



Burnout Assessment Among Physicians and Medical Students: Comparing Time-Periods of Coronavirus Disease Outbreak in Shiraz

Yaser Sarikhani ¹, Kiana Khatami ², Mohammad Salehi-Marzijarani ², AliReza Estedal ², Gholam Reza Sivandzadeh ³, Pariya Kouhi ⁴, Saeed Shahabi ², Leila Zarei ², Seyyed Taghi Heydari ^{2,*} and Kamran Bagheri Lankarani ²

¹Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran

²Health Policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran

³Department of Internal Medicine, Gastroenterohepatology Research Center, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

⁴Department of Internal Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

*Corresponding author: Health Policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran. Email: heydari.st@gmail.com

Received 2021 May 19; Revised 2021 August 14; Accepted 2021 September 15.

Abstract

Background: Physician burnout is a serious issue associated with physician attrition, mental and physical problems, and medical errors.

Objectives: This study aimed to investigate the prevalence of overall burnout among interns-residents and general physicians (GPs)-specialists during the coronavirus disease 2019 (COVID-19) pandemic in Iran.

Methods: This cross-sectional study was conducted among 220 interns-residents and 212 GPs-specialists in university-affiliated hospitals and clinics in Shiraz, Iran. A convenience sampling method was used to recruit the samples, and the data were gathered using Maslach Burnout Inventory that was previously validated for the Persian language. We used covariance analysis and multiple logistic regression to analyze the data.

Results: The mean age of participants was 31.44 (ranged 21-62) years. Multiple logistic regression for GPs-specialists showed that working in COVID-19 wards during June-July (OR=13.93, P=0.01, CI: 3.61-53.51) was associated with increased odds of overall burnout. Moreover, older age among GPs-specialists was associated with decreased odds of overall burnout (OR=0.94, P=0.01, CI: 0.90-0.98). On the other hand, the odds of overall burnout among interns-residents was not significantly different between various periods (P=0.94). Furthermore, age (OR=0.24, P=0.01, CI: 0.04-0.47) and being married (OR=0.31, P=0.02, CI: 0.12-0.81) were positively associated with decreased odds of overall burnout among interns-residents.

Conclusions: This study revealed that the risk of professional burnout among specialists and GPs increased over time during the COVID-19 pandemic. Moreover, older physicians had a lower risk of burnout. Despite the disagreements regarding the association between burnout and the duration of exposure to patients during epidemics, the findings of this study have the potential to remind policymakers of the importance of the issue among physicians during pandemics to taking appropriate action to prevent this phenomenon.

Keywords: Physicians, Professional Burnout, COVID-19, Iran

1. Background

Physician burnout is an important issue associated with physician attrition, mental and physical health, and self-reported medical errors (1). The "burnout" phenomenon caused by work-related stress is a challenge for academic psychiatry both conceptually and professionally. More than 140 definitions have been suggested from the first description of burnout in 1974 (2). Therefore, a consensual definition of occupational burnout is currently lacking (3). However, according to a recent systematic review, several studies focusing on burnout have used Maslach

Burnout Inventory (MBI) to assess burnout (4). Considering MBI, burnout results from chronic exposure to stress: comprising emotional exhaustion (EE), depersonalization (DP), and a reduced sense of personal achievement (PA) (5). Burnout has been gaining much attention, mainly due to its adverse impacts such as physicians' poor health and decreased functional outcomes, lower quality of care, the shrinking physician workforce, and compromised patient safety (6). Burnout for each individual is a result of the interplay between his/her characteristics and environmental factors. However, Stigma and fear of professional conse-

quences appear to be a leading barrier for physicians to express their burnout and access services (7). Furthermore, this phenomenon has high costs for healthcare systems (8). Thus, any additional evidence on this issue from all over the world is of great importance.

The coronavirus disease 2019 (COVID-19) pandemic has brought several challenges to an underprepared healthcare system. Healthcare providers face unpredicted acute workplace stress as well as a higher rate of physician burnout (9). The rates of physician burnout, depression, and suicide increased over the past 50 years. However, during the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and COVID-19 pandemics, these numbers are predicted to show a steep increase due to the increased work demands, social isolation, decreased self-care, and increased exposure to emotionally traumatic events at work and home (10). Although the issue of burnout among physicians is not new, the COVID-19 pandemic is expanding the negative consequences of inadequate support by the authorities for solving this problem (11). The pandemic has already posed strain on the entire healthcare system (12). Consequently, it is vital to provide precise data on the prevalence of burnout during different periods since the beginning of the pandemic.

Physician burnout during the COVID-19 pandemic in Iran has not been determined in previous studies, and researches have tended to focus on nursing burnout (13, 14).

2. Objectives

The present study aimed to compare the prevalence of overall burnout and its related sub-dimensions (using MBI) among interns-residents and general physician (GPs)-specialists in three different periods since the beginning of the COVID-19 pandemic. In addition, our study takes a new look at the association between different variables, including working in COVID-19 wards, with the overall burnout of both mentioned groups.

3. Methods

This cross-sectional study was conducted among 220 interns-residents and 212 (GPs)-specialists working at hospitals affiliated with Shiraz University of Medical Sciences, southern Iran. In this study, we tried to investigate the prevalence of burnout among physicians at various time intervals after the onset of the COVID-19 pandemic. Therefore, the study was performed in three periods of time, including March-April 2020, June-July 2020, and December 2020-January 2021. These physicians had a regular working schedule during the COVID-19 outbreak.

Due to the lack of the cooperation of physicians, we were not able to apply a sampling framework in this study, so we used a convenience sampling method to recruit participants. We reached the sample size in each group based on the participation of physicians. To collect data, a trained questioner referred to university-affiliated teaching hospitals and their related outpatient clinics in Shiraz. Questionnaires were completed by participants who met inclusion criteria. Experience of at least six months presence at clinical wards was considered inclusion criteria for interns. Willingness to participate in the study was considered an inclusion criterion for all participants.

In this study, we gathered data using a researcher-made checklist and a valid questionnaire. The checklist comprises demographic features and job characteristics, including working experience and taking care of COVID-19 patients. We also applied the Persian version of the Maslach Burnout Inventory (MBI), which included nine items on emotional exhaustion (EE), eight items on depersonalization (DP), and five items on personal accomplishment (PA) (15). The scoring of these items ranges from zero (never) to six (every day). The MBI has frequency and intensity ratings. To avoid redundancy, the intensity rating was used in this study. The Persian version of the MBI was previously validated in the study of Sepehri Shamloo et al. with the Alpha Cronbach value of 0.76 (16).

In this study, a physician with a high score for either the depersonalization and/or emotional exhaustion dimensions was considered to have at least one manifestation of job burnout. The level of EE was classified high if the score was greater than 26, intermediate if it was from 17 to 26, and low if the score was less than 17. In the DP dimension, the overall score of more than 12 was considered high depersonalization, and the scores from 7 to 12 and less than seven were deemed to be intermediate and low levels, respectively. PA dimension scores include higher than 39 (top-level), from 32 to 38 (moderate-level), and those below 32 (low-level). According to Li et al., an EE score equal to or more than 27 or a DP score equal to or more than 13 was considered overall burnout (17).

3.1. Ethics Approval and Consent to Participate

The research protocol of this study was evaluated and approved by the Ethics Committee of Shiraz University of Medical Sciences (code: IR.SUMS.REC.1398.877). All the participants were asked to fulfill their written consent forms before completing the questionnaires. All participants completed the questionnaires willingly and were ensured of the confidentiality of the collected data.

3.2. Statistical Analysis

We analyzed data using IBM SPSS 18. Quantitative and qualitative variables were described by mean \pm standard deviation (SD) and frequency (percent). The chi-square test was used to compare qualitative variables between the groups. The total score of burnout and related sub-dimensions were compared between the periods using analysis of covariance adjusted for age and sex. To determine factors related to the overall burnout, we employed a multiple logistic regression. Because of the limited number of the variables included in the study, all of them were entered into the regression model. A P value of less than 0.05 was considered statistically significant.

4. Results

The participants' characteristics are shown in [Table 1](#). The Mean age of the participants was 25.33 ± 1.89 (ranged 21 to 31) years for interns-residents and 37.55 ± 9.01 (ranged 26-62) years for GPs-specialists. Most GPs-specialists were married and female. Working experience in COVID-19 centers was significantly lower in December-January than March-April.

The comparison of the total score of burnout and related sub-dimensions is presented in [Table 2](#). For Interns and Residents, the mean score of burnout, depersonalization, and reduced achievement was significantly higher in December-January than March-April. In June-July, GPs and specialists reported the highest level of burnout, EE, and DP. Moreover, EE for interns and residents and reduced achievement for GPs and specialists were not significantly different between the periods.

One-hundred and fifty-seven (71.4%) interns-residents and 141 (66.5%) GPs-specialists had overall burnout. The prevalence of overall burnout was not statistically different between the two groups ($P = 0.27$).

In the rows, same lower letters indicate significant differences between the periods of time.

In the univariate analysis, for interns-residents, all determining factors except age ($OR = 1.18$, $P = 0.04$, 95% CI: 1.01 - 1.38) were not significantly associated with overall burnout ($P > 0.05$). Working in COVID-19 wards during the studied periods was not significantly related to overall burnout ($OR = 1.04$, $P = 0.94$, 95% CI: 0.33 - 3.24). Multiple logistic regression revealed that age ($OR = 0.24$, $P = 0.01$, CI: 0.04 - 0.47) and being married ($OR = 0.31$, $P = 0.02$, CI: 0.12 - 0.81) were positively associated with decreased odds of overall burnout among interns-residents. Detailed results are shown in [Table 3](#).

According to the univariate analysis, the higher level of burnout among the GPs-specialists was reported in June-July ($OR = 4.44$, $P = 0.02$, 95% CI: 1.23 - 16.03) and males (OR

$= 2.03$, $P = 0.01$, 95% CI: 1.12 - 3.66). Also, higher level of overall burnout is reported in December-January ($OR = 0.29$, $P = 0.01$, 95% CI: 0.15 - 0.57) and older age GPs-specialists ($OR = 0.95$, $P = 0.01$, 95% CI: 0.93 - 0.99). Multiple logistic regression depicted that working in COVID-19 wards during June-July ($OR = 13.93$, $P = 0.01$, 95% CI: 3.62 - 53.51) was associated with increased odds of overall burnout. However, older age was associated with decreased odds of overall burnout ($OR = 0.94$, $P = 0.01$, 95% CI: 0.90 - 0.98). Detailed results of overall burnout and its determinant factors are presented in [Table 4](#).

5. Discussion

In this study, we have provided further information on overall professional burnout and its related sub-dimensions among Iranian interns-residents and GPs-specialists during three separated periods during the COVID-19 pandemic. In addition, we have searched for a significant association between sex, age, and working in COVID-19 wards with the overall burnout in both groups.

While there was no significant difference between the prevalence of overall burnout among interns-residents and GPs-specialists, the highest mean score of burnout and its sub-dimensions including depersonalization, and reduced achievement for interns-residents, was attributed to December-January. This score for GPs-specialists was at the highest level during June-July, with an exception in the sub-dimension of reduced achievements. The higher values of overall burnout score in December and January correlate reasonably well with the study conducted by Amanullah and Ramesh Shankar (18) and support the concept of increasing burnout resulting from the workload due to COVID-19. These results substantiate previous findings in the literature, which has shown a statistically significant decrease in the physicians' wellness during the pandemic of COVID-19 as a result of feeling less happiness at work, having more stress on days not being at work, having more trouble falling asleep, having a sense of dread when thinking of work needing to be done, and being more concern about ones' health and the health of the beloved ones (19).

Moving through the rest of our results, the most striking point was the correlation between working in COVID-19 wards and burnout in June-July for GPs-specialists versus lack of any similar correlation for interns-residents, according to both univariate and multivariate analysis. In line with the results of this study, a study carried out by Sunjaya et al. points to the higher risk of experiencing depressive symptoms and burnout for the healthcare personnel who are responsible for treating COVID-19 patients over time (20). On the contrary, a recent study has shown that although the effect of COVID-19 on the work environment

Table 1. Participants' Characteristics Measured in Different Periods

Characteristics	Interns-Residents			GPs-Specialists			
	Mar-Apr (n = 158)	Dec-Jan (n = 62)	P Value	Mar-Apr (n = 76)	Jun-Jul (n = 43)	Dec-Jan (n = 93)	P Value
Age, y	25.11 ± 1.83	25.88 ± 1.95	0.01	30.90 ± 4.43	41.62 ± 9.99	41.09 ± 8.24	0.01
Work experience, y	2.62 ± 1.01	2.25 ± 1.36	0.03	5.27 ± 2.62	11.51 ± 8.58	10.81 ± 8.35	0.01
Gender							
Male	86 (54.43)	25 (40.32)	0.06	35 (46.05)	20 (46.51)	44 (47.31)	0.98
Female	72 (45.56)	37 (59.67)		41 (53.94)	23 (53.48)	49 (52.68)	
Marital status							
Single	140 (88.60)	51 (82.25)	0.21	45 (59.21)	18 (41.86)	16 (17.20)	0.01
Married	18 (11.39)	11 (17.74)		31 (40.78)	25 (58.13)	77 (82.79)	
Working in COVID-19 ward							
No	14 (8.86)	40 (64.51)	0.01	12 (15.78)	0 (0.00)	40 (43.01)	0.01
Yes	144 (91.13)	22 (35.48)		64 (84.21)	43 (100)	53 (56.98)	
Experience of resuscitation maneuver for COVID-19 patients							
0	30 (18.98)	39 (62.90)	0.01	13 (17.10)	27 (62.79)	42 (45.16)	0.01
1 - 4	101 (63.92)	11 (17.74)		43 (56.57)	12 (27.90)	30 (32.25)	
≥ 5	27 (17.08)	12 (19.35)		20 (26.31)	4 (9.30)	21 (22.58)	
Experience of dealing with patients died from COVID-19							
0	19 (12.02)	18 (29.03)	0.01	11 (14.47)	23 (53.48)	25 (26.88)	0.01
1 - 4	81 (51.26)	22 (35.48)		23 (30.26)	15 (34.88)	26 (27.95)	
5 - 9	38 (24.05)	9 (14.51)		21 (27.63)	2 (4.65)	12 (12.90)	
≥ 10	20 (12.65)	13 (20.96)		21 (27.63)	3 (6.97)	30 (32.25)	

Table 2. Comparison of Total Score of Burnout and Related Sub-dimensions

Burnout Dimensions	Interns-Residents			GPs-Specialists			
	Mar-Apr	Dec-Jan	P Value ^a	Mar-Apr	Jun-Jul	Dec-Jan	P Value ^a
Burnout	55.24 ± 9.97	60.66 ± 12.24	0.01	53.65 ± 13.28a	55.83 ± 9.27b	47.02 ± 20.04ab	0.01
Emotional exhaustion	27.99 ± 7.32	28.40 ± 7.19	0.94	29.31 ± 7.64a	32.83 ± 6.93a	23.45 ± 12.09a	0.01
Depersonalization	8.86 ± 4.60	10.98 ± 4.86	0.01	7.40 ± 4.66	8.65 ± 4.38a	6.12 ± 5.49a	0.02
Reduced achievement	18.38 ± 6.00	21.27 ± 5.22	0.01	16.93 ± 6.45	14.34 ± 4.35	17.44 ± 7.77	0.05

^a Comparisons between the periods of time are adjusted for age and sex.

and personal perceptions, as well as fears about its impacts on lifestyle, have affected physicians' well-being, burnout levels among emergency physicians remained stable during the initial weeks of the pandemic (21).

It seems that some factors such as workloads, personal and demographic characteristics, and organizational factors could be considered contributors to burnout among physicians (22) during the COVID-19 pandemic.

In the case of interns-residents as trainee physicians, although there was no special correlation between burnout

and working in COVID-19 wards, there are many workplace-related factors leading to burnout which exist in all wards of the hospital, including COVID-19 wards (23, 24). Therefore it could be hypothesized that the lower responsibility of interns-residents to COVID-19 patients than GPs-specialists may justify the differences between these two groups.

On the other side, our study showed that age correlated with burnout for both groups of GPs-specialists and interns-residents so that being older was positively associ-

Table 3. Determinant Factors of Overall Burnout Among Interns and Residents

Determinant Factors	Overall Burnout		Multiple Logistic Regression		
	No	Yes	OR	95% CI	P Value
Periods * working in COVID-19 ward					
Dec-Jan * work (Yes)	5 (22.7)	17 (77.3)	1.04	0.33-3.24	0.94
Dec-Jan * work (No)	10 (25)	30 (75)	-	-	-
Mar-Apr * work (Yes)	43 (29.9)	101 (70.1)	-	-	-
Mar-Apr * work (No)	5 (35.7)	9 (64.3)	-	-	-
Periods working in COVID-19 ward					
Dec-Jan	15 (24.2)	47 (75.8)	· ^a	· ^a	· ^a
Mar-Apr	48 (30.4)	110 (69.6)	· ^a	· ^a	· ^a
No	15 (27.8)	39 (72.2)	· ^a	· ^a	· ^a
Yes	48 (28.9)	118 (71.1)	· ^a	· ^a	· ^a
Age, y	25.50 ± 1.84	24.92 ± 1.97	0.24	0.04-0.47	0.01
Gender					
Male	33 (29.7)	78 (70.3)	-	-	-
Female	30 (27.5)	79 (72.5)	1.19	0.64-2.32	0.56
Marital status					
Single	52 (27.2)	139 (72.8)	-	-	-
Married	18 (62.1)	11 (37.9)	0.31	0.12-0.81	0.02
Experience of resuscitation maneuver for COVID-19 patients					
No	22 (31.9)	47 (68.1)	-	-	-
1 - 4	34 (30.4)	78 (69.6)	0.83	0.37-1.83	0.64
≥ 5	7 (17.9)	32 (82.1)	2.21	0.67-7.22	0.18
Experience of dealing with patients died from COVID-19					
0	15 (40.5)	22 (59.5)	-	-	-
1 - 4	30 (29.1)	73 (70.9)	1.67	0.66-4.23	0.27
5 - 9	11 (23.4)	36 (76.6)	2.03	0.66-6.24	0.21
≥ 10	7 (21.2)	26 (78.8)	1.99	0.57-6.94	0.27

^a To prevent redundancy, main effects of periods of time and working in COVID-19 ward were not included in the multiple logistic model.

ated with the reduced risk of burnout. In this regard, it is reported that physicians with more professional experience demonstrated lower rates of burnout, while early-career physicians demonstrated higher rates of burnout (25). It is suggested that the peer support networks among physicians with more professional experience may lead to reduced burnout during the pandemics (26).

Based on the results of this study and related reports, it could be concluded that exposure to COVID-19 does not necessarily correlate with increased burnout among physicians. Therefore the issue is still could be considered an area for further investigation. Focusing on organizational resilience and institutional support (27), improving the working environment, rewarding physicians fairly and eq-

uitably (28), and fostering coping skills (29-31) could be suggested as the most essential strategies to reduce physicians' burnout during pandemics.

5.1. Limitations of the study

One of the main limitations of the study was the lack of a sampling framework due to the limited cooperation of physicians to participate in the study. Moreover, the willingness of some individuals to participate in the study based on their degree of burnout and well-being may have an effect on the results of the study. Another limitation of this study was the reluctance of participants to complete the questionnaires due to the high volume of activities. We tried to address this problem by describing the im-

Table 4. Determinant Factors of Overall Burnout Among General Physician and Specialist

Determinant Factors	Overall Burnout		Multiple Logistic Regression		
	No	Yes	OR	95% CI	P Value
Periods * working in COVID-19 ward					
Dec-Jan * work (Yes)	27 (50.9)	26 (49.1)	0.73	0.33-1.57	0.42
Dec-Jan * work (No)	22 (55)	18 (45)	-	-	-
Jun-Jul * work (Yes)	3 (7)	40 (93)	13.93	3.62-53.51	0.01
Jun-Jul * work (No)	0 (0)	0 (0)	-	-	-
Mar-Apr * work (Yes)	18 (28.1)	46 (71.9)	-	-	-
Mar-Apr * work (No)	1 (8.3)	11 (91.7)	-	-	-
Periods					
Dec-Jan	49 (52.7)	44 (47.3)	._ ^a	._ ^a	._ ^a
Jun-Jul	3 (7)	40 (93)	._ ^a	._ ^a	._ ^a
Mar-Apr	19 (25)	57 (75)	._ ^a	._ ^a	._ ^a
Working in COVID-19 ward					
No	23 (44.2)	29 (55.8)	._ ^a	._ ^a	._ ^a
Yes	48 (30)	112 (70)	._ ^a	._ ^a	._ ^a
Age, y	39.83 ± 8.77	36.40 ± 8.95	0.94	0.90-0.98	0.01
Gender					
Male	25 (25.3)	74 (74.7)	1.89	0.98-3.64	0.06
Female	46 (40.7)	67 (59.3)	-	-	-
Marital status					
Single	20 (25.3)	59 (74.7)	-	-	-
Married	51 (38.3)	82 (61.7)	0.99	0.45-2.15	0.97
Experience of resuscitation maneuver for COVID-19 patients					
No	29 (35.4)	53 (64.6)	-	-	-
1-4	29 (34.1)	56 (65.9)	0.9	0.39-2.05	0.8
≥ 5	13 (28.9)	32 (71.1)	1.87	0.65-5.35	0.23
Experience of dealing with patients died from COVID-19					
0	20 (33.9)	39 (66.1)	-	-	-
1-4	19 (29.7)	45 (70.3)	1.35	0.52-3.50	0.53
5-9	9 (25.7)	26 (74.3)	1.63	0.51-5.20	0.4
≥ 10	23 (42.6)	31 (57.4)	0.83	0.28-2.41	0.73

^aTo prevent redundancy, main effects of periods of time and working in COVID-19 ward were not included in the multiple logistic model.

portance of research to the participants. Moreover, given that our findings are based on a limited number of participants, the result from such analysis should be considered with the utmost caution.

5.2. Conclusions

This study revealed that the risk of burnout among GPs and specialists increased over time during the COVID-19 pandemic. Moreover, physicians who were older had a

lower risk of burnout. Despite the contradictions regarding the relationship between professional burnout and the duration of exposure to patients during epidemics, the results of this study have the potential to remind policymakers of the importance of burnout issue among physicians during pandemics to taking appropriate action in order to prevent this phenomenon. Finally, it should be noted that the issue is still an area for more researches.

Acknowledgments

The present study was supported by a grant from the Vice-chancellor for Research, Shiraz University of Medical Sciences, Shiraz, Iran.

Footnotes

Authors' Contribution: YS and ST contributed to designing the study, analyzing the data, and interpreting the results, and drafting the manuscript. MSM, AE, and LZ contributed to analyzing the data and interpreting the results. SSh, KKh, GhRS, and PK contributed to interpreting the results and drafting the manuscript. KBL contributed to interpreting the results and designing the study. The final version was approved by all authors before submission.

Conflict of Interests: The authors declare that they have no competing interests.

Ethical Approval: Research protocol of this study was evaluated and approved by the Ethics Committee of Shiraz University of Medical Sciences (code: IR.SUMS.REC.1398.877).

Funding/Support: The research grant was provided by Research Deputy of Shiraz University of Medical Sciences (No. 16175). Funding body of the study did not play any role in the design of the study, collection, analysis, and interpretation of data as well as writing the manuscript.

Informed Consent: All participants were asked to fulfill their written consent forms before completing the questionnaires. All participants completed the questionnaires willingly and were ensured of the confidentiality of the collected data.

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