

# INFLUENCE OF WORK CHARACTERISTICS ON ASSOCIATION BETWEEN DOCTOR'S STRESS AND SLEEP QUALITY.

Shivani P. Lanjewar<sup>1</sup>, Shravani G. Deolia<sup>2</sup>, Rutuj N. Waghmare<sup>3</sup>, Surbhi R. Kankriya<sup>4</sup>,  
Simran D. Badki<sup>5</sup>, Shivani D. Jaiswal<sup>6</sup>

1. Shivani P. Lanjewar, Assistant Resident, Sharad Pawar Dental College, Datta Meghe Institute Of Medical Sciences Wardha, India.
2. Shravani G. Deolia. , Associate Professor And Head Department Of Public Health Dentistry, Sharad Pawar Dental College And Hospital, Datta Meghe Institute Of Medical Sciences, Wardha, India
3. Rutuj N. Waghmare, Sharad Pawar Dental College, Datta Meghe Institute Of Medical Sciences Wardha, India.
4. Surbhi R. Kankriya, Assistant Resident, Sharad Pawar Dental College, Datta Meghe Institute Of Medical Sciences Wardha, India
5. Simran D. Badki, Assistant Resident, Sharad Pawar Dental College, Datta Meghe Institute Of Medical Sciences Wardha, India.
6. Shivani D. Jaiswal, Assistant Resident, Sharad Pawar Dental College, Datta Meghe Institute Of Medical Sciences Wardha, India

### **Address for correspondence**

Shravani G Deolia. (MDS), Department of Public Health Dentistry,, Sharad Pawar Dental College and Hospital, Sawangi (M), Wardha, Maharashtra, India; Phone no- 9503523656, Email id- [deoliashravani@gmail.com](mailto:deoliashravani@gmail.com)

### **Original Research**

**Conflict of Interest: None**

### **Abstract**

**INTRODUCTION-** Doctor's stress has an impact for health and doctor's satisfactory level involved which ultimately has an effect on care quality for the patients. Stress induced sleep disturbance is prominent.

**AIM-**This study was designed with aim of assessing the influence of work characteristics on the association between doctor's stress and sleep quality

**METHOD-** This cross-sectional study was conducted on doctors of Tertiary Care Hospitals of Wardha city using questionnaire, containing 24 questions. The stress was evaluated using 10 items "Global perceived stress scale" and for sleep quality "Pittsburgh Sleep Quality Index" of

total 14 items was used. The variables were compared in unpaired *t* test and Pearson correlation test to know the level of significant of determinacy which was set at less than 0.05.

**RESULTS** –The Positive PSS Score for post-graduates was  $14.03 \pm 4.55$  and staff was  $15.69 \pm 4.44$ , the Negative PSS score was  $13.57 \pm 5.15$  and  $11.37 \pm 4.39$ , respectively which was statistically significant ( $p < 0.05$ ). Negative PSS scores of females were higher ( $13.92 \pm 5.36$ ) as compared to males ( $11.96 \pm 4.54$ ) but the difference was also statistically insignificant ( $p < 0.05$ ). The total PSS and Total PSQI scores were almost equals in post-graduates and staff, males and females, day and night shift duty doctors.

**CONCLUSION**- Certain characteristic of work shift among doctors can directly affects the stress and sleep quality and indirectly affect the patient care and treatment. The study indicates that work characteristic may influence sleep quality and stress among doctors. We need to improve work shift schedule in order to provide good health and well-being of doctor which will further improve the quality of patient care.

**Key Words**- Doctor, Sleep quality, Stress

## **Introduction:**

Stress is a part of every individual's life.<sup>1</sup> Doctors continuously exposed to a very high-level stress in the course of their whole career.<sup>2</sup> Stress in a health practice has always a topic of issue as while taking care of people's life, mistakes and errors could be expensive and sometimes may be irreversible.<sup>3</sup> WHO recommends one doctor to treat thousand people.<sup>4</sup> Doctors have huge patient load reporting with various complaints, WHO recommends one doctor to treat thousand people.<sup>5</sup> Thus, is expected that doctors need to be in the perfect state of mind without any anxieties and morbid worries but it is not frequently the situation, as doctors are affected by the same variables that execute stress on the overall population as well as the stress owing to the particularities of profession and the society expectations.<sup>3</sup>

By the quality of work doctors are exposed to an excess of emotions like disappointment when the patient's disease advances, a sense of failure feeling of helplessness against disease and its related losses, a need to rescue the patient, anxiety of becoming himself ill, unhappiness, facing uncertainty in medical practice. These feelings are dominant in nature and capable of causing distress arise due to patient-doctor relationship. Frequent exposure to such involvement of distress and emotions will contribute to the very high levels of stress which doctor experience in their course of occupation.<sup>2</sup> Stress is usually associated with undesirable organizational outcomes such as reduced productivity, improper timekeeping, trouble in comprehending new procedures, lack of collaboration, lack of attention, felling of irritation, increased tendency to make faults and aggressiveness.<sup>2</sup>

Moreover, excessive stress leads to tension, anxiety in turn causing sleep problems.<sup>6</sup> For human being, sleep is a vital indicator of overall health and well-being.<sup>7</sup> Sleep is an integral part of human life and it is a very important behavioural components of sustaining good healthy state.<sup>8</sup> Sleep has healing and refreshing effects.<sup>9</sup> Hence disorder of it may be results in significantly affected functionality thus emphasizing the importance of sufficient sleep. Sleep disturbances means any difficulty in falling asleep or failure to maintain sleep due to nocturnal eating, noise or snoring.<sup>9</sup> Sleeping habit means behavior pertaining to bed time, time to rise, coffee at night, night sleep duration and sleeping pills consumptions.<sup>9</sup> Sleep disturbances can also lead to

psychological and physical problems.<sup>7</sup> Several previous studies have found association between work place stress<sup>10-13</sup> and sleep problems in various occupation groups.<sup>13-16</sup> It is also very important to understand the influence of work characteristic in doctors and its association between doctor's stress and sleep quality as many studies designed to know about the influence of work characteristics. As per our literature research, there was less study done on sleep quality on Doctors profession. Hence this study was designed with aim of influence of work characteristics and its association between doctor's sleep quality and the stress in tertiary care hospitals of Wardha city.

### **Methodology-**

This cross-sectional study was conducted on doctors working at Tertiary Care Hospitals of Wardha city for investigation of the association between sleep- stress quality in doctors using questionnaire. Ethical approval was obtained from "Institutional Ethical Committee" (DATTA MEGHE INSTITUTE OF MEDICAL SCIENCES (DU)/ IEC/2018-19/7577) and informed consent was first taken from all study participants. Data was collected by single person during entire period providing instructions about how to fill questions. A period of 30 minutes was given for filling the questionnaires. Questionnaire containing components were: Demographic component, Global perceived stress scale (PSS) and the Pittsburgh Sleep Quality Index (PSQI) was given to doctors. The demographic component included age, gender, designation & work shift.

Fourteen questions were asked for stress evaluation and ten questions were asked for sleep evaluations of doctors. The Perceived Stress Scale [PSS] containing 14 questions is a typical stress assessment tool which helps us understanding how different conditions affect one's feeling and perceived stress. Hence, remains a popular choice. The advantage of Perceived Stress Scale is that it can be applied to different types of subject, wide range of settings, while the other reviewed stress scales for medical professions workers focus only on stresses of academics.<sup>17, 18</sup> PSQI evaluates various factors related to sleep quality in last one-month period. The PSQI in total consist of 7 components: subjective sleep quality, sleep latency, sleep durations the ratio between time slept and time in bed, habitual sleep efficiency, sleep disturbances, use of sleep medication; daytime dysfunction.<sup>16</sup>

The total score which is derived from seven subscales and higher scores designate poorer sleep quality.<sup>16</sup> The perceived stress scale were used for assessing stress, seven among the fourteen items considered as positive (4-7, 9, 10 and 13) and the other seven were considered as negative(1-3, 8, 11, 12 and 14) which represent self-efficacy and perceived helplessness, respectively. The above item was rated on Likert type scale of 5-point (0 = never to 4 = very often). Total 14item scores were obtained by first reversing the score of positive item and then adding all scores to calculate global perceived stress.

Descriptive analysis was carried out in order to evaluate the measures of the collected result. After organizing the data, it was stored in spread-sheet in Windows XP, Excel 2007 program and statistical analysis was conducted on the SPSS version 21. Quantitative variables were compared in unpaired t test and correlation.

## Results:

Table 1 show the mean scores of total PSS and PSQI. Total PSS was  $27.43 \pm 4.19$  and for positive PSS it was  $14.58 \pm 4.57$  and for negative PSS it was  $12.85 \pm 5.01$ . Total PSQI was  $10.18 \pm 1.86$ . The component with the highest score was Sleep duration ( $2.33 \pm 0.65$ ) and lowest scores were found for Habitual sleep efficiency ( $0.12 \pm 0.45$ ).

Table 2 shows the further division of PSS scores based on Specialization, Gender and Working Shift. The total PSS scores were almost equal in Post-graduates ( $27.61 \pm 4.49$ ) and in Staff were ( $27.06 \pm 3.52$ ) which was statistically insignificant. The Positive PSS Score for Post-graduates ( $14.03 \pm 4.55$ ) and Staff ( $15.69 \pm 4.44$ ), the Negative PSS score was ( $13.57 \pm 5.15$ ) and ( $11.37 \pm 4.39$ ) respectively which was statistically significant ( $p < 0.05$ ). Total PSS scores was almost equal in males and females ( $27.06 \pm 3.87$  and  $27.88 \pm 4.55$ ) and it was statistically not significant. For, Positive PSS scores slight difference was noted, males having little higher scores ( $15.10 \pm 4.55$ ) than females ( $13.97 \pm 4.56$ ) but it was statistically insignificant. However, for Negative PSS scores the females showed higher scores ( $13.92 \pm 5.36$ ) than males ( $11.96 \pm 4.54$ ) and this difference was found to be statistically significant, ( $p < 0.05$ ). It was observed, the total PSS scores was almost equal in day and night shift duty doctors. ( $27.23 \pm 4.82$  and  $27.77 \pm 2.88$ , respectively) and it was statistically not significant. For, Positive PSS scores slight difference was noted with day shift doctors having little higher scores ( $15.00 \pm 4.54$ ) than night shift ( $13.87 \pm 4.58$ ) which was again statistically insignificant. However, for Negative PSS scores of females were higher ( $13.92 \pm 5.36$ ) as compared to males ( $11.96 \pm 4.54$ ) but the difference was statistically significant ( $p < 0.05$ ).

Table 3 shows that total PSQI scores were similar in Post-graduates ( $10.31 \pm 1.90$ ) and in Staff ( $9.90 \pm 1.77$ ) and it was statistically not significant. Total PSQI scores were almost equal in males and females ( $9.88 \pm 1.66$  and  $10.53 \pm 2.04$ , respectively) and it was statistically significant ( $p$  value  $< 0.05$ ). Also, "use of sleeping medication", "subjective sleep quality", "daytime dysfunction", "sleep latency", "habitual sleep efficiency", "sleep disturbances" and "sleep duration" was again found to be statistically insignificant between PG & staff and between genders". Table 8 shows that Total PSQI scores were almost equal in day and night shift duty doctors ( $10.14 \pm 2.06$  and  $10.24 \pm 1.49$ , respectively) and it was statistically not significant. Also, Subjective sleep quality ( $1.85 \pm 0.65$  and  $2.22 \pm 0.58$ ) and Sleep duration ( $2.56 \pm 0.52$  and  $1.95 \pm 0.67$ ) were significant between day & night shift ( $p < 0.05$ ) and other components were found to be statistically insignificant.

From table number -4 it was seen that there was statically significant Positive correlation among PSS and PSQI scale.

As in our results, none of the participant had score less than 5 so for convenience we modified the PSQI scale; 0-7 were considered as good sleep quality, 8-13 moderately poor sleep quality and 14-21 categorized as poor sleep quality. The scores showed that 9% subjects had good sleep quality, 89% subjects had moderately poor sleep quality and 2% subjects had moderately poor sleep quality as seen in Table 5.

## Discussion

The tight work schedule can cause physical and mental morbidity leading to risk of sleep deprivation, sleep-wake cycle pattern change.

For this association studies done on professionals working in a tight schedule have shown an elevated error percentage during work because of partial deprivation of sleep. Sleep deprivation leads to a variety of neurophysiologic and psychological imbalances like decreased alertness and mood variations which have direct effects on an individual's performance. Investigators have seen a direct correlation between insomnia and sleep disruption due to stress with development of depression in medical students.<sup>19</sup>

It was seen from the result of this study that the stress severity was associated significantly with poorer sleep quality. According to the prior studies conducted among Norway and Korean populations the findings were found consistent.<sup>20, 21</sup>

Work load and work shift have a straight effect on stress- sleep quality in individual. In our study we observed that 100% of all the subjects have poor sleep quality. However similar Study done on Effect of stress- sleep quality in adult medical students had found that 58% of all the subjects had poor sleep quality.<sup>18</sup> Sterud and Johannessen found the association between high social support and low sleep problem risks in the men workers.<sup>20</sup> Van Laethem et-al conclude the association between high exposure to demands of job and poor sleep quality in workers of Swedish.<sup>24</sup> The job related to stress were associated with disorder of sleep like higher expectations without rewards was reported by Kim et-al.<sup>21</sup> Chazelle et-al work among French workers found that greater exposure to psychological demands predicted independently elevated sleep disorders risk.<sup>22</sup>

Our results showed that there is no significant difference between men and women's quality of sleep. Men and women doctors might have exposed to same amount of stress. Gender did not modify significantly the stress-sleep association. The work load both on male and female doctors was relatively equal. However, in another study done on Paramedical and Medical Students sex was an essential factor in students in perceived stress and females exhibited higher perceived stress as compared to males.<sup>23, 24</sup> Female medical students were more prone to mental health problems in their training period.<sup>25, 26</sup> In contrast, in a study conducted in Norway among general working population females showed lesser stress of work than male which predicted the risk of sleep disorder.<sup>20</sup> Another study done on Korean working population reported similar results they also showed that women had low work-related stress than men which predicted the risk of sleep disorder.<sup>21</sup> The results of studies on general working population may not be extrapolated doctor profession. Further studies are warranted to identify sex specific stress-sleep association. Caruso-et-al study noticed that the diseases and mortality data were associated with extensive working hours (greater than 40 hr/week).<sup>27</sup> Another study showed that the high working hour exposure were reflected in behavioural changes - reduced hours of sleep and physiological - decreased immune response.<sup>28</sup> Recent data indicates that long working hour in relation with sleep quality and duration had adverse effect.<sup>29</sup> In fact, data found in literature report the association between extensive working hours and increased prevalence of weight gain and metabolic syndrome, as well as an increased incidence of symptoms of depression and coronary heart disease.<sup>30</sup>

Ethical approval: Study was approved by "Institutional Ethical Committee" (DATTA MEGHE INSTITUTE OF MEDICAL SCIENCES (DU)/ IEC/2018-19/7577)

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Table 1: Description of Overall PSS Scores Overall PSQI amongst study participants

Variables		n	Mean	Std. Deviation
PSS	Positive PSS	131	14.58	4.57
	Negative PSS	131	12.85	5.01
	Total	131	27.43	4.19
PSQI	Subjective sleep quality	131	1.99	0.65
	Sleep latency	131	1.61	0.64
	Sleep duration	131	2.33	0.65
	Habitual sleep efficiency	131	0.12	0.45
	Sleep disturbances	131	1.87	0.54
	Use of sleeping medication	131	1.22	0.50
	Daytime dysfunction	131	0.12	0.45
	Total PSQI Score	131	10.18	1.86

Table 2: Comparison of PSS scores in Specialization, Gender and Working Shift by unpaired 't' test

Variables	PG (n=88 )	Staff (n=43)	p- value	Male (n=71)	Female (n=60)	p- value	Day (n=82)	Night (n=49)	p- value
	Mean $\pm$ SD	Mean $\pm$ SD		Mean $\pm$ SD	Mean $\pm$ SD		Mean $\pm$ SD	Mean $\pm$ SD	
Positive PSS	14.03 $\pm$ 4.55	15.69 $\pm$ 4.44	0.01	15.10 $\pm$ 4.55	13.97 $\pm$ 4.56	0.15	15.00 $\pm$ 4.54	13.87 $\pm$ 4.58	0.17
Negative PSS	13.57 $\pm$ 5.15	11.37 $\pm$ 4.39	0.05	11.96 $\pm$ 4.54	13.92 $\pm$ 5.36	0.02**	12.23 $\pm$ 5.08	13.89 $\pm$ 4.76	0.65
Total PSS	27.61 $\pm$ 4.49	27.06 $\pm$ 3.52	0.48	27.06 $\pm$ 3.87	27.88 $\pm$ 4.55	0.26	27.23 $\pm$ 4.82	27.77 $\pm$ 2.88	0.47

p&lt;0.05; significant

Table 3: Comparison of PSQI scores in Specialization, Gender and Working Shift by unpaired 't' test

Variables	PG (n=88 )	Staff (n=43)	p- value	Male (n=71)	Female (n=60)	p- value	Day (n=82)	Night (n=49)	p- value
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
Subjective sleep quality	2.05± 0.70	1.86±0.51	0.10	1.91± 0.60	2.08± 0.69	0.142	1.85± 0.65	2.22± 0.58	0.001**
Sleep latency	1.62±0.66	1.60±0.62	0.86	1.56± 0.60	1.68± 0.70	0.294	1.69± 0.69	1.48± 0.54	0.080
Sleep duration	2.26±0.70	2.48±0.50	0.06	2.32± 0.62	2.35± 0.68	0.821	2.56± 0.52	1.95± 0.67	0.001**
Habitual sleep efficiency	0.17±0.53	0.02±0.15	0.07	0.10± 0.46	0.15± 0.44	0.541	0.07± 0.30	0.21± 0.62	0.099
Sleep disturbances	1.92±0.55	1.76±0.52	0.13	1.83± 0.53	1.91± 0.56	0.373	1.82± 0.56	1.93± 0.51	0.269
Use of sleeping medication	1.20±0.48	1.25±0.53	0.58	1.18± 0.42	1.26± 0.57	0.343	1.20± 0.51	1.24± 0.48	0.679
Daytime dysfunction	1.07±0.73	0.90±0.81	0.22	0.97± 0.75	1.08± 0.76	0.404	0.92± 0.79	1.18± 0.66	0.061
Total PSQI score	10.31± 1.90	9.90±1.77	0.23	9.88± 1.66	10.53± 2.04	0.048*	10.14± 2.06	10.24± 1.49	0.771

p<0.05; significant

Table 4: The correlation between perceived stress severity and sleep quality

Variables	PSQI	
	r	p
Total PSS	0.316**	0.001**

Table 5: Modified PSQI Scores

Sr. no	Modified PSQI Scores	Percentage of study participant with poor sleep quality
1	0-7	9 %
2	8-13	89%
3	14-21	2%