ORIGINAL ARTICLE

IMPACT OF COVID-19 PANDEMIC ON PERCEIVED STRESS AND ITS ASSOCIATION WITH HAVING CHILDREN AMONG PHYSICIANS IN SAUDI ARABIA

Khaled Alghamdi[1], Ayat Roushdy Abdallah[2,3], Marwa Mohamed Zalat[2,4], Marwa M. El-Sonbaty[5], Adeel Ahmed Khan[6], Hanan Mosleh Ibrahim[2,7]

[1]Pediatric Complex/Palliative Care, Taibah University, Al Madinah City-Saudi Arabia
[2]Department of Family and Community Medicine, Taibah University, Al Madinah City-Saudi Arabia
[3]Department of Epidemiology and Preventive Medicine, National Liver Institute, Menoufiya University, Shebin Elkom-Egypt
[4]Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Zagazig University, Egypt
[5]Child Health Department, Medical Research and Clinical Studies Institute, National Research Centre (Affiliation ID: 60014618), Dokki, Cairo-Egypt
[6]Saudi Board Program of Community Medicine, Ministry of Health, Makkah-Saudi Arabia
[7]Department of Public Health and Community Medicine, Faculty of Medicine, Cairo University-Egypt

Background: The global pandemic of COVID-19 has led to unprecedented psychological stress on frontline health professionals. The objective of our study was to determine the prevalence of perceived stress and its association with having children among physicians in Al Madinah city, Saudi Arabia, during the COVID-19 pandemic. **Methods:** A web-based analytical cross-sectional study was conducted among the physicians working in Al-Madina, Saudi Arabia. Physicians living in Madina city were invited to participate in this survey by using an online questionnaire that consisted of socio-demographic information, and Perceived Stress Scale (PSS) 10 items questionnaire. The outcome measure was perceived stress score and levels among participants, while exposure factors were having children and the number of children of each participant. **Results:** Low, moderate and high levels of perceived stress were found in 39.3%, 56.4% and 4.3% of the physicians, respectively. 53.6% of those physicians who have children, had significant moderate perceived stress as compared to 93.3% of those who do not have any children (odds ratio (OR) = 0.08, 95% confidence interval (CI) 0.01–0.65, p=0.004). There was an inversed significant correlation between the number of children a participant had and the perceived stress scale score (R = −0.21, p=0.026). **Conclusion:** COVID-19 pandemic resulted in perceived stress among physicians in Saudi Arabia, mostly moderate level. Having children was found to be a protective factor.

Keywords: Physicians; Stress; Children; COVID-19; Saudi Arabia

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INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) is a global health crisis, and is by far the largest outbreak of atypical pneumonia since the severe acute respiratory syndrome (SARS) epidemic in 2003.[1] COVID-19 was first identified in December 2019 in China and has been declared by the World Health Organization (WHO) as a global pandemic in March 2020.[2]

COVID-19 is an emerging infectious disease that threatens not only life but also the psychological health. Outbreaks can put significant psychological stress and anxiety among people and the media have huge impact on increasing mental distress.[3] Apart from the fear and uncertainty about the spread of infections, people faced other challenges that could impact their mental health and psychological well-being including movement restriction, changes in their lifestyle, living conditions and jobs, closure of schools. Thus, ongoing COVID-19 pandemic is inducing anxiety, there has been fear of suffering from the disease or losing loved ones, rapid changes in the way of life (e.g., study, work, social gatherings), and disrupted plans due to travel restrictions and social distancing. Though, these experiences are all important to recognize the seriousness of the public health challenge facing by our community.[4] A review of the literature concluded that COVID-19 pandemic has negatively impacted mental health outcomes such as depression, anxiety, stress, post-traumatic stress, anger, and feeling of social isolation and loneliness.[5]

In late 2019, a number of severe and even fatal respiratory cases of unknown cause emerged in Wuhan, China, where a novel virus was identified with a record number of deaths.[1] Few weeks later, the infection reached nearly all other countries which aroused enormous attention worldwide. The largest numbers of confirmed infected cases were reported in Italy, Iran, United States, and Spain.[1]

The new virus is a ribonucleic acid (RNA) virus belonged to corona viruses' family, which is a big

family of viruses that affects mainly the respiratory system. Its symptoms may vary from mild common cold to more severe respiratory diseases and it is reported to be transmitted between people via close contact.[2] On February 2020, the World Health Organization (WHO) announced a new name for this disease caused by this novel coronavirus: coronavirus disease 2019 (COVID-19) and it was declared a global pandemic by the WHO on the 11th of March 2020.[1,3]

According to the WHO, on 21st of April 2020, there were nearly 2 million and half (2,402,250) confirmed cases of COVID-19, 163,097 confirmed deaths, and 213 countries have been affected.[4] As of April 21, the Saudi Government has reported to the WHO 10,484 confirmed COVID-19 cases.[5] The majority of cases have been reported in four large cities: Al Madinah, Makkah, Riyadh, and Jeddah.

Due to the serious health consequences of COVID-19, the Saudi Government has taken strict quarantine measures to prevent and control the disease spread. They have suspended operations in many governmental agencies, shopping malls, restaurants. All schools and universities have been closed; gatherings in parks, and visits became prohibited, while hospitals, pharmacies and grocery stores remained open. Entry and exit from all areas are prohibited with a 24-hour daily curfew in all over the Kingdom. Al Madinah city is located in the western district in Saudi Arabia with a population size of 2,188,138 in year 2018.[6] The healthcare system in Al Madinah is facing a challenge to provide medical care to nearly 100–200 new cases of COVID-19 daily, which could have a psychological and physical burden on healthcare workers (HCWs) in Al Madinah hospitals and primary healthcare centers.

Frontline physicians who have close contact with infected patients experience excessive workload and discrimination from the surroundings and thus, they are highly vulnerable to experience physical exhaustion, fear, sleep problems, and emotional disturbance.[7] A recent study in China conducted over 1,563 health professionals involved in treatment of COVID-19 cases, reported that more than half (50.7%) of the participating HCWs had depressive symptoms, 44.7% had anxiety, and 36.1% had sleep disturbance.[8] The fear of transmission of infections from health professionals to their children and families must be reckoned and respected. There is a need to study the fear of health professionals who are at risk to be exposed to fatal and highly contagious diseases that put an extra burden of stress over HCWs. The job and responsibility of health professionals demand the optimal care to the infected patients and having close contact with patients' families and relatives. There is very limited evidence regarding the psychological effects of pandemic diseases on physicians working during this COVID-19 pandemic. Also, HCWs consider themselves at high risk of exposure to infection and can be stressed over the safety of their family members, so we considered studying the association of perceived stress with the children living with physicians.

The aim of our study was; 1) to estimate the prevalence of perceived stress among physicians in Al Madinah city, Saudi Arabia during the COVID-19 pandemic, 2) to determine the association of having children with the level of perceived stress among physicians, and 3) to investigate the correlation of the number of children with the perceived stress score among the study participants.

MATERIAL AND METHODS

We conducted an analytical cross-sectional study in Al Madinah city, Saudi Arabia, during the period from March 1st to April 1st, 2020.

The target population was physicians of Al Madinah city, in Saudi Arabia. Inclusion criteria was physicians currently working in governmental or private health sector and aged above 20 years. A convenient sampling technique approach was applied for this study as the questionnaire was circulated on social media applications to physicians in social media groups. Snowball sampling technique was then applied as some physicians was asked to circulate the questionnaire to their circle of colleagues. The sample size (n) was calculated based on a single population proportion formula, by assuming 95% confidence level, and the prevalence of perceived stress of COVID-19 among physicians was not known, Therefore, a proportion of 50%, with 95% confidence interval, and margin of error (d) = 5% was taken, it was required to enrol 384 physicians but due to special COVID-19 situation, we were able to collect data from 117 physicians. Systematic presentation of study procedure is given in Figure-1. Data was collected using an online questionnaire that was distributed via social applications (WhatsApp, Twitter) to the target population of physicians. The online questionnaire consisted of 2 parts.

Part 1: socio-demographic and work-related characteristics of the participants, which included age, gender, marital status, having children, number of children if any, and current designation of physician.

Part 2: Perceived Stress Scale (PSS) tool is a widely applied, easy-to-use questionnaire with established acceptable psychometric properties. The PSS used in the study was the 10 items questionnaire. In general, the psychometric properties of the 10-item PSS were superior to those of the 14-item PSS.[9] Individual scores on the PSS could range from 0–40 with higher scores indicating higher perceived stress. Generally, levels of stress can be considered at the following cut-off points of PSS score.[10]

- Scores ranging from 0–13 would be considered low stress.
- Scores ranging from 14–26 would be considered moderate stress.
- Scores ranging from 27–40 would be considered high perceived stress.

The outcome measure in the study was the perceived stress score measures and levels among participants. Exposure factors examined were having children and the number of children of each participant. Statistical analysis was done using the Statistical Package for Social Science (SPSS) version 21.0 (SPSS, Chicago, United States of America). Two types of statistics were done: 1. Descriptive statistics: quantitative data were shown as mean±standard deviation because continuous data was found to be normally distributed when examined by Shapiro-Wilk test, while qualitative data were expressed as frequency and percentages; 2. Inferential statistics: Chi-squared test was used to compare the level of perceived stress and having children with low perceived stress being the reference group. Odds ratios were computed for comparing low level of stress with moderate and severely perceived stress respectively. Fisher exact test was used when appropriate. Independent sample T test was used to compare the mean difference of PSS scores between groups of participants having children or not. Pearson correlation was used to examine the correlation of PSS scores with the number of children of the participants. *p*-value was considered statistically significant when it is < 0.05. Official ethical approval was obtained from a local university Scientific Research Ethical Committee (CM-REC 0339-1441). The first page of the online form described the aim of the study and consent was taken on that page. Privacy and confidentiality were assured.

RESULTS

60.7% of the physicians were males, 40.2% were in their thirties (30-39 years) and 86.3% were married. Majority of participants were non-Saudis (81.2%). Around 46.2% were specialist physicians, while 29.1% were residents. Nearly 84.6% have children and 73.5% have 3 children or less. Levels of perceived stress as low, moderate and high were found in 39.3%, 56.4% and 4.3% of the physicians enrolled in our study, respectively. The mean perceived stress score of the studied group was 15.59±6.59. (Table-1)

53.6% of those who have children had moderate perceived stress compared to 93.3% of those who did not have any children. Having children was found to be a protective factor against having moderate perceived stress (OR = 0.08, 95% CI 0.01-0.65, p = 0.004). Similarly, only 4.3% of those who have children had high level of perceived stress, compared to 75% of those who did not have children, thus having children was a protective factor against having high level of perceived stress (OR = 0.01, 95% CI 0.001-0.21, p = 0.002). (Table-2)

The mean perceived stress score among those who did have children was statistically significantly lower than those who did not have children (14.53± 6.27 versus 21.39±5.30 respectively, $p\leq$ 0.0001). (Table-3). The existence of an inverse significant correlation between the number of children a participant had and the perceived stress scale score was also found (R = −0.206, p=0.026). (Table-4)

Table-1: Sociodemographic and work-related characteristics of study participants

Variable	Variables	n = 117	%
Age group	20-	9	7.7
	30-	47	40.2
	40-	33	28.2
	50-	23	19.7
	60-	5	4.3
Sex	Male	71	60.7
	Female	46	39.3
Marital status	Unmarried	16	13.7
	Married	101	86.3
Nationality	Non-Saudi	95	81.2
	Saudi	22	18.8
Current position	Consultant	25	21.4
	Specialist	54	46.2
	Resident	34	29.1
	Other	4	3.4
Have children	Yes	99	84.6
	No	18	15.4
Number of children (n = 99)	≤ 3	86	73.5
	> 3	31	26.5
Level of perceived stress	Low	46	39.3
	Moderate	66	56.4
	High	5	4.3
		Mean	± SD
Perceived Stress Score		15.59	6.59

SD = standard deviation.

Table-2: Association of having children with perceived stress among the study participants

Perceived stress	Having children		Total n = 117 (%)	OR (95% CI)	*p*-value
	No n = 18 (%)	Yes n = 99 (%)			
Low**	1 (5.6%)	45 (45.5%)	46 (39.3%)		
Moderate	14 (93.3%)	52 (53.6%)	66 (58.9%)	0.08 (0.01-0.65)	0.004*
High	3 (75%)	2 (4.3%)	5 (9.8%)	0.01 (0.001-0.21)	0.002*

*p<0.05 is statistically significant; **Low perceived stress is the reference group; OR = odds ratio; CI = confidence interval.

Table-3: Mean difference of the perceived stress scores among those who have children and those who do not have any children in our study participants

Variable	Having children	n	Mean	± SD	*p*-value
PSS scores	Yes	99	14.53	6.27	0.000*
	No	18	21.39	5.30	

*P < 0.05 is statistically significant; SD = standard deviation; PSS = Perceived Stress Scale.

Table-4: Pearson correlation coefficient between perceived stress score and the number of children

Variable		Number of children
PSS scores	Person correlation	- 0.206
	Significance (P-value)	0.026*
	n	117

*p<0.05 is statistically significant; PSS = Perceived Stress Scale.

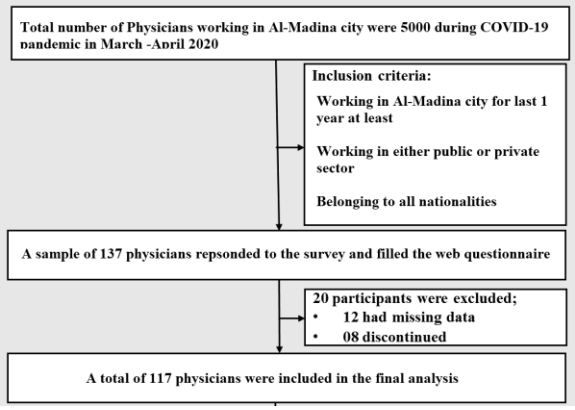

Figure-1: Flowchart of the study

DISCUSSION

Identifying and realizing the psychological impact of the COVID-19 outbreak among HCWs is very important in guiding policies and interventions to protect their psychological well-being. Our findings revealed that most of physicians had moderate levels of stress (56.4%), while 39.3% and 4.35% experienced low and high levels of stress, respectively. We restricted our survey to only physicians as they have more patients' exposure than non-medical people, who are not in direct contact with patients. In previous epidemics like the Middle East Respiratory Syndrome Coronavirus (MERS-CoV), there was significant level of stress among HCWs ranged from severe to moderate.[11,12] However, COVID-19 is a highly contagious pandemic, while (MERS- CoV) was an epidemic in which strict quarantine measures like social distancing and markets closure were not undertaken.

In Wuhan, China, healthcare authorities realized that stress, anxiety, depressive symptoms, insomnia, denial, anger and fear among their HCWs could affect their decision making, their war against COVID-19, so they began to recruit interventional groups for assessment and intervention.[7] Finding of this study was in line with the study conducted in China by Wang *et al*.[13] which reported 53.8% perceived stress. Another study conducted in Ethiopia among governmental healthcare providers, reported the prevalence of perceived stress to be 51.6%.[14] On the other hand, the findings of a study conducted in Wuhan, China, by Dai *et al*.[15] were lower as compared to those of this study (39.1%). Similarly, a study done in Singapore reported that perceived stress in medical HCWs was only 6.4%, in contrary to our study, this could be explained by the very early time of conducting their study during the pandemic, different sample size, sampling technique (convenience sampling), and use of different tools of assessment.[16] Also, the health authorities have not taken immediate steps yet to address the issues of psychological well-being of HCWs in the Kingdom. Previous studies in different countries also reported a higher prevalence of mental health problems among HCWs compared with the general population due to their close and frequent contact with patients, working longer hours than usual, and continuous working in frightening, stressful and constrained conditions where they are exposed to constant threat of infection.[17–19]

Surprisingly, we found that having children was considered as a protective factor against having moderate and high perceived stress, which is contrary

to many other studies, as physicians had an excess fear from risk of transmitting infection to their children. The physicians had to live outside their homes which could be additional contributing factor for more stress.[20,21] In Saudi Arabia, physicians might feel safer than other countries since the government had applied strict rules to protect contacts and provided the infection control tools to every healthcare setting. As a result, HCWs don't have to leave their homes and be separated from their children.[22] School closure in many countries may add an excess burden on the HCWs, as it increases child obligations.[23] Childlessness could be added as an important stressor to couple life which is also reported by many studies,[24,25] though in our study, the comparison between those living with children and others without children based on unequal numbers, 99 and 18 respectively.

In agreement with the current study findings that HCWs having children have less, moderate and severe stress compared to those who do not, studies concluded that having children is associated with less work burnout.[26,27] Moreover, the greater number of children the HCWs had, the less stress they experienced; this may be due to some cultural issues apart from the pandemic, as they consider children as source of happiness and proud.[28–31]

Our study has some limitations. Data was obtained from self-reported web questionnaires which were not verified with medical documentations. We were only able to take a small sample size, maybe some associations could be stronger if we had a larger sample size. Moreover, our sample comprised of only physicians of one city, which will have an impact on generalizability of our findings to other HCWs like nurses, technicians, staff etc. Place of work also may have affected the generalizability as if any of primary healthcare (PHC) centers or hospitals is under or over represented, which is a possible outcome in snow ball sampling. The study did not assess socioeconomic status, ethnic background as many Madinah inhabitants came from different ethnic background and from different countries. We also were not able to collect data on other factors like isolation, COVID-19 behaviours, social media use, other stressors, or community level factors, such as population density that may have an impact on perceived stress during COVID-19 pandemic. Follow up studies are needed as our study was done during the early phase of the pandemic, there is a likelihood that as the time passes by, there would be an increase in stress among physicians.

CONCLUSION

COVID-19 pandemic resulted in mostly moderate level perceived stress among physicians in Saudi Arabia. Having children was considered as a protective factor. Thinking about ways to support the psychological wellbeing and mental health of HCWs is very important as it is considered as the cornerstone for their productivity. Development of evidence-based support systems and initiatives should be the high priority of healthcare authorities. It may include counselling services and provision of behavioural support programs for this vulnerable population. Furthermore, self-relaxation training, regular exercise and healthy lifestyle should also be emphasized. Future studies should also be conducted to find out the impact of these behavioural interventions on the well-being of HCWs during this COVID-19 pandemic.

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AUTHORS' CONTRIBUTION

KA, ARA, MMZ, MS, AAK & HMI conceived and designed the study, provided research materials, and collected and organized data. KA, ARA & MMZ analysed and interpreted data. MS & AAK wrote initial draft of article, while final draft was written by HMI, AAK & MS. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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Address for Correspondence:

Adeel Ahmed Khan, Public Health Specialist, Saudi Board Program of Community Medicine, Ministry of Health Makkah-Saudi Arabia
Cell: +966-582265945
Emil: adeel_ahmed_khan@hotmail.com