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Assessment of Physician Burnout and its Association with Musculoskeletal Disorder

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ABSTRACT

Objective: To assess burnout among doctors and to determine its association with a musculoskeletal disorder.
Study Design: Cross sectional study.
Place and Duration of Study: Government and Private Hospitals of Islamabad and Rawalpindi Pakistan, from Jun to Aug 2020.
Methodology: Two hundred and forty doctors were included through two-stage cluster sampling from different departments of the selected hospitals. Maslach Burnout Inventory (MBI) was used to assess burnout. Second, Nordic Musculoskeletal Questionnaire (NMQ) was used to assess the musculoskeletal disorder.
Results: There were one hundred thirty-five males and one hundred and five females participants with an average age of 31.64±6.21 years. There was an association between burnout, and Musculoskeletal Disorder (MSD) assessed through "Depersonalization" and "Personal Achievement" components with *p*-values of 0.005 and 0.017. In contrast, burnout assessed through the Emotional Exhaustion (EE) component was not associated with Musculoskeletal Disorder (MSD) and had a *p*-value of 0.817. The logistic regression analysis showed that marital status, age and burnout assessment through depersonalization were significant confounders for musculoskeletal disorders.
Conclusion: Musculoskeletal disorder is related to the presence of burnout assessed through depersonalization. Nearly half of the doctors had at least one component of burnout.

Keywords: Depersonalization (DP), Emotional exhaustion (EE), Maslach burnout inventory (MBI), Musculoskeletal disorder (MSD), Nordic musculoskeletal questionnaire (NMQ), Personal achievement (PA).

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INTRODUCTION

Although viewed as flip sides of the same coin, physician wellbeing and burnout are indeed multicoated and complex constructs.[1] Coined in the 1970s by psychologist Herbert Freudenberger, burnout is a state of mental exhaustion caused by one's professional life that consists of three salient features: emotional exhaustion, depersonalization and a reduced sense of accomplishment or success.[2] Physician burnout is an underrecognized and under-reported problem.[3] Deterioration of the quality of patient care is a significant issue and is of great concern when considering Physician burnout. Recent findings suggest that preventable medical errors are the third leading cause of death in the United States and are strongly attributed to physician burnout.[4]

Burnout is associated with an increased incidence of Musculoskeletal Disorders (MSDs). Emotional exhaustion, depersonalization and personal accomplishment significantly correlate with musculoskeletal disorders.[5] MSDs are the main cause of sickness absence in western European countries (European Agency for Safety and Health at Work, 2007). Another study shows that elevated burnout predicts the onset of musculoskeletal disorder even among healthy employees.[6] In another study, the results showed that the prevalence of musculoskeletal disorders and cardiovascular diseases increased with the severity of all three dimensions of burnout.[7]

Physician burnout is an under-recognized entity in Pakistan. Factors leading to burnout must be addressed as they have important implications for physicians' health and patient care. This study was planned to assess burnout in physicians working in Islamabad/Rawalpindi and determine its association with musculoskeletal pain.

METHODOLOGY

This cross sectional study was conducted at Government and Private Hospitals in Islamabad and Rawalpindi Pakistan. The study was started after approval from the Hospital Ethical Committee (wide letter No. FGPC.1/12/2020/Ethical Committee).

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Inclusion Criteria: Doctors working in different Government and Private Hospitals of Islamabad and Rawalpindi were included in the study.

Exclusion Criteria: Non-consenting doctors were excluded in the study.

The selection of the sample was based on two stages. In the first step 6 hospitals were selected, i.e., Federal Government Polyclinic Hospital (FGPC), Capital hospital (CH), Islamabad Medical and Surgical Hospital, Holy Family Hospital (HFH), Rawal Institute of Health Sciences (RIHS) and Benazir Bhutto Hospital (BBH), from among the hospitals located in Rawalpindi and Islamabad. In the second phase, the sample was selected within each cluster through simple random sampling with an equal sample from the hospitals included in the study. The sample size was calculated using the result mentioned in a study by Honkenen *et al.* in which the incidence of burnout was 52.7%, with a confidence level of 95% and absolute precision of 7%.[7] Therefore, the minimum sample size calculated with the above stats was 196. However, 40 complete responses were taken from each hospital, and 240 doctors were included in our study.

Verbal consent was obtained from all the study respondents prior to enrollment in the study. The purpose, process and benefits of the research were briefly explained to all participants included in the study. The research anonymity and confidentiality of study participants' response was maintained. Baseline characteristics, i.e., sex, age, education, designation, experience and department/specialization, were noted. To assess burnout, Maslach's burnout inventory was used.

The Maslach Burnout Inventory (MBI) is a 22-item instrument considered the "gold standard" for assessing burnout. To determine the risk of burnout, the MBI explores three components: exhaustion, depersonalization and personal achievement. Out of 22 items, seven items are included in Emotional Exhaustion (EE), seven items in Depersonalization (DP) and eight items in Personal Achievement (PA),[9] for this study, the response was analyzed in binary categories: individuals having low burnout on MBI score were considered to have No burnout and those having moderate or high burnout were considered to be suffering from burnout. For screening musculoskeletal pain, a modified Nordic Musculoskeletal Questionnaire (NMQ) was used, which was designed by Ramdan *et al*. in 2019 for Indonesia.[10] Modified NMQ consist of 28 items, and for each item, the response was collected in binary categories: Yes/No.

Statistical Package for Social Sciences (SPSS) version 20.0 was used for the data analysis. Descriptive analysis was performed for qualitative and quantitative variables through frequency, percentage, mean and standard deviation. The chi-square test was used to test the association of burnout from all three components with MSD and other baseline characteristics. Logistic regression was used to identify the confounders of musculoskeletal disorder. In logistic regression, we used backwards stepwise selection criteria, and any confounder from the model was re-moved based on Wald statistics. The *p*-value of ≤0.05 was considered statistically significant.

RESULTS

Overall, 240 doctors were included, 135 (56.25%) were male, and 105 (43.75%) were females. The average age was 31.64±6.21 years, and the average experience was 5.71±5.53 years. Tables-I to III showed the relationship with depersonalization, emotional exhaustion and personal achievement. Of 240, 49.5% of individuals experienced EE, 80.4% experienced DP, and 45% lacked PA.

The association of MSD with various demographic characteristics was shown in Table-IV. Gender, age, marital status and monthly income were not associated with the MSD. Duty hours and amount of sleep per day were significantly associated with MSD (p=0.006 and 0.019, respectively). While hospital setting, speciality, medical qualification and designation did not have a significant *p*-value. The logistic regression analysis was used to find the confounders related to MSD. Initially, 13 confounders were included in the model, i.e., Gender, Job, Duty time, Designation, Age, Marital status, Department, Private practice, Monthly income, Sleep time, Emotional exhaustion (EE), Depersonalization (DP) and Personal achievement (PA). The non-significant confounders were dropped based on the Wald statistic. Backward Wald selection criteria were used to achieve the final model used to predict the MSD present. The final model came into the 11th step, and their coefficients and odds ratios.

Only three confounders significantly affected MSD. The Neglekerke R square was 0.414, which showed that the model explained around 41.4% variation in MSD. With that model, we can correctly predict the MSD at around 76.3%. The Hosmer and Lemeshow test had a *p*-value of 0.612, which was greater than 0.05, showing that the model is a good fit. Similarly, the results of the Omnibus test were also very good. The *p*-value of the Omnibus test was 0.001,

which shows that the explained variation in MSD was greater than the unexplained variation of MSD (Table-V).

Table-I: Association of Emotional Exhaustion (EE) with Patients' Demographic Characteristics (n=240)

Characteristics	Groups	Emotional Exhaustion (EE) Frequency (Percentage)		*p*-value
		No	Yes	
Gender	Female	53 (50.5)	52 (49.5)	0.987
	Male	68 (50.4)	67 (49.6)	
Age in years	≤30	57 (43.2)	75 (56.8)	0.019
	>30	64 (59.3)	44 (40.7)	
Marital status	Married	74 (57.4)	55 (42.6)	0.028
	Single	47 (42.3)	64 (57.7)	
Experience in years	>8	30 (63.8)	17 (36.2)	0.040
	≤8	91 (47.2)	102 (52.8)	
Private practice	No	66 (44.0)	84 (56.0)	0.015
	Yes	55 (61.1)	35 (38.9)	
Department	Medicine & Allied	105 (53.0)	93 (47.0)	0.112
	Surgery & Allied	16 (38.1)	26 (61.9)	
Hospitals	FGPC	20 (50.0)	20 (50.0)	0.456
	CH	19 (47.5)	21 (52.5)	
	IMSH	21 (52.5)	19 (47.5)	
	HFH	24 (60.0)	16 (40.0)	
	RIHS	22 (55.0)	18 (45.0)	
	BBH	15 (37.5)	25 (62.5)	
Designation	House Officer	13 (38.2)	21 (68.2)	0.004
	Trainee	42 (42.9)	56 (57.1)	
	Medical Officer	27 (56.3)	21 (43.8)	
	Registrar	16 (53.3)	14 (46.7)	
	Associate	17 (70.8)	7 (29.2)	
	Consultant	6 (100.0)	0 (0)	
Duty Time in hours	<36	26 (78.8)	7 (21.2)	0.001
	37-54	42 (53.8)	36 (46.2)	
	55-72	19 (48.7)	20 (51.3)	
	>72	34 (37.8)	56 (62.2)	
Monthly Income in thousands	<50	11 (35.5)	20 (64.5)	0.005
	50-100	56 (48.3)	60 (51.7)	
	100-150	23 (53.5)	20 (46.5)	
	150-200	14 (45.2)	17 (54.8)	
	>200	17 (89.5)	2 (10.5)	
Sleep (Hours Per Day)	>8	6 (60.0)	4 (40.0)	0.753
	7-8	39 (51.3)	37 (48.7)	
	5-6	67 (50.8)	65 (49.2)	
	<4	9 (40.9)	13 (59.1)	
Musculoskeletal disorder (MSD)	Absent	30 (52.6)	27 (47.4)	0.817
	Present	91 (49.7)	92 (50.3)	

A single doctors had 1.96 times higher chances of having MSD than married. It also showed that those above 30 years were 2.39 times more likely to have MSD than those under 30 years. The Depersonalization (DP) variable also has a positive coefficient which shows that the increasing score of DP showed higher chances of MSD. The odds ratio of 2.167 showed that the ratio of subjects with MSD having DP was almost 2.17 times higher than the person who did not have DP (Table-V).

DISCUSSION

Two hundred forty doctors from six different hospitals participated in this study. As assessed by MBI, Burnout was seen in many doctors, especially the DP component, whereas nearly half had EE and lack of PA. These results are in accordance with both international studies and national studies. For example, nation wise survey done in the United States showed that 54.4% of US physicians reported at least one symptom of burnout.[11] Similarly, a study by Messias *et al*. in the United States witnessed the prevalence of personal burnout in 52.7%, work-related bur-

Table-II: Association of Depersonalization (DP) With Patients' Demographic Characteristics (n=240)

Characteristics	Groups	Depersonalization (DP) Frequency (%)		*p*-value
		No	Yes	
Gender	Female	15 (14.3)	90 (85.7)	0.097
	Male	32 (23.7)	103 (76.3)	
Age in years	≤ 30	13 (9.8)	119 (90.2)	0.001
	>30	34 (31.5)	74 (68.5)	
Marital status	Married	36 (27.9)	93 (72.1)	0.001
	Single	11 (9.9)	100 (90.1)	
Experience in years	> 8	20 (42.6)	27 (57.4)	0.001
	≤ 8	27 (14.0)	166 (86.0)	
Private practice	No	19 (12.7)	131 (87.3)	0.001
	Yes	28 (31.1)	62 (68.9)	
Department	Medicine & Allied	36 (18.2)	162 (81.8)	0.330
	Surgery & Allied	11 (26.2)	31 (73.8)	
Hospital	FGPC	20 (50.0)	20 (50.0)	0.456
	CH	19 (47.5)	21 (52.5)	
	IMSH	21 (52.5)	19 (47.5)	
	HFH	24 (60.0)	16 (40.0)	
	RIHS	22 (55.0)	18 (45.0)	
	BBH	15 (37.5)	25 (62.5)	
Designation	HO	13 (38.2)	21 (68.2)	0.004
	Trainee	42 (42.9)	56 (57.1)	
	MO	27 (56.3)	21 (43.8)	
	Registrar	16 (53.3)	14 (46.7)	
	Associate	17 (70.8)	7 (29.2)	
	Consultant	6 (100)	0(0)	
Duty time in hours	<36	26 (78.8)	7 (21.2)	0.001
	37-54	42 (53.8)	36 (46.2)	
	55-72	19 (48.7)	20 (51.3)	
	>72	34 (37.8)	56 (62.2)	
Monthly Income in thousands	<50	11 (35.5)	20 (64.5)	0.005
	50-100	56 (48.3)	60 (51.7)	
	100-150	23 (53.5)	20 (46.5)	
	150-200	14 (45.2)	17 (54.8)	
	>200	17 (89.5)	2 (10.5)	
Sleep (hours per day)	>8	6 (60.0)	4 (40.0)	0.753
	7-8	39 (51.3)	37 (48.7)	
	5-6	67 (50.8)	65 (49.2)	
	<4	9 (40.9)	13 (59.1)	
Musculoskeletal Disorder (MSD)	Absent	30 (52.6)	27 (47.4)	0.817
	Present	91 (49.7)	92 (50.3)	

nout in 47.5% and patient/client-related burnout in 20.3% of the total respondents as assessed through CBI.[12]

Regarding national studies, a study was done in which 365 doctors from PIMS, Islamabad, responded about their burnout. 64.2% of participants had EE, 57% reported a lack of PA, and 60.8 % had DP.[13] Though our study found a lower EE and DP (i.e. study 49.6% and 45%, respectively), it had a higher prevalence of DP (i.e. 80.4%). Overall, our study reinforces the previous finding that burnout is present in nearly half of doctors.

Age, marital status and experience had a significant association with burnout. Younger physicians were more likely to have burnout with significant *p*-values for EE and DP. Similar results were obtained from international studies where physicians aged 25 to 35 years had experienced a high level of emotional exhaustion and depersonalization.[14,15] In addition, single physicians and those having less experience were more likely to have burnout than married and more experienced counterparts.

The designation, duty hours, Income and MSD also significantly affected various categories of

Table-III: Comparison of Personal Achievement With Respect of Patients' Demographic Characteristics (n=240)

Characteristics	Groups	Personal Achievement (PA) Frequency (%)		*p*-value
		No	Yes	
Gender	Female	44 (41.9)	61 (58.1)	0.472
	Male	64 (47.4)	71 (52.6)	
Age in years	≤ 30	55 (41.7)	77 (58.3)	0.309
	>30	53 (49.1)	55 (50.9)	
Marital status	Married	64 (49.6)	65 (50.4)	0.156
	Single	44 (39.6)	67 (60.1)	
Experience in years	> 8	26 (55.3)	21 (44.7)	0.155
	≤ 8	82 (42.5)	111 (57.5)	
Private practice	No	58 (38.7)	92 (61.3)	0.016
	Yes	50 (55.6)	40 (44.4)	
Department	Medicine & Allied	93 (47.0)	105 (53.0)	0.246
	Surgery & Allied	15 (35.7)	27 (64.3)	
Hospitals	FGPC	22 (55.0)	18 (45.0)	0.078
	CH	17 (42.5)	23 (57.5)	
	IMSH	15 (37.5)	25 (62.5)	
	HFH	12 (30.0)	28 (70.0)	
	RIHS	18 (45.0)	22 (55.0)	
	BBH	24 (60.0)	16 (40.0)	
Designation	House Officer	13 (38.2)	21 (61.8)	0.016
	Trainee	42 (42.9)	56 (57.1)	
	Medical Officer	20 (41.7)	28 (58.3)	
	Registrar	18 (60.0)	12 (40.0)	
	Associate	9 (37.5)	15 (62.5)	
	Consultant	6 (100.0)	0 (0)	
Duty time in hours	<36	13 (39.4)	20 (60.6)	0.155
	37-54	33 (42.3)	45 (57.7)	
	55-72	24 (61.5)	15 (38.5)	
	>72	38 (42.2)	52 (57.8)	
Monthly Income in thousands	<50	11 (35.5)	20 (64.5)	0.451
	50-100	52 (44.8)	64 (55.2)	
	100-150	19 (44.2)	24 (55.8)	
	150-200	14 (45.2)	17 (54.8)	
	>200	12 (63.2)	7 (36.8)	
Sleep (hours per day)	>8	3 (30.0)	7 (70.0)	0.752
	7-8	35 (46.1)	41 (53.9)	
	5-6	59 (44.7)	73 (55.3)	
	<4	11 (50.0)	11 (50.0)	
Musculoskeletal Disorder (MSD)	Absent	34 (59.6)	23 (40.4)	0.017
	Present	74 (40.4)	109 (59.6)	

burnout. In a study conducted in Mayo hospital Lahore, out of 74 physicians, only 25.7% never felt tired, only 29.7% never felt fatigued, and 41.1% never felt stressed. The majority of the responders were married (80.8%). In that study, gender was not associated, while salary satisfaction level was significantly associated with burnout.[16] In our study, the results were also the same: monthly income was found to be associated with burnout assessed through EE and DP with *p*-values of 0.005 and 0.001, respec-tively.

So, we can conclude from above that physician burnout in Pakistan is as common as in developed countries and have the same demographic and physician characteristics.

Regarding the second part of the study, we found that more than three-fourths of physicians suffered MSD in at least one region lasting more than 24h over the past 12 months. Out of 240, 183 (76.25%) responders claimed they felt musculoskeletal disorders. Our results were lower than the study conducted in China, where even more physicians experienced MSD, i.e. prevalence rate of experiencing an MSD in at least one body region was 91.2%.[17] However, the result was higher than in India, where the prevalence was 58%.[18]

Table-IV: Characteristics of Responders And Relation With Musculoskeletal Disorders (MSD) (n=240)

Parameters	Categories	Musculoskeletal Disorders (MSD)		*p*-value
		Absent Frequency (%)	Present Frequency (%)	
Gender	Female	22 (21.0)	83 (79.0)	0.456
	Male	35 (25.9)	100 (74.1)	
Age groups	Less than or equal to 30 years	37 (28.0)	95 (72.0)	0.116
	More than 30 years	20 (18.5)	88 (81.5)	
Marital status	Single	20 (18.0)	91 (82.0)	0.075
	Married	37 (28.7)	92 (71.3)	
Monthly income (in thousand rupees)	Less than 50	9 (29.0)	22 (71.0)	0.307*
	Between 50 to 100	26 (22.4)	90 (77.6)	
	Between 100 to 150	14 (32.6)	29 (67.4)	
	Between 150 to 200	6 (19.4)	25 (80.6)	
	Greater or equal to 200	2 (10.5)	17 (89.5)	
Hospitals	FGPC	11 (27.5)	29 (72.5)	0.280
	CH	10 (25.0)	30 (75.0)	
	IMSH	13 (32.5)	27 (67.5)	
	HFH	4 (10.0)	36 (90.0)	
	RIHS	10 (25.0)	30 (75.0)	
	BBH	9 (22.5)	31 (77.5)	
Designation	House Officer	9 (26.5)	25 (73.5)	0.123*
	Trainee	20 (20.4)	78 (79.6)	
	Medical Officer	12 (25.0)	36 (75.0)	
	Registrar	12 (40.0)	18 (60.0)	
	Associate Professor	4 (16.7)	20 (83.3)	
	Consultant	0 (0)	6 (100)	
Education	MBBS	13 (19.7)	53 (80.3)	0.151
	MCPS/FCPS/MDS trainee	20 (20.4)	78 (79.6)	
	FCPS/MCPS/MDS or equivalent	24 (31.6)	52 (68.4)	
Department	Medicine and allied	46 (23.2)	152 (76.8)	0.834
	Surgery and allied	11 (26.2)	31 (73.8)	
Private Practice	No	37 (24.7)	113 (75.3)	0.784
	Yes	20 (22.2)	70 (77.8)	
Duty hours per week	Less than 36	2 (6.1)	31 (93.9)	0.006
	Between 37 to 54	27 (34.6)	51 (65.4)	
	Between 55 to 72	6 (15.4)	33 (84.6)	
	More than 72	22 (24.4)	68 (75.6)	
Experience	Less or equal to 8 years	49 (25.4)	144 (74.6)	0.309
	More than 8 years	8 (17.0)	39 (83.0)	
Sleep per day in hours	Less or equal to 4	2 (9.1)	20 (90.9)	0.019*
	Between 5 to 6	37 (28.0)	95 (72.0)	
	Between 7 to 8	18 (23.7)	58 (76.3)	
	More than 8	0 (22.7)	10 (100.0)	

Table-V: Final Logistic Regression Analysis Model (n=240)

Confounders	Coefficient	*p*-value	Odds ratio	95% Confidence Interval	
				From	To
Marital status	0.672	0.043	1.958	1.161	4.354
Age in groups	0.871	0.002	2.389	1.210	2.159
Depersonalization (DP)	0.773	0.004	2.167	1.011	1.091

After detailed analysis, only three factors were found to play a significant role in the occurrence of MSD. These are age, marital status and DP. The most common region affected in our study was the neck, followed by the left upper arm, left hand and back. Strengthening our finding that DP played an important role in the occurrence of MSD is another study carried out by Cho *et al*. which showed that higher levels of psychological distress are meaningfully related to MSD within the upper back, neck, and shoulder regions.[19] An interesting finding in our study is that Single doctors are more likely to have MSD

when compared to married doctors. Age is understandably related to increased incidence of MSD, and various studies show it; for example study in Korea showed that with age under 30 years old as a reference, MSD increased with age until age 65.[20] MSD are important to understand as they affect not only one's life but also his ability to function.[21]

CONCLUSION

We conclude that burnout is a very common issue in doctors working in Private and Government setups, and its component DP has a significant association with MSD. Therefore, it is recommended that solid steps are taken both at the hospital and government levels to improve physicians' working environment so that the incidence of burnout can be reduced and resultant patient care can be improved.

Conflict of Interest: None.

Author's Contribution

SS: Data collection, article writing, references, TK: References, Proof reading, Data collection, MHA: Proof reading, FH: Statistics results.

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