ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

PRESENTEEISM IN CASE OF A DISEASE OR ILLNESS AND ITS RELATIONSHIP WITH ANXIETY AND DEPRESSION AMONGST DOCTORS IN A TERTIARY CARE HOSPITAL IN KARACHI, PAKISTAN: A CROSS SECTIONAL STUDY

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ABSTRACT

INTRODUCTION:

Presenteeism refers to a common practice of working while sick, working longer hours than required and attending calls outside of work hours. This can have a negative impact on physical, emotional, and psychological well-being of the employees, causing lack of productivity. Occupations whose everyday work includes providing treatment, care, and welfare services such as doctors, nurses and other healthcare professionals tend to have a greater risk of presenteeism. Previous studies have shown an association between presenteeism and the occurrence of mental illnesses such as anxiety and depression.

OBJECTIVE:

The main objective of our study was to investigate the correlation between presenteeism and the prevalence of anxiety and depression amongst doctors working at Jinnah Postgraduate Medical Centre and to analyse its projected influence on the healthcare system.

METHODOLOGY:

A cross-sectional study was conducted through a questionnaire, which was administered to medical doctors of Jinnah Postgraduate Medical Centre (JPMC), Karachi Pakistan (n=278) in May, June, and July 2023. After this, a Hospital Anxiety and Depression Scale (HADS) chart was administered to measure prevalence of anxiety and depression.

Results: In our study, 278 medical doctors participated, 73.0% (n=203) were female and 27.0% (n=75) were male. 85.6% (n=238) of the participants reported to have worked while they were sick in the past 12 months, and only 14.4% (n=40) reported never. Applying the HADS scale, 36.3% (n=101) were identified as abnormal cases of anxiety and 43.5% (n=121) were reported to be abnormal cases of depression.

CONCLUSION:

Presenteeism may be commonplace in the medical field, but considering its association with anxiety and depression, it may lead to higher rates of job burnout, decreased productivity, and error. Increasing awareness about this issue could influence future policies regarding sick leave and the stigma surrounding it, whilst helping reduce the economic and productivity losses caused by presenteeism.

KEYWORDS
presenteeism, medical, doctors, anxiety, depression, cross sectional.

INTRODUCTION

Presenteeism refers to a common practice of working while sick, working longer hours than required, and attending calls outside of work hours.[1] A study conducted by Klein et al. in 2013 in Germany illustrated that 90% of the participants were working at least once over a period of 12 months regardless of being ill.[2] Presenteeism has been associated with affecting an individual's physical, emotional, and mental well-being, leading to conditions such as depression and anxiety.[3] According to ICD-10, depression or depressive disorder is a mental condition characterised by depressive mood (e.g., sad, irritable, empty) or loss of pleasure accompanied by other cognitive, behavioural, or neurovegetative symptoms that significantly affect the individual's ability to function.[4] While anxiety is defined as apprehensiveness or anticipation of future danger or misfortune accompanied by a feeling of worry, distress, or somatic symptoms of tension. The focus of anticipated danger may be internal or external.[4]

Both these mental disorders cause impairment, leading to an inability to contribute to the community.[5] A study conducted by Tsuchiya et al. in 2012 in Japan states that the influence of mental disorders on work performance most commonly causes 28 to 30 lost days per year.[6] Furthermore, excessive pressure from the workplace and decreased productivity due to presenteeism, causes job dissatisfaction, emotional exhaustion and insomnia; key factors leading to mental health disorders.[7] In the working population the prevalence of depression and anxiety disorders throughout the year ranges from 3.5% - 6.0% for depressive disorder in European countries and 6.4% mood disorder in the United States.[8] A study conducted by Amin et al (2020) found a 43% prevalence of anxiety and depression amongst frontline doctors in Pakistan. With more than a third of doctors in Pakistan suffering from anxiety and depression, the need for research into risk factors and alleviating measures is imperative.[9]

Additionally, occupations whose everyday work includes providing treatment, care and welfare services such as doctors, nurses and other healthcare professionals tend to have a greater risk of presenteeism. This is due to excessive occupational workload and the overbearing expectation of doing the missed work after a period of absence.[10] According to a study conducted by Sendén et al.(2013), as a part of the Health and Organisation among University hospital Physicians in Europe (HOUPE) project, the prevalence of presenteeism among European physicians is 70 to 86%, creating a behavioural pattern where doctors hide their own illness mostly due to a competitive environment.[11] Doctors tend to avoid taking sick leave and keep working long hours whilst having infections and other diseases, creating a harmful environment for the patients and other staff members.[12] Presenteeism leads to a build- up of stress, which is associated with accelerated disease processes.[3] Moreover, it is shown that presenteeism amongst doctors was associated with higher medical errors, loss of productivity, and negative effect on the health of co-workers.[13] Medical training amongst all specialties comes with extended working hours and interrupted sleep, leading to difficulties in concentration, cognition, motor skills, mood and higher rates of burnout.[14,15]

Over the years, research has been done on presenteeism and its association with depression/anxiety worldwide. However, in Pakistan, limited research has been conducted to understand its impact on healthcare professionals. Exploring this subject can aid in understanding the long-term threat presenteeism poses to healthcare professionals to create a change in policy regarding sick leave and mental health of doctors, in a country with a worsening grade of job dissatisfaction.[16]

RATIONALE:

Previous studies have shown the relationship between anxiety and depression and presenteeism.[17] Mental illnesses present with various emotional mood and sleep disturbances. Though, instead of taking an absence from work or getting the right treatment, doctors often adhere to job demands, which can result in poor decision-making skills, decreased productivity, and professional competence of a doctor. Therefore, this study aims to investigate the relationship between presenteeism and anxiety and depression and the potential implications

presenteeism may have on the medical workforce in Pakistan.

MATERIAL AND METHOD:

We conducted a cross-sectional study through an online google form questionnaire, which was administered to medical doctors of Jinnah Postgraduate Medical Centre (JPMC), Karachi

Pakistan (n=278) in May, June, and July 2023. Inclusion criteria was doctors at all departments of JPMC and exclusion criteria was medical doctors who are not currently affiliated with the medical institute being studied, doctors of physiotherapy, Doctor of Pharmacy, and non-consenting participants. The first part of the questionnaire consisted of demographics of the study population. Then, moved onto work environment factors such as attendance reward systems in the hospital, monthly salary, etc. Our questionnaire was taken from the Xiaoyu Xi et al. study and altered slightly to accommodate the sociocultural differences of Pakistan.[18]

Presenteeism was measured using the following single-item question "How many times has it happened over the previous 12 months that you have gone to work despite feeling that you really should have taken sick leave because of your state of health?" Answers were given through a multiple-choice option of 'never', 'once', '2-5 times', and 'over 5 times'. For analysis, the options were divided into two categories, 'never or once' and 'twice or more'.[18]

Prevalence of anxiety and depression was measured by the HADS chart. The HADS is a 14- item scale that collects ordinal data. Out of the 14 items, seven items relate to anxiety and seven items relate to depression. To each item, there are four scores: 0 (never), 1 (occasionally), 2 (often) and 3 (always). A total of 6 items were reverse scored. The possible scores range from 0 to 21 for anxiety and 0 to 21 for depression. A score between 0 and 7 was considered normal cases, a score of 8-10 identified borderline cases and a score of 11-21 indicated abnormal cases of anxiety or depression.[19]

We analysed our data with the software, statistical package for the social sciences (SPSS) version 2.0. We took the mean result of all the responses as multiple participants filled our questionnaire with different answers. We asked the participants to fill out the form physically on our phones via google forms and sent the questionnaire via email and WhatsApp to some participants to ensure the most responses. We aimed to receive responses from all levels of seniority (i.e., house officers, residents, medical officers, senior residents, and head of departments), however doctors at a higher level of seniority were often too busy to participate or were unavailable.

Ethical approval was obtained from the Institutional Review Board of Jinnah Sindh Medical University (reference number: JSMU/IRB/2023/796).

RESULTS:

RESPONSE RATE

A total of 278 surveys were administered, with a response/completion rate of 100% (n=278). 70.4% (n=196) surveys were completed by doctors of junior management status (i.e., house officers), while 22.7% (n=63) surveys were completed by doctors of middle management status (i.e., residents). Doctors of sub-top management (i.e., medical officers and senior residents) and top management (i.e., head of departments) accounted for 5.4% (n=15) and 1.4% (n=4) survey responses, respectively.

PROFILE OF RESPONDERS

Among the participants, 73.0% (n=203) were females and 27.0% (n=75) were males, 90.6% (n=252) were aged between 20-29, 8.3% (n=23) were aged between 30-39, 1.1% (n=3) were aged between 40-49 and none being aged 50 plus.

With 80.9% (n=225) having completed their Bachelors/MBBS, 6.5% (n=18) of the study population completed their Masters/M.Phil. /MCPS, and 12.6% (n=35) had done their PhD/FCPS. Furthermore, 93.6% (n=261) did not have a chronic disease, Comparing the leadership style of their superiors, 52.5% (n=146) of the study population felt they worked in a democratic leadership type, 34.9% (n=97) in an authoritarian superior leadership type and 12.6% (n=35) in laissez-faire leadership. Further descriptive information about the participants is shown in Table 2.

TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

Variables	Types	Counts	Proportions
Age	20-29	252	90.6
	30-39	23	8.3
	40-49	3	1.1
Gender	Female	203	73.0
	Male	75	27.0
Marital Status	Divorced	3	1.1
	Married	64	23.0
	Never married	210	75.5
	Widowed	1	.4
Pregnancy status	Non-pregnant or spouse was not pregnant	268	96.4
	Pregnancy or spouse was pregnant	10	3.6
Number of children	0	253	91.0
	1	14	5.0
	2	11	4.0
Living Dynamics	Alone	58	20.9
	Joint	128	46.0
	Nuclear	71	25.5
	Shared housing	21	7.6
Highest education level	Bachelor/MBBS	225	80.9
	Master/M.Phil./MCPS	18	6.5
	PhD/FCPS	35	12.6
History of chronic diseases in the past year	No	261	93.9
	Yes	17	6.1

TABLE 2: WORK-RELATED CHARACTERISTICS OF THE STUDY POPULATION

Variables	Types	Counts	Proportions
Reward system for full attendance	Do not know	18	6.5
	No	228	82.0
	Yes	32	11.5
Monthly salary	1-1.2 Lakh	22	7.9
	60,000-80,000	160	57.6
	80,000-1 Lakh	36	12.9
	Greater than 1.2 Lakh	7	2.5
	Less than 60,000	53	19.1
Number of years working at the current hospital	0-2 years	224	80.6
	2-4 years	40	14.4
	4-6 years	9	3.2
	Greater than 6 years	5	1.8
	Junior management (i.e., house officers)	196	70.5

Level of seniority	Middle management (i.e., residents)	63	22.7
	Sub-top management (i.e., medical officers and senior residents)	15	5.4
	Top management (i.e., head of departments)	4	1.4
People management duty	No, I am not a leader (absence of staff from the lower levels)	198	71.2
	Yes, I am a leader (presence of staff from the lower levels)	80	28.8
Weekly work hours	35-39	35	12.6
	35-49	8	2.9
	40	45	16.2
	41-45	24	8.6
	46 or more	128	46.0
	Less than 34	38	13.7
No. of Calls	0-4 in a month	63	22.7
	2 times in a week	168	60.4
	3 times in a week	19	6.8
	4 or more times in a week	28	10.1
Makeup work (Substitute availability)	None or only a small proportion	58	20.9
	Somewhat less than half	77	27.7
	Somewhat more than half	79	28.4
	Virtually all	64	23.0
Superior's leadership type	Authoritarian (Controlling)	97	34.9
	Democratic (Participative)	146	52.5
	Laissez-faire (Minimum interference)	35	12.6

85.6% (n=238) of the participants reported to have worked while they were sick in the past 12 months, and only 14.4% (n=40) reported never. Of the 85.6%, 22.7% (n=63) reported once, 38.8% (n=108) reported 2-5 times, and 24.1% (n=67) reported more than 5 times. Participants also reported that making up virtually all the tasks missed when back to work (n=64, p-value= 0.013) had a significant development on presenteeism. Males had a significantly higher proportion of presenteeism (n=75, p-value=0.002) when compared to their female counterparts. Doctors with 2 children had decreased cases of presenteeism (n=11, p-value= 0.046). Work hours equal and greater than 46 hours a week (n=128, p-value=0.04) was also significant. Physicians on call 3 times per week (n=19, p-value=0.007) reported to have less cases of presenteeism.

FIGURE 1: PREVALENCE OF PRESENTEEISM

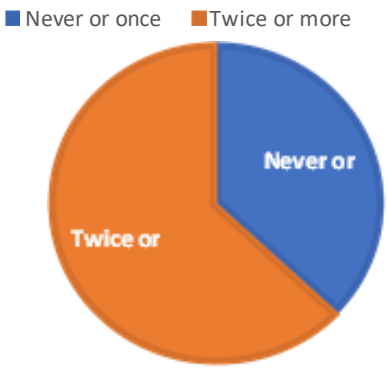


TABLE 3: PREVALENCE OF PRESENTEEISM

Prevalence of Presenteeism				
	Frequency	Percent	Valid Percent	Cumulative Percent
Never or once	103	37.1	37.1	37.1
Twice or more	175	62.9	62.9	100.0
Total	278	100.0	100.0	

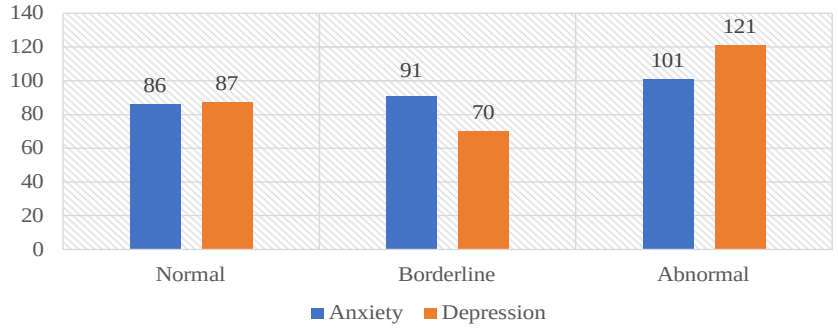
TABLE 4: FACTORS SIGNIFICANTLY AFFECTING PREVALENCE OF PRESENTEEISM

Number of Work Hours				
	Frequency	Percent	Valid Percent	Cumulative Percent
35-39	43	15.5	15.5	15.5
40	45	16.2	16.2	31.7
41-45	24	8.6	8.6	40.3
46 or more	128	46.0	46.0	86.3
Less than 34	38	13.7	13.7	100.0
Total	278	100.0	100.0	
Makeup work				
	Frequency	Percent	Valid Percent	Cumulative Percent
None or only a small proportion	58	20.9	20.9	20.9
Somewhat less than half	77	27.7	27.7	48.6
Somewhat more than half	79	28.4	28.4	77.0
Virtually all	64	23.0	23.0	100.0
Total	278	100.0	100.0	
***Other significant factors are included in Annex 1**				

TABLE 5: PREVALENCE OF DEPRESSION AND ANXIETY BASED ON "HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS)"

Prevalence of depression and anxiety based on "Hospital Anxiety and Depression Scale (HADS)"			
Anxiety Score	Symptom-free	86	30.9
	Suspicious cases	91	32.7
	Confirmed case	101	36.3
Depression Score	Symptom-free	87	31.3
	Suspicious cases	70	25.2
	Confirmed case	121	43.5

FIGURE 2: PREVALENCE OF DEPRESSION AND ANXIETY BASED ON "HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS)"



Asia Pacific Journal of Health Management 2024; 19(3):i3519. doi: 10.24083/apjhm.v19i3.3519

Applying the HADS scale, 36.3% (n=101) were identified as abnormal cases of anxiety and 43.5% (n=121) were reported to be abnormal cases of depression. Borderline (suspicious) (n=91, p-value=0.001) and abnormal (confirmed) cases of anxiety (n=101, p-value= 0.007) were significant in doctors with presenteeism. Alternatively, abnormal cases of depression (n=121, p-value=0.043) in patients had significantly decreased instances of presenteeism.

Logistic regression analysis showed that 8 variables were significantly associated with presenteeism with statistical difference as shown in table 6. Compared with participants with normal cases of anxiety or depression, participants with abnormal cases of anxiety and borderline cases of anxiety were more likely to practise presenteeism whereas participants with abnormal cases of depression were less likely to practise presenteeism (all p<0.05). Data analysis using SPSS also showed that there were interactions between anxiety and depression which, however, did not affect the overall finding about the association between abnormal cases of anxiety or depression and presenteeism in this study. In addition to two demographic factors (gender and being a parent), four work-related factors were also more likely to resulting in presenteeism including the knowledge of attendance reward system, weekly work hours, number of calls taken in a week, and lack of ease of replacement of missed work (all p<0.05).

TABLE 6: LOGISTIC REGRESSION ANALYSIS OF FACTORS ASSOCIATED WITH PRESENTEEISM

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Gender	**Male**	**-1.401**	**.448**	**9.795**	**1**	**.002**	**.246**	**.102**	**.592**
Number of children	0			4.674	2	.097			
	1	-1.516	1.113	1.854	1	.173	.220	.025	1.947
	2	**-2.626**	**1.318**	**3.969**	**1**	**.046**	**.072**	**.005**	**.958**
History of chronic diseases in the past year	**ChronicDisease**	**1.304**	**.906**	**2.071**	**1**	**.150**	**3.684**	**.624**	**21.763**
Reward system for full attendance	**Do not know**			**11.577**	**2**	**.003**			
	No	**1.353**	**.684**	**3.917**	**1**	**.048**	**3.869**	**1.013**	**14.777**
	Yes	-.341	.822	.172	1	.678	.711	.142	3.558
Weekly work hours	**Less than 34**			**20.294**	**5**	**.001**			
	35-39	-.268	.652	.169	1	.681	.765	.213	2.746
	35-49	20.010	12794.885	.000	1	.999	489954871.736	0.000	
	40	-.394	.608	.420	1	.517	.675	.205	2.220
	41-45	-.195	.668	.085	1	.770	.823	.222	3.048
	46 or more	**1.685**	**.579**	**8.474**	**1**	**.004**	**5.393**	**1.734**	**16.772**
No. of Calls	**0-4 in a month**			**8.491**	**3**	**.037**			
	2 times in a week	-.235	.443	.281	1	.596	.790	.332	1.885
	3 times in a week	**-2.149**	**.797**	**7.271**	**1**	**.007**	**.117**	**.024**	**.556**

DISCUSSION:

In this study, we found the prevalence of presenteeism to be high, with 62.9% of doctors reporting presenteeism 2 or more times in the previous 12 months. We also found that 36.3% of doctors had abnormal cases of anxiety and 43.5% of doctors had abnormal cases of depression. Whilst the prevalence of presenteeism is similar to presenteeism reported in hospital doctors in China (66.4%) in Xiaoyu Xi's study et al, the rates of abnormal cases of anxiety and depression were found to be much lower in this study.[18] Xiaoyu Xi's study et al. reported 68.8% of abnormal cases of anxiety and 72.3% of abnormal cases of depression.[18] This vast difference could be due to our study having a much smaller sample size (n=276) when compared to Xiaoyu Xi's study et al. (n=1153).[18]

We found that 85.6% of the study population worked while they were sick in the past 12 months. Despite there being around 175,000 registered doctors in Pakistan, a majority have moved abroad to practise and many female physicians often do not work due to family and social expectations.[17] As a result, the doctor to patient ratio becomes 1 doctor for every 1,764 persons.[17] With a healthcare system ranked 154th out of 195 countries in terms of performance, physicians find themselves under immense pressure to show up to work even when feeling unwell.[17]

A majority of the participants in our study were aged between 20-29 (90.6%), had completed their Bachelors/MBBS (80.9%), and were a part of junior management status (i.e., house officers) (70.4%). This younger age group could also account for the high prevalence of presenteeism found in our study, as our participants were at the bottom of the 'medical hierarchy', with little to no control over their schedules, workload and gain little reward. A study by M Faisal et al. found that promotions and rewards were based on seniority rather than performance.[20] It also found that overburdened staff and unnecessary job responsibilities sometimes compromised patient care.[20]

In our study, we found that males had a significantly higher proportion of presenteeism than their female counterparts. This was unexpected as a study by C. Chambers et al. found that women and younger doctors had the highest rates of presenteeism.[13] Alternatively, a study by P. M. Conway et al. found that contrary to expectations, the prospective association between presenteeism and future depression had no gender related differences.[21] The difference between all these findings must be accounted for through differences in work environments, age, political and social climate, culture as well as the major differences in sample sizes. Unless a study is specifically conducted on presenteeism in female doctors vs male doctors, gender remains as a confounder rather than a potential effect modifier in exploring presenteeism and its effects on anxiety and depression, as explained by P. M. Conway et al. [21]

Our study found that leadership style, whether it be democratic, authoritarian, or laissez-faire, did not have a significant effect on the prevalence of presenteeism. This is interesting as we thought that an authoritarian style leadership would increase stress on doctors and push them towards presenteeism. Instead, we found no significant differences between the rates of presenteeism and the corresponding leadership styles. This may be due to personality differences resulting in doctors thriving in different work environments, and the psychosocial pressure of success.[22]

The majority of our study population (93.9%) did not suffer from chronic disease. A previous study Cocker et al., found that poorer general health resulted in greater absenteeism and thus, associated with the 'health-protective' effects of absenteeism.[3] Our study had a greater population in good health standing, which may contribute to the high rates of presenteeism as healthy people are more likely to ignore their health needs and continue to work while sick.

Similar to Xiaoyu Xi et al., our study also found that if a doctor would have to make up the tasks not completed during their absence, these doctors would practise presenteeism at a greater rate than their co-workers who did not have to make up missed work.[18] Therefore, task substitution and the amount of work that was to be made up after one's absence had a significant effect on the rates of presenteeism.

Doctors with multiple children were reported to have less cases of presenteeism than those with no children or a single child. This may be due to social responsibility and prioritisation. Considering our study population was made up of mainly females, this may have influenced the result as, in traditional Pakistani culture, the mother is the primary caretaker of children, leading to absenteeism.[23] This factor could be investigated in further studies.

Physicians on call 3 times per week reported to have less cases of presenteeism. This may be due to the more labour intensive and physically taxing work done on call versus a normal workday. Therefore, physicians with a larger number of calls in the week may feel the need to rest before returning to work. Such practices should be encouraged in the medical field as they decrease productivity losses and reduce risk of illness spreading to patients.

The study found that those with less than 34 hours of weekly work and those with over 46 hours of weekly work had increased rates of presenteeism. With a shorter work week, doctors may resort to presenteeism as they do not want to burden their co-workers and have a greater leave period to relax and resolve their illness. While those with a longer than 46-hour work week may have increased rates of presenteeism, due to the need to make up their missed work, they may instead choose to work while they are ill, to not burden themselves or their co- workers. The study Al Nuhait et al. found the most common reasons reported for presenteeism were not wanting to burden co-workers, feelings of duty toward patients, and avoiding an increased future workload caused by absence.[24] Doctors may also trivialise less severe illnesses and soldier on, which over an extended period of time can lead to exhaustion, ill-being, and productivity damage and continue an ensuing resource loss cycle.[25, 26]

Considering the relationship between presenteeism and mental illness, a study by J Klein et al. found that presenteeism was associated with psychosocial stress, which can be caused by high efforts and demands, low rewards and increased overcommitment.[2] Working while ill takes more effort than required normally, and this can result in greater stress levels and allostatic load.[21] Based on the Effort-Recovery model, this may affect the individual's capacity to relax after work.[21] This cycle can lead to prolonged psychophysiological overactivation and also burdens the recovery process, keeping the doctor sick for longer. Increased allostatic load has been associated with accelerated disease processes, unhealthy behaviours, and an increased risk of cardiovascular disease.[3] Inadequate recovery, psychophysiological overactivation and a poor work environment can all contribute to an increased risk of depression, according to P. M. Conway et al. [21]

Presenteeism can also be associated with a lifestyle of at-risk health behaviours, such as poor sleep, low physical activity, and poor diet. These factors have been associated with the incidence of major depression, due to dysregulated physiological pathways.[21] Our study found that depression caused lower rates of presenteeism, contrasting the findings of the Xiaoyu et al. study.[18] The findings of our study are clinically appropriate, as depression often causes anhedonia, lowering job satisfaction and willingness to come to work sick. Interestingly, this could help the doctor recover faster, as they would get the required rest. Future studies could examine this contrast and factors that may cause the practice of presenteeism, such as intrinsic work values like autonomy, competence, and satisfaction and extrinsic work values such as socioeconomic status, social approval, financial and social security, career prospects, etc.[25] The effects of presenteeism on productivity and work output can be investigated in further studies and possible coping strategies and policies to support doctors facing the negative effects of presenteeism should also be studied.[18]

CONCLUSION:

Presenteeism may be commonplace in the medical field, but considering its association with anxiety and depression, it may lead to higher rates of job burnout, decreased productivity, and error. Increasing awareness about this issue could influence future policies regarding sick leave and the stigma surrounding it, whilst helping reduce the economic and productivity losses caused by presenteeism.

LIMITATIONS OF STUDY:

Although we aimed to conduct a reliable cross-sectional study of all doctors at JPMC to get an understanding of the factors that could contribute to presenteeism, the sample size was not large enough to account for all the levels of seniority and the impact this could have on the results. Majority of participants were female; therefore, further study would include gaining a

more equal response rate from both sexes. Our study also relied on participants recalling the past 12 months which may be too long, leading to inaccurate results due to memory loss. Also, the presenteeism, anxiety and depression were measured using self-assessment rather than more objective methods. This study focused solely on a single hospital. Subsequent investigation could include multiple hospitals nationwide and doctors in various settings

other than a hospital for a more comprehensive understanding of the workforce.

CONTRIBUTIONS:

CL: Review & Editing, Validation TA: Supervision, Validation JAS: Investigation, Writing Original Draft, Review & Editing, Visualization, Project Administration HA: Investigation, Writing Original Draft, Review & Editing, Visualization, Project Administration SABN: Conceptualization, Investigation, Formal Analysis, Methodology MH: Writing Introduction, Investigation, Review & Editing IAA: Investigation, Review & Editing TI: Writing Introduction, Investigation, Review & Editing AH: Writing Introduction, Investigation, Review & Editing FW: Investigation, Review & Editing

CONFLICT OF INTEREST:

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

DATA AVAILABILITY STATEMENT:

The data that support the findings of this study are available from the corresponding author, HA, upon reasonable request.

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