not overcome them at your workplace?	40(14.2%)	54(19.2%)	136(48.4%)	40(14.2%)	11(3.9%)
3	How often have you felt that you were unable to control the important things at your workplace?	51(18.1%)	49(17.4%)	96(34.2%)	68(24.2%)	17(6.0%)
4	How often have you been angered because of things that were outside of your control?	34(12.1%)	61(21.7%)	107(38.1%)	54(19.2%)	25(8.9%)
5	How often have you felt nervous and “stressed”?	23(8.2%)	62(22.1%)	90(32%)	74(26.3%)	32(11.4%)
6	How often have you felt confident about your ability to handle your problems?	4(1.4%)	26(9.3%)	44(15.7%)	113(40.2%)	94(33.5%)
7	How often have you felt that things were going your way at your workplace?	9(3.2%)	24(8.5%)	100(32.6%)	106(37.7%)	42(14.9%)
8	How often have you found that you could not cope with all the things that you had to do at your workplace?	46(16.4%)	64(22.8%)	119(42.3%)	47(16.7%)	5(1.8%)
9	How often have you been able to control your job in an effective manner?	10(3.6%)	18(6.4%)	62(22.1%)	115(40.9%)	76(27%)
10	How often have you felt that you were on top of things (positive feedback about your work)?	4(1.4%)	24(8.5%)	60(21.4%)	114(40.6%)	79(28.1%)
	Overall, Jobs Stress Perceived by the PTs during COVID 19 Pandemic	Low Stress 16 (5.7%) Moderate Stress 215 (76.5%) High Perceived Stress 50 (17.8%)				

($p=0.709$) did not show a significant association with the job stress experienced by the PTs ($p>0.05$).

Discussion

HCPs play a crucial role in managing COVID-19 patients as front-liners and are the first point of contact with those patients in hospitals. To manage patients during the COVID-19 pandemic and in the new normal scenario, the knowledge, awareness, attitude,

and practices adopted by the HCPs are paramount to prevent the spread of the virus in hospital settings. More recently, Alshahrani et al (4). have conducted a cross-sectional study to determine KAP among PT toward COVID-19 in KSA. Unlike previous studies, this research is the first to reveal the KAP adopted by PT in KSA while managing patients and determining the level of job stress during the COVID pandemic.

Several elements of human behavior decide the serendipity of the COVID-19 pandemic and include knowledge about the disease, attitude toward it, and

Table 6. Chi-square statistics showing the association between a demographic variable and the Job Stress perceived by the physical therapists during the COVID-19 pandemic in Saudi Arabia.

Characteristic		Level of Job Stress perceived during COVID-19 Pandemic				
		Low Stress N (%)	Moderate Stress N (%)	High Perceived Stress N (%)	Chi-Square Test	P-Value
Gender	Male	11(6.0%)	143(78.6%)	28(15.4%)	2.082	0.044*
	Female	5(5.1%)	72(72.7%)	22(22.2%)		
Age	18 - 29	2(2.7%)	59(79.7%)	13(17.6%)	4.358	0.823
	30 - 39	5(5.6%)	71(78.9%)	14(15.6%)		
	40 - 49	6(6.9%)	63(72.4%)	18(20.7%)		
	50 - 59	3(10.7%)	20(71.4%)	5(17.9%)		
	60 and above	-	2(100%)	-		
Nationality	Saudi	15(6.3%)	185(77.1%)	40(16.7%)	2.137	0.143
	Non-Saudi	1(2.4%)	30(73.2%)	10(24.4%)		
Marital Status	Married	14(7%)	153(76.5%)	33(16.5%)	2.731	0.001*
	Not married	2(2.5%)	62(76.5%)	17(21%)		
What is your Highest Qualification?	Ph.D. (Doctor of Philosophy)	4 (10%)	33 (82.5%)	3 (7.5%)	10.977	0.042*
	Postgraduate	5 (7.1%)	50 (71.4%)	15 (21.4%)		
	Bachelor degree	6 (3.6%)	130 (77.4%)	32 (19%)		
	Diploma	1 (33.3%)	2 (66.7%)	-		
Occupation	Clinical Versus	13 (6.6%)	149 (76%)	34 (17.3%)	1.096	0.001*
	Academic setup	3 (3.5%)	66 (77.6%)	16 (18.8%)		
Where are you currently working?	Government	14 (6.2%)	172 (76.4%)	39 (17.3%)	0.688	0.709
	Private	2 (3.6%)	43 (76.8%)	11(19.6%)		
How long have you been working in this hospital?	Less than 1 year	3(6.3%)	35 (72.9%)	10(20.8%)	4.890	0.076
	1 to 5 years	6 (7.7%)	61 (78.2%)	11 (14.1%)		
	6 to 10 years	6 (5.6%)	78 (72.9%)	23 (21.5%)		
	11 or more years	1 (2.1%)	41 (85.4%)	6 (12.5%)		
Do you typically have direct interaction or contact with patients?	YES, I typically have direct interaction or contact with patients	12(5.8%)	160(76.9%)	36(17.3%)	1.132	0.043*
	NO, I do NOT have direct interaction or contact with patients	4(5.5%)	55(75.3%)	14(19.2%)		

practices adopted by the public to contain or prevent the disease. Good knowledge of healthcare workers about the characteristics of the disease and its transmission routes to vulnerable groups will positively impact the attitude toward the disease. This, in turn, will be implemented in clinical practice and would

prevent the transmission of COVID-19 to and from therapists and patients. Therefore, understanding the knowledge of PT about the disease of COVID-19 is essential, as they are an integral part of the team involved in the management of COVID-19 patients. Furthermore, it is essential to study the attitude of PTs

toward controlling the spread of COVID-19 in their clinical practice.

Knowledge and awareness of PT about COVID 19

An earlier study by Shrivastava et al (14) found that 36.9% of Saudi allied HCPs were able to identify the virus causing COVID-19. Furthermore, 97.5% and 95% of them correctly responded to the questions related to the COVID-19 transmission and incubation period. However, this study observed that 83.3% of the PTs in KSA correctly identified the type of virus causing COVID-19 infection. 89% and 95% were aware of the spread and incubation period of COVID-19. Consistent with this finding, a more recent study indicated that 82% of PTs across the globe have the required knowledge of the symptoms of COVID-19 (15).

The present study revealed that 75% of PTs in KSA have the essential knowledge about the measures to be taken to manage the confirmed cases of COVID-19. Contrary to this finding, a more recent study by Asdaq et al (16) observed that 95% of Saudi health workers were aware of immediately placing the COVID-19 confirmed patient in proper isolation. The observed difference between the findings could be because the earlier study focused on HCPs in general, while this study focused on PTs working in public and private hospitals in KSA.

Another recent study also explored that 66% of PTs were well known for preventive measures related to COVID-19 (8). Our findings reveal that 98% of PTs possess the required knowledge and are aware of recommended ways to prevent the incidence of COVID-19 disease. This increased awareness could be because 85% of the PTs received training on COVID-19 related topics at their respective hospitals. This finding implies that the knowledge of Saudi PTs could be improved by motivating them to attend various lectures/infection control workshops concerning COVID-19, thus improving their awareness and staying up-to-date with recent advances in such fields (15).

Furthermore, according to the findings of this study, 88% of the participants felt that consuming a healthy diet and regular exercise improve the immune system against COVID-19. According to the opinion of PTs, a more recent study also showed that nutrition

plays an indispensable role in the development and maintenance of the immune system (17). In contrast, nutritional insufficiencies can compromise the immune response and increase susceptibility to infections. Multifarious studies in humans and animals have shown the profound impact of exercise on the immune system (17). Furthermore, the positive effects of exercise on immunity, particularly innate immunity, strengthen the current public health recommendations favoring physical activity during COVID-19 (18).

Attitude and practices adopted by PT regarding COVID-19

This study showed that 96% of PTs in KSA perceived COVID-19 as contagious and a threat to the community. A recent study also reported that 96.4% of HCPs felt COVID-19 contagious, and 90.9% of them considered COVID-19 a threat to their community (9). Another study revealed that 77% of physicians and nurses were anxious and afraid while working with suspected cases of COVID-19 (16). The present study reported that only 64% of PTs agreed that they found a person with COVID-19, and 75.8% of the respondents expressed their disagreement that they are concerned about getting COVID-19 while participating in inpatient care. Our findings are consistent with a recent study that demonstrated that PTs showed a positive attitude toward COVID-19 (11).

As hand hygiene (HH) is one of the essential factors of infection control in a healthcare setting, this study reveals the attitude of PTs toward HH practices to combat COVID-19 disease, and 98.6% of them felt that frequent handwashing with soap could prevent the spread of COVID-19. Furthermore, a more recent Saudi-based study also indicated that PTs show a positive attitude toward the best practice guidelines for hand hygiene (11). Therefore, in addition to promoting proper hygiene in the workplace, optimizing protective equipment and other IPC measures in the health care facilities and community settings is paramount to protect HCWs and the community (19-21). Ahmed et al (9) reported that 67% of HCWs followed CDC guidelines for patient care, but only 11.6% of them wore N-95 masks during patient contact. Contrary

to these findings, this study observed that 91.5% of Saudi PTs follow the CDC guidelines during patient care, and 96% felt that they could avoid this infection if they followed the CDC guidelines. However, 31% of them often wear N-95 masks during patient contact. Furthermore, 72.2% of the PTs agreed that PPEs are available in their respective institutions according to the guidelines.

Irrespective of the availability of PPE, the expertise in the donning and doffing of PPE is dominant. The method for donning and removing PPE is vital to protect healthcare providers performing these activities. In addition, insufficient education and training could influence compliance with PPE recommendations (22). An earlier study also indicated that 55% of PTs lack sufficient knowledge of PPE (15). While reviewing our results, 81.1% and 56.6% of Saudi PTs always/usually wear and remove the PPE kit in a correct sequence, respectively. The compliance of PTs with the use of PPEs is due to proper training and updated guidelines provided by the health authorities (23,24).

Job stress perceived by the PTs during the COVID-19 pandemic

All coronavirus outbreaks (SARS, MERS-CoV, and COVID-19) had a significant influence on the physical and mental health of HCPs, according to a recent systematic review of 115 publications (25). Like other healthcare interventions, during COVID-19 rehabilitation programs, PTs have direct contact with patients where person-to-person transmission of COVID-19 infection has been reported (26). This occurred predominantly through direct contact with infected patients or through droplets spread by infected patients coughing or sneezing (27). Furthermore, severe COVID-positive patients in the intensive care unit beds required oxygen support and mechanical ventilation. PT was front-line professionals in the battle against the disease for these patients due to their attributions to mechanical ventilators, handling this process, and other therapeutic resources (28). As a result, physical therapists who were part of the rehabilitation team in healthcare settings were prone to stress and anxiety during the COVID-19 pandemic.

A Russian study stated that 7.1% of HCPs were often upset due to something that occurred unexpectedly, and could not control crucial things in their lives, correspondingly (29). This study also found that 8.2% of PTs working in KSA were very often upset due to something that happened unexpectedly at their workplace, and 4% of them were unable to control the important things. This study also revealed that 11.4% of PTs very often felt nervous and stressed at their workplace during the COVID-19 pandemic, while an earlier study found that 21.1% of HCPs felt nervous and stressed during the pandemic (29).

Furthermore, a recent study stated that PTs were prone to more emotions and feelings that were difficult to manage and cope with during the COVID-19 pandemic (30). This could happen because, during the pandemic, medical workers experienced high-performance pressure and more adverse psychological consequences due to increased workload, poor infection protection and frustration from failing to provide excellent patient care (31). However, in this study, only 3.9% of PTs in KSA often felt that the difficulties were so overwhelming that they could not overcome them. At the same time, 8.9% are often angry due to things outside of their control. Although 53% of PTs often perceived that things were going well, 19% of them could not cope with the things they had to do at work, and 8.1% of them very often felt that they were on top of things.

Previous studies have shown that HCPs have substantial mental and physical stress while managing confirmed cases of COVID-19 (32,33). On the contrary, the current study revealed that most PTs felt moderate stress (76.5%) during COVID-19. However, the Saudi government paid considerable attention from the early stage of the COVID-19 pandemic with protective measures for HCPs (34). The critical factors of psychological stress among HCPs may be due to fear of getting COVID-19 infection and transmitting it to family members, discomfort in PPE and the anxiety of worsening or death of the patient (35). Other causes of such adverse psychological consequences among HCPs include high workload or excessive working hours, insufficient PPE, overenthusiastic media updates, reinforced sense of incompetence, and infection rate (36).

Association between job stress and demographics of PTs

Spoorthya et al. (2020) stated that various sociodemographic factors, including age, sex, occupation, workplace, work department, were associated with a high level of stress, depression, anxiety and insomnia among HCPs due to the COVID-19 pandemic (36). A study in KSA revealed that HCP age showed a significant negative relationship with their depression score (37). Another recent study revealed that demographic variables such as age and nationality were significantly associated with job stress, while sex, marital status, and the educational level of HCPs did not show a significant association with their stress levels (38). However, this study demonstrated a significant association between the stress job felt by PTs and their gender, marital status, educational qualification, type of occupation (employed in a clinical or academic setting) and the type of patient interaction. Previous studies also found that women front-line HCP were found to be at direct risk for developing stress symptoms. In addition, married HCPs were more stressed than their counterparts as they had a family to worry about (35,39). Furthermore, the remaining variables such as age, nationality, duration of employment and the type of sector in which they work did not show a significant association with the job stress felt by PTs (Table 5), and exploring the reason behind this insignificant association is beyond the scope of this study; therefore, further research is warranted.

Study limitations

Some limitations of the study include inherent issues of self-reported surveys. In this study, the results are derived from a self-reported survey of PTs on KAP and their perceived job stress during the COVID-19 pandemic. Therefore, independent verification of data was not possible.

The study captured the KAP and the perceived job stress experienced by the PTs employed in private and public sector hospitals in KSA. Therefore, the perceptions cannot be generalized to PTs working outside the KSA. Therefore, future studies should include a broader population of PTs working around the world to study their perceptions and suggest suitable

strategies to improve KAP to overcome the job stress experienced during the pandemic.

Conclusions

This is the first study that addresses the KAP and perceived job stress of PTs during the COVID-19 pandemic in KSA. This study found that most PTs have adequate knowledge and understanding of COVID-19. More than 85% of PTs in KSA received training on COVID-19 related topics in their respective hospitals, indicating that hospitals in KSA are providing required continuing professional development programs, including lectures and workshops on COVID-19 to manage patients during the pandemic and reduce associated morbidity and mortality. Furthermore, most of the PTs exhibited a positive attitude toward COVID-19 guidelines, such as adherence to the CDC guidelines during patient care, disinfection protocol, biomedical waste management system, and acquiring verified knowledge about the disease of COVID-19. Most hospitals in KSA have PPE KIT according to the guidelines, and most PTs use the best practices to prevent themselves from becoming infected with COVID-19 by wearing PPEs. However, the use of N-95 masks during patient contact is less among PTs in KSA. Unlike previous studies, the findings of this study conclude that 77% of PTs perceived moderate level of job stress while managing patients during the COVID-19 pandemic. There is a significant association between gender, marital status, educational qualification, type of occupation (whether employed in a clinical or academic setting), and type of patient interaction with respect to perception of job stress.

Conflict of Interest: Each author declares that they have no commercial associations that might pose a conflict of interest in connection with the submitted article.

Ethics Approval and Informed Consent: Ethical clearance for this study was obtained from the Institutional Research Board (IRB) of Imam Abdulrahman Bin Faisal University (IAU), KSA (Ref No: IRB-2022-20-048, NCBE Registration number HAP-05-D-003, dated 30th January 2022). Informed consent was obtained from all the participants before filling out the survey.

Author Contributions Statement: The first author (SHP) proposed the study questionnaire's conception and prepared the original draft. The second author (AVS) designed the study, finalized the questionnaire, carried out the literature review, formal analysis, and interpretation of data, and edited the initial draft. Both authors contributed to the data acquisition and approved the final version of the manuscript.

Data Availability Statements: The data presented in this study are available on request from the corresponding author.

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