Burnout risks in Bangladeshi Physicians: A multicenter, cross-sectional study

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ABSTRACT

Physician burnout is a global concern that can lead to exhaustion, ineffectiveness, and poor health outcomes. Burnout has been linked to a variety of societal and professional variables worldwide. This cross-sectional, multi-centered study was conducted by face-to-face interviews between April 2019 and December 2021 at sixty-two (62) tertiary level hospitals to identify potential risk factors for burnout among Bangladeshi physicians, which is essential for preventing adverse impact on their well-being, improving overall quality of life, and facilitating measures to manage stress and maintain a healthy work-life balance. A simple random sampling technique in conjunction with a structured questionnaire was used to collect a total of 1434 responses, assuming 20 % of the sample as non-responsive. Univariate, bivariate, and multinomial logistic regression statistical analyses were performed to determine the risk factors and associate the level of severity. The distribution of burnout status differs significantly at distinct covariate levels, such as working place, working hour, prevalence of potential interpersonal conflicts (subsequent increase of adjusted odds ratios i.e.; 6.52, 8.82, 11.41, and 37.07 is observed for physicians having inter-personal conflicts with both co-workers & family members), job dissatisfaction, annoyed feeling while dealing with patients (adjusted odds ratios are 529.68, 518.26,983.87 and 849.57 respectively) and some other significant factors of the physicians. This study also reveals that the female physicians, physicians with age 40–49, physicians with additional liabilities, physicians with job dissatisfaction, less salary compared to the workload, less flexibility and security at the job sector as well as obese physicians are at high risk of burnout. These results are statistically significant with a p value ≤ 0.05. To reduce burnout of Bangladeshi physicians, it is necessary to address the risk factors, create supportive workplaces, maintain a healthy work-life balance, provide opportunities for self-care, and promote mental health.

1. Introduction

Persistent unsuccessful workload management usually leads to burnout for professionals which is characterized by physical, emotional and mental enervation [1]. The Statista reported in a survey conducted in the USA in 2022 that three out of five employees of various industries are suffering from burnout [2]. Another survey managed by Microsoft's 2021 Work Trend Index suggested that Physicians are placed top of the burnout category in comparison with other professionals although they are delineated to achieve professional appeasement through the dedication of their lifetime to humanity [3]. Moreover, a study carried out on the physician of developing countries revealed that 90.7 % of them are suffering from moderate to high levels of burnout which is uncustomary higher [4]. This accentuates the crucial need for organizations and policymakers to prioritize the well-being of physicians and implement measures to address burnout in the medical field.

As earlier researches suggest, physicians are a prospective contender for burnout that initiates normally during their persuasion of the medical degree, the academic life; the internee period or residency and subsequently extended in the working professional life [5, 6]. Diversified professional grounds have been identified for the possible burnout reason of physicians such as excessive workload, disorganized working environment and less support from the workmate [7]. Physicians also have to face some challenges in the workplace outside of the regular duty such as lofty presumptions from patients and belligerent behavior from patient's side that can contribute to their mental and emotional fatigue [8]. Research found that burnout of physicians is corelated to the low level of job contentment [9]. In the Bangladeshi perspective, poor healthcare infrastructure, low job satisfaction along with a very low doctor to patient ratio, 5.25 physicians per 10,000 population, may propel physician to encounter more defiance in the workplace [10]. These hurdles can lead to high levels of stress and burnout among physicians, which ultimately affects the quality of care they are able to provide to their patients.

There are several treacherous consequences of burnout of physicians that can be reflected in patient health, healthcare system cost, physician workforce turnover rate along with physician health [7]. Earlier study disclosed that physicians who are experiencing burnout have achieved low patients' contentment and 9 out of 100 physicians reported that they enacted one vital medical error due to burnout [11]. Furthermore, burnout can lead to psychological issues such as depression, mood disorders and stress along with the increased risk of accidents occurred by them [12]. Burnout has been outlined for insomnia and anxiety among physicians especially who work rotating shifts [13]. Due to burnout, an estimated cost of 7600 dollars per year for each employed physician was deduced in the USA including the contributing factor; turnover rate and reduced working hours [14]. In Bangladesh, on average around 48 s are spent for each patient per visit to the doctor due to patients over flow, so possibility of medical error is compounded by the burnout effect [15]. Consequently, this leads to a high incidence of prescription errors (56.07 %) and fatal consequences (93 fatal cases per year) arising from incorrect treatments [16,17]. Moreover, if patients are unable to receive adequate treatment from their doctors, they may seek for additional care from other hospitals or clinics; this can put additional strain on an already overburdened healthcare system in Bangladesh. Additionally, the low budget allocation in the healthcare sector in Bangladesh leaves little room for spending on implicit and explicit costs related to burnout.

In a developing country like Bangladesh, physicians are particularly vulnerable to burnout, as previous research has highlighted. It
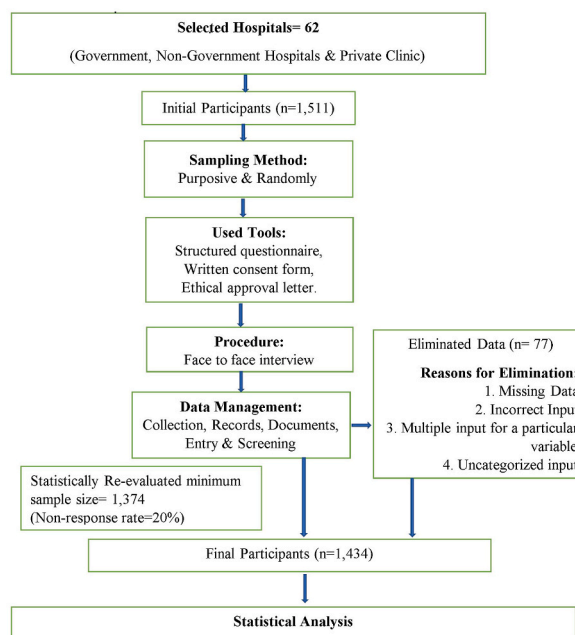

Fig. 1. Work - flow.

is crucial to manage burnout effectively to improve health outcomes and ensure a better future with limited resources. Addressing the factors that contribute to burnout is essential in reducing the current concerns and promoting physician well-being. The objective of this study was to identify the factors that contribute to burnout among physicians in Bangladesh so that effective management strategies can be developed.

2. Methods

2.1. Study design, participants selection, and ethics

A simple random sampling method was used to conduct this cross-sectional, multicentered survey. Sixty-two (62) tertiary level government and non-government hospitals were arbitrarily chosen from Bangladesh's administrative regions. A structured paper-based questionnaire and in-person interview were used in the study, which was conducted from April 2019 to December 2021 and had a target population of 1434 physicians (demonstrated in the Fig. 1) [18]. Only the working physicians were included, whereas the undergrad intern, and retired physicians were excluded from this study. The mandatory fields of questionnaire were specified to assure
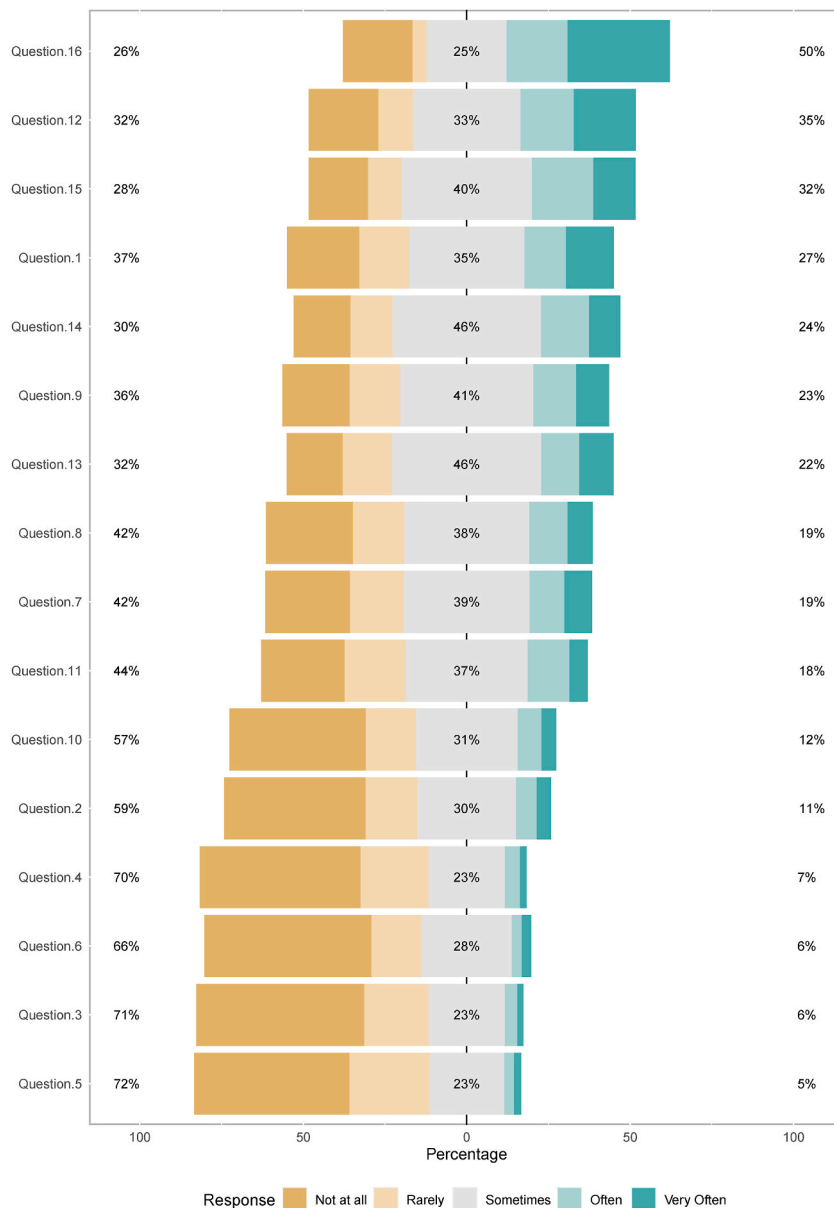

Fig. 2. Distribution of response of Likert scale questions.

Table 1
Demographic profiles of the healthcare professionals and univariate analysis of the study dataset.

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	860	60
	Female	574	40
Age	20–29 years	215	15
	30–39 years	445	31
	40–49 years	531	37
	50–59 years	215	15
	60–69 years	29	2
Body Mass Index (BMI)	Underweight	29	2
	Normal weight	559	39
	Overweight	717	50
	Obese	129	9
Designation	Professor	115	8
	Associate Professor	143	10
	Assistant Professor	186	13
	Medical Officer	473	33
	Consultant	129	9
	Sr. Consultant	29	2
	Jr. Consultant	86	6
	Postgraduate Student	143	10
	Register	72	5
	Honorary Medical Officer	29	2
	Assistant Register	14	1
	Lecturer	43	3
Specialization	Medicine	244	17
	Surgery	115	8
	Oncology	100	7
	Cardiology	86	6
	Nephrology	57	4
	Ophthalmology	72	5
	Hematology	14	1
	Neurology	29	2
	Pediatrics	229	16
	Orthopedics	29	2
	Gynecology	115	8
	Pathology	29	2
	Dentistry	14	1
	Dermatology	43	3
	Hepatology	29	2
	Urology	29	2
	Radiology	43	3
	Neonatology	14	1
	Anesthesiology	57	4
	Gastroenterology	43	3
	Endocrinology	29	2
Working Place	Government Hospital	1147	80
	Non-Govt. Hospital	272	19
	Clinic	14	1
Duration of Job	<1 year	57	4
	1–3 years	215	15
	3–5 years	229	16
	5–10 years	315	22
	>10 years	602	42
Private Practicing Area	Inside City	631	44
	Outside City	115	8
	No practice	531	37
	Both inside and outside of the city	158	11
Working Hours/Day	Up to 6 h/day	402	28
	Up to 8 h/day	387	27
	Up to 10 h/day	359	25
	Up to 12 h/day	258	18
	Up to 14 h/day	14	1
	>14 h/day	14	1
Weekly Vacation	Yes	1162	81
	No	272	19
Marital Status	Single	201	14
	Married	1219	85
	Divorced	14	1

Table 1 (*continued*)

Variable	Category	Frequency (n)	Percentage (%)
	Widowed	0	0
Monthly Income	<184.23 USD (<20 thousand BDT)	57	4
	From 184.23 to 267.18 USD (From 20 to 29 thousand BDT)	186	13
	From 276.43 to 359.36 USD (From 30 to 39 thousand BDT)	129	9
	From 368.57 to 451.50 USD (From 40 to 49 thousand BDT)	287	20
	From 460.71 to 921.41 USD (From 50 to 1 lakh BDT)	502	35
	>921.41 USD (>1 lakh BDT)	272	19
Number of Family members	2 members	72	5
	3 members	315	22
	4 members	574	40
	5 members	301	21
	6 members	100	7
	7 members	29	2
	8 members	0	0
	>8 members	14	1
Family or Social liabilities	Yes	975	68
	No	459	32
Staying with Family	Yes	1319	92
	No	115	8
Go on vacation with Family	Sometimes	903	63
	Rarely	402	28
	Not very often	129	9
Able to maintain family or social interactions	Sometimes	803	56
	Rarely	416	29
	Not very often	215	15
The most disappointing thing about this job.	Workload	502	35
	Long shift	86	6
	Less salary	287	20
	Lack of security	373	26
	Lack of promotion	57	4
	Less salary compared to the workload	43	3
	Less salary along with a lack of security	29	2
	Long shift and low salary	14	1
	Complex Professional burden	43	3
Feelings while dealing with patients	Monotonous	158	11
	Good	961	67
	Distressed	100	7
	Annoying	29	2
	Complex mental state	172	12
	Distressed and annoying	14	1
Prevalence of any interpersonal conflict	Co-workers	373	26
	Family members	129	9
	Both	402	28
	None	531	37
Any Clinical symptoms due to job dissatisfaction	Anxiety	574	40
	Fatigue	301	21
	Insomnia	129	9
	Agitations	72	5
	Depression	215	15
	Anxiety and depression	57	4
	Fatigue and insomnia	72	5
	None	0	0
Dealing with job-related mental disturbances	Switching workplace	72	5
	Taking medication	129	9
	Need to go on vacation	645	45
	Difficulty in time management	373	26
	Need to have rational behavioral therapy	115	8
	Need to have training in social skill	29	2
	Taking medication and need to go on vacation	72	5
	Difficulty in time management and need to have rational behavioral therapy	14	1
	Need to go on vacation and difficulty in time management	0	0
Worried about the encounter of politics at the workplace	Yes	946	66
	No	488	34
Other professions are more flexible in their job sector apart from yours	Yes	1061	74
	No	373	26
Burn Out	No sign of burnout	43	3
	Little sign of burnout, along with some severe factors	315	22

Table 1 (*continued*)

Variable	Category	Frequency (n)	Percentage (%)
	At the initial risk of burnout	717	50
	At severe risk of burnout	301	21
	At the very severe risk of burnout	72	5

Here, total sample size (N) = 1434; Here, USD = United States Dollar; BDT = Bangladesh Taka.

survey completion. The Institutional Review Board of National Institute of Cancer Research and Hospital (NICRH), Dhaka, Bangladesh, approved the study protocol; the reference number is NICRH/Ethics/2019/430. The doctors were given oral and written consent before they voluntarily participated. Undergraduate pharmacy students from East West University took part in the interview processes under the supervision of the physicians and coauthors of this research. Declarations of data confidentiality and anonymity were also explained. It should be noted that the majority of the data was collected prior to the COVID-19 outbreak. However, the method used to collect data differs significantly throughout the pandemic. Physicians conducted interviews at several hospitals in Dhaka while taking all required safety measures.

2.2. Sample size evaluation

A total of 1511 registered doctors, general physicians, post graduate students, academicians, and private practitioners from different specialty were taken part in this study. The minimum sample size was calculated using the formula: $n = \frac{Z^2 P(1-P)}{d^2}$; where, n = sample size, z = standard score corresponding to a given confidence level, P = prevalence of disease (can be obtained from a study conducted by the other researchers), and d = degree of precision (corresponding to effect size). However, the prevalence varies from country to country and prevalence was found up to 78 % in physicians [19].

We assume, p = 0.78, q = 1-p = 0.22, Z = 1.96 (at 95 % confidence interval), and d = 0.03 (at 3 % margin of error). Using the above-mentioned information, the estimated sample size is 733 [(3.8416 × 0.78 x 0.22)/0.0009 = 733]. This basic sample size was adjusted for design effect of 1.5 and the required sample size is, therefore, n = 733 × 1.5 = 1099. However, assuming a non-response rate of 20 %, the final sample size is 1099/0.80 = 1374. Where, we collected the data from 1511 participants and finally extracted a total of valid data of 1434.

3. Measures

3.1. Sociodemographic, organizational, and occupational variables

The self-administered questionnaire's first component was used to collect potential sociodemographic, organizational, and occupational data. With the use of pertinent questions, it was attempted to uncover potential risk factors associated to the workplace, considering both self-reported mental disturbances and measures taken by the physicians.

3.2. Body mass index (BMI)

According to WHO-BMI cutoff, the self-reported height and weight of the respondents were used to assess their BMI. Adults with BMI under 18.5 kg/m^2 were deemed underweight; those with a BMI between 18.5 and 24.9 kg/m^2 were considered normal weight; those with a BMI between 25 and 29.9 kg/m^2 were considered overweight and those with a BMI over 30 kg/m^2 were labeled obese [20].

3.3. Burnout assessment

Initially, the Bangladeshi Healthcare workers' self-assessment statements for fifteen (15) items were created using the Maslach Burnout Inventory-Human Service Survey (MBI-HSS) handbook and other published studies on burnout [21]. This test was performed by the respondents to assess the different components related to burnout and, at the conclusion of the in-person interview, they calculated their overall score with an interpretation to ascertain their level of burnout. The dangers of burnout are classified as very severe, severe, initial risk, little sign, and no sign, respectively. The participants chose their answers to these statements using a five-point scale that ranged from: not at all, rarely, sometimes, often, very often [22].

3.4. Data analysis

Data were organized and analyzed by using Microsoft Excel 365 and statistical tool R. Univariate, bivariate, multinomial logistic regression analyses were performed as mixed effects analyses using risk factors of burnout as outcome variables. Univariate analysis was done to determine the frequency and percentage of the significant factors and followed this with a bivariate and multinomial analysis featuring the statistically significant variables. To examine whether the different levels of burnout profiles have an association with the different types of covariates, the universal nonparametric chi-square tests were conducted, and the result is presented in the

Table 2
Bivariate analysis of the several burnout profiles at different covariate levels.

Variable	Category	Burn out					P-value
		No sign of burnout n (%)	Little sign of burnout, along with some severe factors n (%)	At the initial risk of burnout n (%)	At severe risk of burnout n (%)	At the very severe risk of burnout n (%)	
Gender	Male	24 (2.77)	212 (24.48)	418 (48.27)	175 (20.21)	37 (4.27)	0.06
	Female	12 (2.11)	104 (18.31)	296 (52.11)	125 (22.01)	31 (5.46)	
Age	From 20 to 29 years	5 (2.36)	30 (14.15)	114 (53.77)	53 (25)	10 (4.72)	0.07
	From 30 to 39 years	12 (2.67)	89 (19.78)	223 (49.56)	103 (22.89)	23 (5.1)	
	From 40 to 49 years	12 (2.27)	142 (26.84)	255 (48.2)	97 (18.34)	23 (4.35)	
	From 50 to 59 years	6 (2.75)	45 (20.64)	111 (50.92)	44 (20.19)	12 (5.5)	
	From 60 to 69 years	1 (4)	10 (40)	11 (44)	3 (12)	0 (0)	
BMI	Underweight	0 (0)	7 (25)	17 (60.71)	3 (10.72)	1 (3.57)	0.73
	Normal weight	19 (3.39)	124 (22.14)	266 (47.5)	124 (22.15)	27 (4.82)	
	Overweight	16 (2.23)	160 (22.35)	362 (50.56)	145 (20.25)	33 (4.61)	
	Obese	1 (0.77)	25 (19.23)	69 (53.08)	28 (21.54)	7 (5.38)	
Designation	Professor	3 (2.61)	26 (22.61)	59 (51.3)	19 (16.52)	8 (6.96)	0.00*
	Associate Professor	5 (3.55)	33 (23.4)	69 (48.94)	29 (20.56)	5 (3.55)	
	Assistant Professor	2 (1.05)	49 (25.65)	94 (49.21)	37 (19.38)	9 (4.71)	
	Medical Officer	14 (2.99)	90 (19.23)	243 (51.92)	99 (21.16)	22 (4.7)	
	Consultant	0 (0)	39 (30.71)	55 (43.31)	28 (22.04)	5 (3.94)	
	Sr. Consultant	2 (9.09)	3 (13.64)	11 (50)	1 (4.54)	5 (22.73)	
	Jr. Consultant	6 (7.23)	23 (27.71)	38 (45.78)	11 (13.26)	5 (6.02)	
	Postgraduate Student	2 (1.41)	21 (14.79)	71 (50)	41 (28.87)	7 (4.93)	
	Register	2 (3.03)	18 (27.27)	32 (48.48)	14 (21.22)	0 (0)	
	Honorary Medical Officer	0 (0)	5 (15.15)	21 (63.64)	6 (18.18)	1 (3.03)	
	Assistant Register	0 (0)	3 (30)	5 (50)	2 (20)	0 (0)	
	Lecturer	0 (0)	6 (16.67)	16 (44.44)	13 (36.11)	1 (2.78)	
Specialization	Medicine	1 (0.42)	54 (22.78)	123 (51.9)	55 (23.21)	4 (1.69)	0.00*
	Surgery	6 (5.56)	26 (24.07)	52 (48.15)	16 (14.81)	8 (7.41)	
	Oncology	1 (0.98)	19 (18.63)	47 (46.08)	29 (28.43)	6 (5.88)	
	Cardiology	1 (1.11)	20 (22.22)	50 (55.56)	15 (16.67)	4 (4.44)	
	Nephrology	1 (1.82)	13 (23.64)	28 (50.91)	9 (16.36)	4 (7.27)	
	Ophthalmology	4 (5.56)	24 (33.33)	32 (44.44)	11 (15.28)	1 (1.39)	
	Hematology	0 (0)	3 (15.79)	10 (52.63)	3 (15.79)	3 (15.79)	
	Neurology	0 (0)	7 (21.88)	17 (53.13)	7 (21.86)	1 (3.13)	
	Pediatrics	5 (2.22)	53 (23.56)	111 (49.33)	46 (20.45)	10 (4.44)	
	Orthopedics	0 (0)	5 (16.13)	16 (51.61)	8 (25.81)	2 (6.45)	
	Gynecology	5 (4.13)	15 (12.4)	68 (56.2)	27 (22.31)	6 (4.96)	
	Pathology	1 (3.57)	5 (17.86)	16 (57.14)	6 (21.43)	0 (0)	
	Dentistry	1 (6.67)	5 (33.33)	7 (46.67)	2 (13.33)	0 (0)	
	Dermatology	1 (2.56)	10 (25.64)	22 (56.41)	6 (15.39)	0 (0)	
	Hepatology	3 (8.82)	9 (26.47)	15 (44.12)	6 (17.65)	1 (2.94)	
	Urology	0 (0)	2 (5.71)	20 (57.14)	7 (20.01)	6 (17.14)	
	Radiology	0 (0)	9 (21.95)	19 (46.34)	9 (21.95)	4 (9.76)	
	Neonatology	0 (0)	1 (9.09)	9 (81.82)	1 (9.09)	0 (0)	
	Anesthesiology	2 (3.33)	12 (20)	27 (45)	14 (23.34)	5 (8.33)	
	Gastroenterology	0 (0)	12 (24)	18 (36)	17 (34)	3 (6)	
	Endocrinology	4 (13.79)	12 (41.38)	7 (24.14)	6 (20.69)	0 (0)	
Working Place	Government Hospital	28 (2.44)	280 (24.43)	568 (49.56)	221 (19.29)	49 (4.28)	0.00*
	Non-Govt. Hospital	8 (2.93)	35 (12.82)	135 (49.45)	77 (28.21)	18 (6.59)	
	Clinic	0 (0)	1 (6.67)	11 (73.33)	2 (13.33)	1 (6.67)	
Duration	Less than 1 year	0 (0)	11 (20.37)	30 (55.56)	9 (16.66)	4 (7.41)	0.15
	From 1 to 3 years	3 (1.37)	41 (18.72)	110 (50.23)	54 (24.66)	11 (5.02)	
	From 3 to 5 years	10 (4.35)	48 (20.87)	113 (49.13)	52 (22.61)	7 (3.04)	
	From 5 to 10 years	11 (3.42)	82 (25.47)	139 (43.17)	72 (22.35)	18 (5.59)	
	More than 10 years	12 (1.97)	134 (22)	322 (52.87)	113 (18.56)	28 (4.6)	
Private Practice	Inside City	15 (2.38)	160 (25.36)	326 (51.66)	110 (17.43)	20 (3.17)	0.00*
	Outside City	4 (3.39)	26 (22.03)	57 (48.31)	27 (22.88)	4 (3.39)	
	No practice	15 (2.82)	93 (17.51)	270 (50.85)	125 (23.55)	28 (5.27)	
	Both	2 (1.3)	37 (24.03)	61 (39.61)	38 (24.67)	16 (10.39)	
Working Hour	Upto 6 h per day	8 (2.02)	83 (20.91)	218 (54.91)	78 (19.64)	10 (2.52)	0.00*
	Upto 8 h per day	12 (3.06)	79 (20.15)	185 (47.19)	95 (24.24)	21 (5.36)	
	Upto 10 h per day	7 (1.96)	94 (26.33)	180 (50.42)	63 (17.65)	13 (3.64)	
	Upto 12 h per day	8 (3.14)	54 (21.18)	119 (46.67)	55 (21.56)	19 (7.45)	
	Upto 14 h per day	0 (0)	2 (16.67)	6 (50)	0 (0)	4 (33.33)	
	More than 8 h per day	1 (4.76)	4 (19.05)	6 (28.57)	9 (42.86)	1 (4.76)	
Weekly Vacation	Yes	31 (2.67)	257 (22.17)	588 (50.73)	236 (20.37)	47 (4.06)	0.07
	No	5 (1.82)	59 (21.45)	126 (45.82)	64 (23.27)	21 (7.64)	

Table 2 (*continued*)

Variable	Category	Burn out					P-value
		No sign of burnout n (%)	Little sign of burnout, along with some severe factors n (%)	At the initial risk of burnout n (%)	At severe risk of burnout n (%)	At the very severe risk of burnout n (%)	
Marital Status	Single	7 (3.57)	32 (16.33)	99 (50.51)	48 (24.49)	10 (5.1)	0.24
	Married	29 (2.37)	282 (23.08)	609 (49.84)	245 (20.05)	57 (4.66)	
	Divorced	0 (0)	2 (16.67)	3 (25)	6 (50)	1 (8.33)	
	Widowed	0 (0)	0 (0)	3 (75)	1 (25)	0 (0)	
Income	<184.23 USD (<20 thousand BDT)	0 (0)	11 (17.46)	37 (58.73)	12 (19.05)	3 (4.76)	0.05*
	From 184.23 to 267.18 USD (From 20 to 29 thousand BDT)	4 (2.16)	32 (17.3)	101 (54.59)	41 (22.17)	7 (3.78)	
	From 276.43 to 359.36 USD (From 30 to 39 thousand BDT)	5 (3.94)	27 (21.26)	65 (51.18)	23 (18.11)	7 (5.51)	
	From 368.57 to 451.50 USD (From 40 to 49 thousand BDT)	9 (3.11)	53 (18.34)	129 (44.64)	85 (29.41)	13 (4.5)	
	From 460.71 to 921.41 USD (From 50 to 1 lakh BDT)	10 (1.99)	119 (23.71)	254 (50.6)	93 (18.52)	26 (5.18)	
	>921.41 USD (Greater than 1 lakh BDT)	8 (2.99)	74 (27.61)	128 (47.76)	46 (17.16)	12 (4.48)	
Number of Family members	2 members	2 (2.7)	20 (27.03)	35 (47.3)	14 (18.92)	3 (4.05)	0.01*
	3 members	9 (2.79)	57 (17.65)	167 (51.7)	75 (23.22)	15 (4.64)	
	4 members	9 (1.55)	133 (22.97)	297 (51.3)	116 (20.03)	24 (4.15)	
	5 members	12 (3.93)	78 (25.57)	140 (45.9)	60 (19.68)	15 (4.92)	
	6 members	3 (3.03)	16 (16.16)	49 (49.49)	23 (23.24)	8 (8.08)	
	7 members	1 (3.13)	9 (28.13)	14 (43.75)	7 (21.86)	1 (3.13)	
	8 members	0 (0)	0 (0)	1 (50)	1 (50)	0 (0)	
	More than 8 members	0 (0)	3 (15)	11 (55)	4 (20)	2 (10)	
Any liabilities	Yes	24 (2.47)	223 (22.94)	483 (49.69)	196 (20.17)	46 (4.73)	0.74
	No	12 (2.6)	93 (20.13)	231 (50)	104 (22.51)	22 (4.76)	
Staying along with Family	Yes	28 (2.13)	290 (22.05)	661 (50.27)	276 (20.99)	60 (4.56)	0.03*
	No	8 (6.72)	26 (21.85)	53 (44.54)	24 (20.17)	8 (6.72)	
Go on vacation with Family	Sometimes	26 (2.87)	193 (21.28)	454 (50.06)	188 (20.72)	46 (5.07)	0.95
	Rarely	7 (1.76)	92 (23.17)	197 (49.62)	85 (21.42)	16 (4.03)	
	Not very often	3 (2.31)	31 (23.85)	63 (48.46)	27 (20.76)	6 (4.62)	
Able to attend all the family functions	Sometimes	20 (2.49)	175 (21.82)	412 (51.37)	159 (19.83)	36 (4.49)	0.84
	Rarely	10 (2.38)	91 (21.67)	208 (49.52)	89 (21.19)	22 (5.24)	
	Not very often	6 (2.83)	50 (23.58)	94 (44.34)	52 (24.53)	10 (4.72)	
The most disappointing thing about this job.	Workload	15 (2.99)	123 (24.55)	232 (46.31)	108 (21.56)	23 (4.59)	0.11
	Long shift	4 (4.65)	17 (19.77)	45 (52.33)	18 (20.92)	2 (2.33)	
	Less salary	3 (1.06)	67 (23.76)	140 (49.65)	62 (21.98)	10 (3.55)	
	Lack of security	10 (2.7)	82 (22.16)	190 (51.35)	67 (18.11)	21 (5.68)	
	Lack of promotion	0 (0)	9 (16.36)	33 (60)	7 (12.73)	6 (10.91)	
	Less salary compared to the workload	3 (7.5)	1 (2.5)	24 (60)	11 (27.5)	1 (2.5)	
	Less salary along with a lack of security	0 (0)	6 (17.14)	16 (45.71)	11 (31.44)	2 (5.71)	
	Long shift and low salary	0 (0)	5 (23.81)	11 (52.38)	5 (23.81)	0 (0)	
	Complex Professional burden	1 (2.27)	6 (13.64)	23 (52.27)	11 (25)	3 (6.82)	
Feelings while dealing with patients	Monotonous	3 (1.99)	40 (26.49)	72 (47.68)	29 (19.2)	7 (4.64)	0.75
	Good	25 (2.6)	216 (22.48)	475 (49.43)	201 (20.91)	44 (4.58)	
	Distressed	2 (2.11)	14 (14.74)	55 (57.89)	17 (17.89)	7 (7.37)	
	Annoying	0 (0)	5 (17.24)	13 (44.83)	8 (27.59)	3 (10.34)	
	Complex mental state	6 (3.37)	37 (20.79)	91 (51.12)	38 (21.35)	6 (3.37)	
	Distressed and annoying	0 (0)	4 (20)	8 (40)	7 (35)	1 (5)	
Prevalence of any inter-personal conflict	Co-workers	8 (2.17)	78 (21.2)	172 (46.74)	86 (23.37)	24 (6.52)	0.01*
	Family members	2 (1.56)	25 (19.53)	64 (50)	28 (21.88)	9 (7.03)	
	Both	3 (0.74)	80 (19.75)	216 (53.33)	86 (21.24)	20 (4.94)	
	None	23 (4.32)	133 (24.95)	262 (49.16)	100 (18.76)	15 (2.81)	
Any Clinical symptoms due to job dissatisfaction	Anxiety	12 (2.07)	133 (22.93)	314 (54.14)	105 (18.1)	16 (2.76)	0.03*
	Fatigue	11 (3.62)	71 (23.36)	141 (46.38)	64 (21.05)	17 (5.59)	
	Insomnia	4 (3.2)	32 (25.6)	53 (42.4)	31 (24.8)	5 (4)	
	Agitations	1 (1.41)	17 (23.94)	33 (46.48)	18 (25.35)	2 (2.82)	
	Depression	6 (2.78)	39 (18.06)	112 (51.85)	41 (18.98)	18 (8.33)	
	Anxiety and depression	2 (3.17)	12 (19.05)	23 (36.51)	19 (30.16)	7 (11.11)	
	Fatigue and insomnia	0 (0)	12 (16.22)	37 (50)	22 (29.73)	3 (4.05)	

Table 2 (*continued*)

Variable	Category	Burn out					P-value
		No sign of burnout n (%)	Little sign of burnout, along with some severe factors n (%)	At the initial risk of burnout n (%)	At severe risk of burnout n (%)	At the very severe risk of burnout n (%)	
	None	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	
Dealing with job-related mental disturbances	Switching workplace	3 (3.95)	14 (18.42)	36 (47.37)	18 (23.68)	5 (6.58)	0.00*
	Taking medication	2 (1.61)	20 (16.13)	67 (54.03)	26 (20.97)	9 (7.26)	
	Need to go on vacation	15 (2.31)	171 (26.39)	307 (47.38)	131 (20.22)	24 (3.7)	
	Difficulty in time management	8 (2.13)	73 (19.47)	207 (55.2)	68 (18.13)	19 (5.07)	
	Need to have rational Behavioral therapy	2 (1.85)	16 (14.81)	60 (55.56)	23 (21.3)	7 (6.48)	
	Need to have training in social skill	3 (12.5)	8 (33.33)	7 (29.17)	5 (20.83)	1 (4.17)	
	Taking medication and need to go on vacation	2 (3.08)	14 (21.54)	24 (36.92)	22 (33.84)	3 (4.62)	
	Difficulty in time Management and need to have rational Behavioral therapy	1 (12.5)	0 (0)	1 (12.5)	6 (75)	0 (0)	
	Need to go on vacation and difficulty in time management	0 (0)	0 (0)	5 (83.33)	1 (16.67)	0 (0)	
Worried about the encounter of politics in the job sector	yes	23 (2.41)	204 (21.41)	490 (51.42)	191 (20.04)	45 (4.72)	0.53
	no	13 (2.7)	112 (23.28)	224 (46.57)	109 (22.67)	23 (4.78)	
Other professions are more flexible in their job sector apart from yours	yes	21 (1.99)	240 (22.71)	551 (52.13)	207 (19.57)	38 (3.6)	0.00*
	no	15 (3.98)	76 (20.16)	163 (43.24)	93 (24.66)	30 (7.96)	

❖ *Represents the significant p-values (p-values≤0.05).
❖ Total sample size (N) = 1434.
❖ Sample numbers in each burnout level are represented by n.
❖ Here, USD = United States Dollar; BDT = Bangladesh Taka.

bivariate Table 2. In this study, to determine the adjusted contribution of the related variables on the different levels of burnout profiles, a multinomial logistic regression model was fitted. Adjusted odds ratio, standard deviations, and p-values are reported in Table 3. In this model, we considered 'no sign of burnout' as a reference category of the response variable, which is "several levels of burnout profiles". Statistical significance was considered as p-value less than or equal to 0.05 at 95 % confidence interval.

To assess the internal consistency or reliability of the data obtained through this observational study on burnout status of the physicians as well as to correlate their responses to the questionnaire; the Cronbach's α and total ω (omega) score were measured. The range of Cronbach's Alpha from 0.8 to 0.9 indicates good internal consistency of data, whereas the values for Cronbach's α below 0.7 indicates that the questions are not internally consistent. Although Cronbach's alpha is the most widely used reliability measure (apparently due to its conceptual straightforwardness and ease of computation), it overestimates the first factor saturation and underestimates test reliability. The ω (omega) measures are probably the most effective reliability measures. Compared to Cronbach's alpha and the greatest lower bound, total ω (omega) provides a more accurate assessment of the reliability of the entire test. The Cronbach's α value for this study is 0.874 with 95 % (Bootstrapped) Confidence Interval (0.863, 0.884) indicating a good internal consistency of data. The Omega (total) value for the data of this study is 0.88 with 95 % Confidence Interval (0.87, 0.89). Furthermore, the Greatest Lower Bound (GLB) value for this data is 0.91. Therefore, it is evident that the data observed through this research is internally consistent and reliable. Also, the distribution of responses of this study is shown in the Fig. 2 which is commensurate with the above reliability tests results.

The questionnaire of this observational study included a "burnout self-test section" for the participants, where the respective physicians independently responded to sixteen Likert scale questions as per the Maslach inventory guideline [21]. Each response was rated on a Likert scale of 1–5, where 1 means not at all; 2 means rarely; 3 means sometimes; 4 means often; 5 means very often. At the end of this burnout self-test, individual participants' responses were summed, and the level of their burnout was interpreted based on the summated scores, where a score range of 15–18 indicates no sign of burnout, 19–32 represents little sign of burnout, 33–49 reveal initial risk of burnout, 50–59 imply severe risk of burnout and 60–75 signify very severe risk of burnout [22]. In the case of "question 5 line" 72 % of respondents do not feel or rarely feel misunderstood or unappreciated by their co-workers, while 5 % feel it often or very often. Furthermore, for "question 13 line" almost half of the participants (46 %) sometimes feel that there is more work to do than they practically have the ability to do while 32 % do not feel it or feel it rarely.

4. Results

A total of 1434 physicians were randomly selected from all over the country to participate in this study. Table 1 shows the summary of the sociodemographic characteristics, job-related information, and status of the burnout assessment of the respondents, including the frequency and percentage of each using the univariate analysis. Male comprised 60 % of the entire sample, while females were 40 %. The largest proportion (37 %) of the respondents were in the 40–49 years age group, 31 % of respondents were in the age group of 30–39 years old. Among all respondents, about 85 % were married, and 14 % were single. Around 80 % of physicians were found to be working in the Governmental sector, while the remaining were non-government/private doctors from different specialties. However, 44 % of the physicians were involved in private practice inside their residing city, and 11 % respondents were involved in private practice both inside and outside of their city. The majority (33 %) of the respondents were medical officers, and the rest of them are qualified physicians, post graduate students, academicians, and administrative employees. The duration of the job was found to be more than 10 years for 42 % of the respondents. More than half (62 %) of the respondents belonged to a four, and three-member (nuclear) family and 68 % of them have additional financial involvement in personal and social life. The most reported burnout level by the physicians is the initial risk of burnout (50 %), while only 5 % of the respondents are at a very severe risk of burnout. It was found that about 2 %, 50 %, and 9 % of the respondents were underweight, overweight, and obese respectively, according to the self-reported height and weight data.

Table 2 represents the distribution of the different burnout levels among the distinct categories of covariates of the respondents. In particular, regarding the working place of physicians where the majority (73.33 %) of them serving in clinics rather than hospitals are at initial risk of burnout. The location of physicians' private practice also has a significant impact on their burnout level. The physicians performing their private practice both inside and outside of their resident city are more prone to be at very severe risk of burnout (10.39 %) because of their double workload and difficulty of time management. Furthermore, the income for physicians in Bangladesh varies depending on their years of experience, areas of specialization, and number of hours worked each day. For example, working up to 14 h a day causes very severe burnout among physicians (33.33 %). These results are statistically significant with a p value ≤ 0.05.

It is also observed from Table 2 that, the physicians staying with their families, having financial liabilities towards their family members and prevalence of any interpersonal conflict either with family members or co-workers can have a significant impact on their burnout levels (p value ≤ 0.05). The maximum percentage of burnout is seen at the "initial risk of burnout level" for the participants of this study (male 48.27 % and female 52.11 %).

On the contrary, among the several clinical symptoms of physicians due to job dissatisfaction, particularly the "anxiety" factor accounts for the highest percentage (54.14 %) of the initial risk of burnout. Moreover, we observed a statistically significant association between the "various clinical symptoms of physicians, job-related mental disturbances, as well as lack of flexibility of the healthcare profession" and the "prevalence of various levels of burnout" among physicians as a result of their depressing work environments (shown in Table 2).

Multinomial logistic regression analyses for several covariates were performed and depicted in Table 3 to predict the adjusted odds ratio (coefficients), standard deviation, and p-value along with evaluating the significant associations of the dependent and independent variables. In this model, we considered the reference category for the response variable as "no sign of burnout". Then, the reference category is compared with the rest of the four levels of response variable sequentially; that is, little sign of burnout, initial risk of burnout, severe risk of burnout and very severe risk of burnout respectively.

It is observed from Table 3 that the explanatory variable "gender" has statistically significant association with the response variable, at 5 % level of significance. The adjusted odds ratio for female is 2.08 times higher compared to male for little sign of burnout relative to no sign of burnout. Similarly, 2.25, 2.31, and 3.65 are the adjusted odds ratios comparing female to male for the initial, severe, and very severe risk of burnouts respectively, relative to no sign of burnout. So, we can interpret that the adjusted probabilities for "initial, severe, and very severe risk of burnouts" would be projected to increase by a factor of 2.25, 2.31, and 3.65, respectively, relative to "no sign of burnout," in the case of females relative to males. Therefore, these data show that female physicians are at higher risk of burnout compared to male physicians.

Bivariate analysis of Table 2 represents the results of a non-parametric chi-square test, examining the association between gender and different levels of burnout profile where no statistically significant association has been observed. In contrast, the multinomial logistic regression model of Table 3 demonstrated a statistically significant effect of gender on the risk of burnout. The results from Table 2, which utilized a chi-square test, suggested an insignificant gender effect on different burnout profiles when treating them as distinct categories. However, it is important to note that burnout is a complex phenomenon influenced by multiple factors. To provide a more comprehensive understanding, we employed a multinomial logistic regression model, as shown in Table 3. This model accounts for the interplay of various covariates and considers the entire spectrum of burnout profiles. The adjusted odds ratios in Table 3 demonstrate that, when examining burnout profiles collectively and accounting for other influential factors, gender emerges as a significant predictor of burnout risk. Thus, while the chi-square test in Table 2 did not show a statistically significant association, the multinomial logistic regression analysis in Table 3 offers a more nuanced and comprehensive perspective on the relationship between gender and burnout risk.

Another very prominent association has been perceived between the response and explanatory variables regarding the "age factor". As the largest proportion (37 %) of the respondents are in the 40–49 years age group, comparing this age group with respect to the reference age group (20–29 years), a statistically significant association has been found (p-value < 0.05) for the incidence of "various levels of burnout". 15.77, 9.79, 6.47, and 6.78 are the adjusted odds ratios which are increased accordingly for the little sign of burnout, initial, severe, and very severe risk of burnout relative to no sign of burnout respectively, for 40–49 age group compared to 20–29 age group.

Table 3
Determinants of several burnout profiles of physicians in Bangladesh using the multinomial logistic regression analyses.

Variable	Category (comparison of other response variables with reference categories at different covariate levels)	Various signs of burnout (1. Little, 2. Initial, 3. Severe, 4. Very severe) compared to "no sign of burnout (0)"	Coefficients	Std Dev.	P-value
Gender	Male				
	Female	1	2.08	0.73	0.02*
		2	2.25	0.72	0.02*
		3	2.31	0.72	0.02*
		4	3.65	0.82	0.00*
Age	20–29 years				
	30–39 years	1	12.34	1.42	0.00*
		2	8.89	1.4	0.00*
		3	6.83	1.42	0.01*
		4	7.52	1.58	0.01*
	40–49 years	1	15.77	1.79	0.00*
		2	9.79	1.76	0.01*
		3	6.47	1.78	0.02*
		4	6.78	1.96	0.03*
	50–59 years	1	6.67	1.93	0.03*
		2	4.34	1.9	0.05*
		3	4.19	1.92	0.05*
		4	3.72	2.18	0.07
	60–69 years	1	2.79	2.59	0.12
		2	1.32	2.58	0.21
		3	1.01	2.64	0.25
		4	0	0.01	0.00*
Body Mass Index (BMI)	Normal Weight				
	Underweight	1	27.62	6.96	0.10
		2	22.51	6.95	0.11
		3	9.69	6.97	0.14
		4	14.59	7.09	0.12
	Overweight	1	1.22	0.67	0.15
		2	1.32	0.66	0.12
		3	1.23	0.67	0.14
		4	0.71	0.76	0.11
	Obese	1	5.7	1.52	0.02*
		2	6.27	1.51	0.01*
		3	5.89	1.53	0.02*
		4	3.43	1.65	0.05*
Specialization	Medicine				
	Surgery	1	0.04	1.57	0.00*
		2	0.03	1.56	0.00*
		3	0.02	1.58	0.00*
		4	0.19	1.74	0.03*
	Oncology	1	0.89	2.27	0.23
		2	0.83	2.26	0.22
		3	0.84	2.27	0.22
		4	2.15	2.42	0.14
	Cardiology	1	1.49	2.74	0.20
		2	1.65	2.73	0.18
		3	0.7	2.74	0.20
		4	1.75	2.89	0.18
	Nephrology	1	1.24	2.29	0.21
		2	1.76	2.27	0.16
		3	1.12	2.29	0.23
		4	14.48	2.45	0.02*
	Ophthalmology	1	0.03	1.77	0.00*
		2	0.01	1.76	0.00*
		3	0.01	1.79	0.00*
		4	0	2.3	0.00*
	Hematology	1	3.64	17.46	0.22
		2	4.68	17.46	0.22
		3	3.48	17.46	0.22
		4	66.19	17.49	0.16
	Neurology	1	212.26	5.36	0.03*
		2	226.59	5.36	0.02*
		3	205.97	5.36	0.03*
		4	513.91	5.52	0.02*
	Pediatrics	1	0.01	1.67	0.00*
		2	0.01	1.66	0.00*

(*continued on next page*)

Table 3 (*continued*)

Variable	Category (comparison of other response variables with reference categories at different covariate levels)	Various signs of burnout (1. Little, 2. Initial, 3. Severe, 4. Very severe) compared to "no sign of burnout (0)"	Coefficients	Std Dev.	P-value
		3	0.01	1.67	0.00*
		4	0.02	1.83	0.00*
	Orthopedics	1	20.4	13.94	0.17
		2	35.28	13.93	0.16
		3	31.82	13.93	0.16
		4	97.95	13.97	0.14
	Gynecology	1	0.01	1.76	0.00*
		2	0.01	1.74	0.00*
		3	0.01	1.75	0.00*
		4	0.02	1.93	0.00*
	Pathology	1	0	2.3	0.00*
		2	0	2.26	0.00*
		3	0	2.3	0.00*
		4	0	34.22	0.13
	Dentistry	1	0	2.41	0.00*
		2	0	2.38	0.00*
		3	0	2.48	0.00*
		4	0	18.06	0.07
	Dermatology	1	0.05	2.02	0.00*
		2	0.06	2	0.01*
		3	0.04	2.04	0.00*
		4	0	47.44	0.17
	Hepatology	1	0.03	1.82	0.00*
		2	0.02	1.8	0.00*
		3	0.03	1.84	0.00*
		4	0.07	2.19	0.01*
	Urology	1	26.96	10.85	0.14
		2	110.05	10.83	0.11
		3	44.42	10.83	0.13
		4	949.78	10.86	0.07
	Radiology	1	11.23	11.91	0.18
		2	12.17	11.9	0.17
		3	13.19	11.91	0.17
		4	75.12	11.94	0.13
	Neonatology	1	2.52	42.26	0.24
		2	6.81	42.25	0.23
		3	1.77	42.26	0.24
		4	0.01	56.1	0.22
	Anesthesiology	1	0.1	2.23	0.02*
		2	0.11	2.22	0.03*
		3	0.12	2.23	0.03*
		4	0.71	2.38	0.20
	Gastroenterology	1	5.31	20.14	0.22
		2	3.31	20.14	0.23
		3	7.07	20.14	0.21
		4	16.12	20.16	0.20
	Endocrinology	1	0.01	2.01	0.00*
		2	0	2.02	0.00*
		3	0	2.03	0.00*
		4	0	118.21	0.20
Working place	Government Hospital				
	Non-Government Hospital	1	0.05	1.06	0.00*
		2	0.07	1.04	0.00*
		3	0.12	1.05	0.00*
		4	0.04	1.18	0.00*
	Private Clinic	1	1.31	11.19	0.24
		2	5.53	11.15	0.19
		3	2.68	11.17	0.22
		4	1.32	11.21	0.24
Duration of job	<1 year				
	1–3 years	1	0.25	2.6	0.09
		2	0.19	2.59	0.07
		3	0.37	2.61	0.12
		4	0.05	2.74	0.02*
	3–5 years	1	0.08	2.65	0.03*
		2	0.1	2.63	0.04*
		3	0.18	2.66	0.07

Table 3 (*continued*)

Variable	Category (comparison of other response variables with reference categories at different covariate levels)	Various signs of burnout (1. Little, 2. Initial, 3. Severe, 4. Very severe) compared to "no sign of burnout (0)"	Coefficients	Std Dev.	P-value
		4	0.01	2.85	0.00*
	5–10 years	1	0.06	2.66	0.02*
		2	0.06	2.65	0.02*
		3	0.15	2.67	0.06
		4	0.02	2.85	0.01*
	>10 years	1	0.4	2.71	0.14
		2	0.81	2.7	0.22
		3	1.33	2.72	0.21
		4	0.15	2.92	0.07
Private practicing area	No Private practice				
	Inside City	1	2.06	0.8	0.03*
		2	1.6	0.79	0.08
		3	1.68	0.8	0.07
		4	0.3	0.94	0.01*
	Outside City	1	1.44	1.55	0.17
		2	1	1.54	0.25
		3	1.58	1.55	0.15
		4	0.24	1.74	0.04*
	Both inside and outside the city	1	8.37	1.73	0.01*
		2	5.16	1.72	0.03*
		3	7.75	1.73	0.01*
		4	3.78	1.84	0.06
Working Hours/day	Upto 6 h/day				
	Upto 8 h/day	1	1.99	0.87	0.05*
		2	1.54	0.87	0.10
		3	2.35	0.88	0.03*
		4	10.57	1.04	0.00*
	Upto 10 h/day	1	1.56	1.13	0.12
		2	1.05	1.12	0.23
		3	0.99	1.13	0.25
		4	2.75	1.28	0.05*
	Upto 12 h/day	1	1.57	1.1	0.12
		2	1.16	1.09	0.20
		3	1.31	1.1	0.16
		4	9.4	1.28	0.00*
	Upto 14 h/day	1	16.35	16.67	0.19
		2	22.1	16.66	0.18
		3	0	0.11	0.00*
		4	4018.88	16.69	0.10
	>14 h/day	1	0	3.01	0.00*
		2	0	3	0.00*
		3	0.01	2.98	0.00*
		4	0.01	3.29	0.01*
Weekly vacation	Yes				
	No	1	5.08	1.29	0.01*
		2	6.95	1.29	0.00*
		3	6.39	1.3	0.01*
		4	4.99	1.38	0.01*
Marital status	Single				
	Married	1	0.49	1.35	0.09
		2	0.34	1.34	0.04*
		3	0.27	1.35	0.03*
		4	0.2	1.45	0.02*
	Divorced	1	1.56	22.08	0.24
		2	0.66	22.08	0.24
		3	4.58	22.08	0.22
		4	9.41	22.11	0.21
	Widowed	1	0.05	52.01	0.23
		2	41.87	28.35	0.20
		3	57.95	28.36	0.20
		4	0.01	72.44	0.22
Family members	<5 members				
	>5 members	1	0.09	0.86	0.00*
		2	0.1	0.84	0.00*
		3	0.07	0.86	0.00*
		4	0.04	1.05	0.00*
Family or social Liabilities	Yes				

Table 3 (*continued*)

Variable	Category (comparison of other response variables with reference categories at different covariate levels)	Various signs of burnout (1. Little, 2. Initial, 3. Severe, 4. Very severe) compared to "no sign of burnout (0)"	Coefficients	Std Dev.	P-value
	No	1	1.45	0.77	0.10
		2	1.75	0.76	0.05*
		3	1.78	0.77	0.05*
		4	1.28	0.84	0.15
Staying with family	Yes				
	No	1	0.15	0.98	0.00*
		2	0.09	0.97	0.00*
		3	0.1	0.99	0.00*
		4	0.25	1.13	0.01*
Go on vacation with family	Sometimes				
	Rarely	1	1.99	0.93	0.05*
		2	1.63	0.91	0.09
		3	1.72	0.92	0.08
		4	0.68	1.02	0.12
	Very often	1	1.52	1.51	0.15
		2	1.37	1.5	0.17
		3	0.95	1.52	0.24
		4	0.39	1.64	0.08
Able to maintain family and social interactions	Sometimes				
	Rarely	1	1.11	0.87	0.21
		2	1.17	0.86	0.18
		3	1.48	0.87	0.11
		4	1.81	0.98	0.07
	Very Often	1	0.27	1.18	0.02*
		2	0.24	1.17	0.01*
		3	0.41	1.18	0.05*
		4	0.19	1.31	0.01*
The most disappointing thing in the job sector	Workload				
	Long shift	1	0.07	1.44	0.00*
		2	0.12	1.43	0.00*
		3	0.1	1.44	0.00*
		4	0.02	1.77	0.00*
	Less salary	1	4.63	0.93	0.00*
		2	4.85	0.93	0.00*
		3	3.81	0.94	0.01*
		4	5.1	1.07	0.00*
	Lack of security	1	0.58	0.78	0.06
		2	0.61	0.77	0.07
		3	0.49	0.78	0.03*
		4	0.94	0.89	0.22
	Lack of promotion	1	98.93	9.01	0.09
		2	189.97	9.01	0.08
		3	59.81	9.01	0.11
		4	528.96	9.03	0.06
	Less salary compared to the workload	1	0.03	1.55	0.00*
		2	0.33	1.17	0.03*
		3	0.25	1.21	0.02*
		4	0.06	1.84	0.00*
	Less salary along with a lack of security	1	333.55	6.28	0.03*
		2	221.26	6.27	0.04*
		3	295.24	6.26	0.03*
		4	256.57	6.33	0.04*
	Long shift and less salary	1	23.29	10.59	0.15
		2	21.41	10.59	0.15
		3	22.59	10.6	0.15
		4	0	89.73	0.23
	Complex professional burden	1	3.27	2.26	0.09
		2	5.26	2.23	0.05*
		3	3.46	2.23	0.08
		4	4.99	2.37	0.06
Feelings while dealing with patients	Good				
	Monotonous	1	0.87	1.02	0.20
		2	0.58	1.02	0.09
		3	0.54	1.03	0.08
		4	0.9	1.14	0.21
	Distressed	1	3.12	1.68	0.06
		2	4.1	1.66	0.04*

Table 3 (*continued*)

Variable	Category (comparison of other response variables with reference categories at different covariate levels)	Various signs of burnout (1. Little, 2. Initial, 3. Severe, 4. Very severe) compared to "no sign of burnout (0)"	Coefficients	Std Dev.	P-value
		3	3.53	1.68	0.05*
		4	7	1.76	0.02*
	Annoying	1	529.68	6.84	0.03*
		2	518.26	6.83	0.03*
		3	983.87	6.84	0.02*
		4	849.57	6.9	0.03*
	Complex mental state	1	1.16	0.89	0.19
		2	0.88	0.88	0.20
		3	0.89	0.89	0.20
		4	0.41	1.06	0.04*
	Distressed & annoying	1	24.43	8.65	0.13
		2	11.82	8.64	0.15
		3	28.37	8.65	0.12
		4	22.56	8.76	0.13
Prevalence of any interpersonal conflict	None				
	With co-workers	1	0.29	0.81	0.00*
		2	0.4	0.8	0.02*
		3	0.64	0.81	0.08
		4	0.77	0.94	0.15
	With family members	1	0.32	1.24	0.03*
		2	0.53	1.22	0.09
		3	0.67	1.24	0.14
		4	2.27	1.36	0.07
	Both co-workers & family members	1	6.52	1.16	0.00*
		2	8.82	1.16	0.00*
		3	11.41	1.17	0.00*
		4	37.07	1.28	0.00*
Any Clinical symptoms due to job dissatisfaction	None				
	Anxiety	1	4.2	14.78	0.21
		2	0.04	10.34	0.15
		3	4.49	14.78	0.21
		4	0.41	26.82	0.24
	Fatigue	1	2.78	14.78	0.22
		2	0.02	10.34	0.13
		3	2.84	14.78	0.22
		4	0.51	26.82	0.24
	Insomnia	1	4.31	14.79	0.21
		2	0.02	10.35	0.13
		3	4.54	14.79	0.21
		4	0.24	26.83	0.23
	Agitation	1	18.47	14.85	0.18
		2	0.16	10.44	0.19
		3	24.77	14.85	0.17
		4	0.84	26.88	0.25
	Depression	1	3.59	14.78	0.22
		2	0.04	10.34	0.14
		3	4.37	14.78	0.21
		4	2.24	26.82	0.24
	Anxiety & depression	1	0.91	14.86	0.25
		2	0.01	10.45	0.10
		3	1.19	14.86	0.25
		4	1.39	26.87	0.25
	Fatigue & Insomnia	1	11405.24	15.72	0.08
		2	142.74	11.65	0.11
		3	16728.36	15.72	0.07
		4	1218.34	27.37	0.16
Dealing with job-related mental disturbances	Switching workplace				
	Taking medication	1	2.94	1.63	0.06
		2	3.32	1.59	0.05*
		3	2.02	1.62	0.11
		4	2.01	1.85	0.12
	Need to go on vacation	1	7.1	1.23	0.00*
		2	5.48	1.2	0.01*
		3	4.7	1.22	0.01*
		4	3.09	1.38	0.04*
	Difficulty in time management	1	13.1	1.32	0.00*
		2	13.74	1.29	0.00*

Table 3 (*continued*)

Variable	Category (comparison of other response variables with reference categories at different covariate levels)	Various signs of burnout (1. Little, 2. Initial, 3. Severe, 4. Very severe) compared to "no sign of burnout (0)"	Coefficients	Std Dev.	P-value
		3	7.91	1.31	0.00*
		4	10.91	1.46	0.00*
	Need to have rational behavioral therapy	1	83.88	1.84	0.00*
		2	123.39	1.81	0.00*
		3	68.32	1.84	0.00*
		4	109.21	2	0.00*
	Need to have training in social skill	1	1.05	1.73	0.24
		2	0.44	1.73	0.10
		3	0.41	1.77	0.09
		4	0.68	2.3	0.19
	Taking medication and need to go on vacation	1	1.93	2.61	0.16
		2	1.22	2.57	0.22
		3	1.46	2.59	0.19
		4	0.1	2.85	0.04*
	Difficulty in time management and need to have rational behavioral therapy	1	0	50.29	0.18
		2	0.06	3.03	0.03*
		3	0.54	2.9	0.17
		4	0	112.46	0.21
	Need to go on vacation and difficulty in time management	1	0	154.56	0.24
		2	216.48	40.51	0.20
		3	77.65	40.52	0.21
		4	0.17	84.85	0.24
Worried about the encounter of politics in the job sector	No				
	Yes	1	0.4	0.76	0.01*
		2	0.44	0.75	0.02*
		3	0.41	0.76	0.02*
		4	0.57	0.85	0.06
Other professions are more flexible in their job sector apart from yours	No				
	Yes	1	4.52	0.75	0.00*
		2	4.47	0.73	0.00*
		3	3.58	0.75	0.00*
		4	3.55	0.88	0.01*

Residual Deviance: 2919.81; AIC (Akaike information criterion): 3791.81; *Represents the significant p-values (p-values≤0.05). Here, 0 = no sign of burnout; 1 = Little sign of burnout.
2 = At the initial risk of burnout; 3 = At severe risk of burnout; 4 = At the very severe risk of burnout.

Additionally, referring to Table 3, a statistically significant (p-value≤0.05) association has been found between the response variables and the obese group of physicians compared to the healthy group of physicians based on their BMI score. It has been observed that in the case of obese physician's relative to healthy physicians, the adjusted odds for "little sign of burnout, initial, severe, and very severe risk of burnouts respectively" would be expected to increase by a factor of 5.7, 6.27, 5.89, and 3.43 accordingly relative to "no sign of burnout". Therefore, these data show that obese physicians are at higher risk of burnout compared to healthy physicians. Similar kinds of observations have been noticed for some other explanatory variables such as lack of weekly vacation, having family or social liabilities, long shift duty, less salary, lack of security, annoying feeling while dealing with patients, prevalence of interpersonal conflict with both co-workers and family members, lack of professional flexibility etc.

Moreover, from Table 3, another statistically significant (p-value≤0.05) association has been found between the response variables and the physicians' working place. It has been observed that in the case of physicians serving in the non-governmental hospitals compare to those serving in the governmental hospitals, the adjusted odds would be expected to decrease for "little sign of burnout, initial, severe, and very severe risk of burnouts respectively" by a factor of 0.05, 0.07, 0.12, and 0.04 accordingly relative to "no sign of burnout". Thus, implicating the fact that the physicians serving in the government hospitals are more likely to get exhausted compared to physicians serving in the non-governmental hospitals. Likewise, the physicians who are married, frequently able to maintain familial and social interactions and have more than five family members been less likely to be burnt out.

5. Discussion

This study shows a number of elements linked to physician burnout. These elements include daily job hours, the nature of the workplace, the size of the family, one's marital status, obesity, and others. The study also shows that compared to their male counterparts, female doctors are more likely to experience really acute burnout. Additionally, compared to younger doctors, doctors in the 40–49 age bracket are more likely to experience the first signs of burnout. The danger of very serious burnout rises with longer workdays. Burnout is often associated with interpersonal disputes with coworkers and family members. Very severe burnout is known to be significantly influenced by the absence of promotion. These outputs therefore imply that a number of factors influence physician burnout.

Female physicians in Bangladesh encounter more challenges due to the primitive socio-cultural structure, referring to

predominating patriarchal society, along with other contributing factors such as perceived commitments of upbringing the child and managing the family [23,24]. This can result in a reduced quality of patient care, decreased job satisfaction, adverse physical and mental health outcomes, and increased healthcare cost. A previous study on Pakistani female physicians indicated that rural areas pose greater challenges for them due to a lack of familiarity with the concept of working women in those regions [25]. The high rate of Bangladeshi female physicians leaving their medical profession as they age, primarily due to non-professional job responsibilities, is a phenomenon not limited to developing countries but also prevalent in developed nations [26]. This study proposed that the risk of severe burnout issue decreases from the age group 30–39 to 60–69 years consecutively, which is similar to the findings of an earlier study conducted on the physician in Turkey [27]. Younger physicians are more likely to suffer from burnout due to work-life balance and long hours while older and experienced physicians may be prone to burnout due to administrative burden. This study also denoted that physicians who were either obese or underweight, based on their BMI, faced a higher risk of experiencing burnout compared to those who fell within the normal weight range. These outcomes corroborate previous research that has highlighted obesity as a significant factor in contributing to burnout among healthcare workers [28]. Obesity suggested to be linked with physical health issues such as diabetes, cardiovascular disease, sleep apnea as well as mental health problems, so burnout among obese physicians is to some extent a natural phenomenon; furthermore, adverse outcomes of burnout such as increased healthcare cost and reduced job satisfaction may be further exacerbated by the combination of obesity with other contributing factors such as workload and stress [29]. Furthermore, working in a private clinic induces risk for burnout more than the other working places according to this research; the lack of proper infrastructure, insufficient manpower and unavailability of modern equipment in Bangladeshi private clinics may contribute significantly to burnout [30].

Long job experience (except more than 10 years) is significantly associated with burnout compared to job experience less than 1 year which is too some extent similar to the findings of a study earlier conducted on the physicians of Yemen [31]. This might be due to the first ten years of a physician's career. During this period, many physicians seek further post-graduate degrees to advance their knowledge and skills, which can lead to increased engagement and productivity. However, this profound focus on professional development may also contribute to burnout over time. This study also identified a significant association between private practice and burnout, with physicians who engaged in private practice while also fulfilling their regular job duties reporting higher levels of burnout compared to those who did not engage in private practice. This could be attributed to the added workload that come with balancing multiple job responsibilities, particularly if the private practice requires travel to different locations. Factors such as a lack of comfortable transportation and traffic congestion may further exacerbate the burden on these physicians, contributing to burnout [32]. Long working hours per day is also associated significantly with burnout; earlier review research also suggested the same findings as more working hour naturally incurs more workload and stress which contribute to burnout [33]. If measures are not taken to address the issue of extended working hours and its effect on burnout, doctors may experience decreased well-being as a consequence.

According to this study physicians may experience burnout when they have a large number of patients to attend to, and insufficient reinforcement from surroundings when dealing with patient. Similar findings highlighted in a published review article in global perspective, physician burnout worsens as a result of the constant demand for longer workdays specially in a setting where patient volume increases and cooperation declines [34]. It can lead to job dissatisfaction as a result. Moreover, physicians who do not live with family were found to have a significantly higher risk of burnout than those who do. This is because living apart from family implies that physicians must rely on themselves more to manage daily lives, which becomes even more difficult combining with heavy workload and long working hours. Though an earlier study on European young physicians revealed that living alone is an independent factor for burnout, this may be due to the facilities and advantages provided in a developed country contrasted to a developing country [35]. It has been observed that Physicians who think other professionals are flexible have been found to be significantly associated with burnout.

Physicians must receive numerous post-graduate degrees to advance in their careers, and they must spend considerably more time in academics in addition to their professional life, which is not applicable for other professionals, and may propel the physician towards this belief. Additionally, social interaction has been linked to both physical and mental health. However, due to their heavy workload, physicians frequently struggle to maintain a proper social life, which has been found to be one of the major causes of burnout [36]. Additionally, time management is also a significant contributor to burnout, and can lead to potentially negative consequences. This can result in an inadequate assessment of conditions, higher risk of misdiagnosis and negative impact on physician-patient relationship. Some physicians are required to take on administrative duties in addition to regular duties which can further disrupt the balance between professional and personal life, leading to burnout. Stability of the job yields sense of security with reduced stress level; hence it can lead to lower the burnout rates. But serious burnout can usher the physicians to consider leaving the current job or searching for a less stipulated job role.

Burnout management is a paramount issue to build a secure healthy nation. Bangladesh, a developing country, has several challenges to manage the burnout issue due to several factors such as low resources, high population density, poor infrastructures. Some initiatives have already been taken by the policy maker to improve the situation such as increasing the seat number for medical graduates though it is not enough. Proper investigation in future regarding the specific factors affecting the average time spent per patient visit possibly can offer an empirical understanding of the healthcare practice in Bangladesh. The following policies can be implemented to effectively manage burnout in Bangladesh and foster a healthier work environment: promoting work-life balance, limiting working hours, establishing a mandatory vacation and leave policy, providing mental health support, and implementing effective workload management strategies. Emphasizing telemedicine and allocating budget to improve primary, secondary and tertiary healthcare in terms of infrastructure and equipment may succor in improving the present scenario in long term.

6. Conclusion

In conclusion, this study has crystalized the multiple key contributors associated with burnout among Bangladeshi physicians. By being conscious of those liable factors, development of the targeted interventions and policy reforms will assist to strive for resilient and healthier workforce in future. Devising evidence-based strategies to alleviate burnout and strengthen the overall wellbeing of the physicians are imperative through future research and measurements.

7. Limitation

Few physicians may be biased to answer the question considering the reveal of their personal information. Mostly the data has been collected from hospitals located in Dhaka, thus they do not accurately reflect the uniform distribution of the physician throughout the country. The data of all types of physicians, including consultants, medical officers, and professors of medical colleges (academicians), were analyzed together to identify burnout contributing factors specific to different ranks/areas.

Ethics statement

The Institutional Review Board of National Institute of Cancer Research and Hospital (NICRH), Dhaka, Bangladesh, approved the study protocol; the reference number is **NICRH/Ethics/2019/430**. The physicians were provided with comprehensive informed consent procedures, which included both oral discussions and written documentation, prior to their voluntary participation. Declarations of data confidentiality and anonymity were also explained. The necessary documents regarding the ethical approval and consent forms are attached in the supplementary file 2.

Data sharing statements

Following publication, the ethical approval certificate, research protocol, data, structured questionnaire, scanned data sheet, and consent form are provided in the supplemental files with this article.

Data availability statement

The data associated with this study is available in the attached supplementary file: 1.

Additional information

No additional information is available for this paper.

CRediT authorship contribution statement

Farhana Rizwan: Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Forhad Monjur:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Mamunur Rahman:** Writing – review & editing, Writing – original draft, Data curation. **Samiha Tamanna:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Noor Muhammad Khan:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Muhammad Rafiqul Islam:** Supervision, Methodology, Conceptualization. **Samira Alam:** Supervision, Methodology, Data curation, Conceptualization. **Lamia Mariyam:** Supervision, Methodology, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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