

## Sleep deprivation and its consequences on house officers and postgraduate trainees

Syed Muhammad Mustahsan,<sup>1</sup> Syed Maroof Ali,<sup>2</sup> Faran Khalid,<sup>3</sup> Ali Abbas Mohsin Ali,<sup>4</sup> Hasan Ahmed,<sup>5</sup> Syed Aizaz Ali Hashmi,<sup>6</sup> Maleeka Syedain,<sup>7</sup> Fatima Feroz<sup>8</sup>

### Abstract

**Objective:** To determine sleep deprivation and its consequences on doctors in tertiary care hospitals.

**Methods:** The cross-sectional study was conducted from February to May 2012 and comprised house officers and postgraduate trainees at 4 public and 1 private tertiary care hospitals in Karachi. The subjects were posted in wards, out-patient departments and emergencies. A proforma was designed with questions about duration of duty hours, sleep deprivation and its effects on quality of performance, and presence of anxiety, depression, medical errors, frequent cold and infections, accidents, weight changes, and insomnia. Duration of 1 hour was given to fill the proforma. SPSS 20 was used for data analysis.

**Result:** The study comprised 364 subjects: 187 (51.37%) house officers and 177 (48.62%) postgraduate trainees. There were 274 (75.27%) females and 90 (24.72%) males. Of those who admitted to being sleep deprived (287; 78.84%), also complained of generalised weakness and poor performance (n=115; 40%), anxiety (n=110; 38%), frequent cold and infections (n=107; 37%), personality changes (n=93; 32%), depression (n=86; 30%), risk of accidents (n=68; 23.7%), medical errors (n=58; 20%) and insomnia (n=52; 18%).

**Conclusion:** Having to spend 80-90 hours per week in hospitals causes sleep deprivation and negative work performance among doctors. Also, there is anxiety, depression and risk of accidents in their personal lives.

**Keywords:** Physicians, Duty 80-90 hours/week, Sleep deprivation, Decrease work performance. (JPMA 63: 540; 2013)

### Introduction

Sleep is defined as a natural unconscious state of rest during which the brain's activity is not apparent (apart from the continued maintenance of basic bodily functions).<sup>1</sup> Sleep is an important constituent of human circadian rhythm, and the loss of adequate amount of sleep results in sleep deprivation. According to the National Sleep Foundation, average duration of sleep of an adult is between 7-8 hours<sup>2</sup> but we know that sleep varies from individual to individual. A state of perfect well-being plus healthy mind requires adequate amount of sleep. Lack of sleep disrupts every physiological function in the body.<sup>3</sup> Sleep deprivation predisposes people to mental, emotional, psychological and physical fatigue.

It is seen that in the lifespan of a medical professional, the duty hours of house officers and postgraduate trainees are severely tough and they remain overburdened with reduced periods of relaxation, thereby affecting their

sleep and predisposing them to health problems. Various studies across the globe have tried to catch the attention of health authorities and individuals about the adverse outcome of sleep deprivation on doctors' performance and motivation, their cognitive ability, behaviour, social vigilance, health and life dissatisfaction.<sup>4-7</sup>

In Pakistan, there is hardly any research addressing adverse atmosphere of doctors in tertiary care hospitals. The current research was conducted to highlight the frequency of sleep deprivation and its consequences on the life of house officers (HOs) and postgraduate (PGs) trainees from various tertiary care hospitals in Karachi.

### Subjects and Method

The analytical study was conducted from February 1 to May 21, 2012, in tertiary care hospitals of Karachi in both government and private sectors. The former included the Jinnah Postgraduate Medical Centre (JPMA), National Institute of Child Health (NICH), the National Institute of Cardiovascular Diseases (NICVD), the Civil Hospital Karachi (CHK) and Abbasi Shaheed Hospital. The lone private-sector facility was the Liaquat National Hospital (LNH). Informed verbal consent was

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<sup>1-6</sup>Third year MBBS Students, Sindh Medical College, Dow University of Health Sciences, <sup>7,8</sup>Jinnah Postgraduate Medical Centre, Karachi.

**Correspondence:** Syed Muhammad Mustahsan. Email: mustu198@gmail.com

obtained from all the subjects.

A questionnaire was first pre-tested on 22 subjects (11 house officers and 11 postgraduates). The sample size was calculated to be 314, at 95% confidence interval, using the anticipated frequency of our pilot study results, according to which 77.4% HOs and PGs suffered from sleep deprivation and reported negative consequences affecting their lives.

A total of 364 pre-designed proformas were distributed among HOs and PGs (excluding those in the pilot study) during their duty hours in wards, out-patient departments (OPDs) and emergencies. The subjects were selected randomly from the population for the sample size. The proforma included questions about duration of duty hours, sleep deprivation and its effects on quality of performance, and presence of anxiety, depression, medical errors, frequent cold and infections, accidents, weight changes, and insomnia, and blood pressure changes. Anxiety and depression were assessed by the two doctors among the researchers who interviewed the subjects. The participants were asked about their fear regarding upcoming events, uncertainty and fear about the future prospects, and presence of anxious feelings (palpitations, headaches, sweating, chest pain, etc.) to diagnose anxiety. The diagnosis of depression was based on whether the subjects had negative perception about the future, feelings of hopelessness, discouragement, feelings of guilt and restlessness. Duration of 1 hour was given to every subject to fill the proforma.

Selection of dependent variables was under two aspects: whether they were sleep-deprived; and, if yes, the consequences of sleep deprivation. The independent

variables were departments of hospitals, experience in the profession, salary and marital status.

SPSS-20 was used to analyse the data. The frequencies and percentages of each variable were calculated and cross-tabs between sleep deprivation and gender, and designation and department were generated.

## Result

Of the total 364 respondents, 122 (33.5%) were from JPMC; 44 (12.08%) from NICVD; 24 (6.59%) from NICH; 70 (19.23%) from Abbasi Shaheed Hospital; 61 (16.75%) from CHK; and 43 (11.81%) from LNH. There were 187 (51.37%) HOs and 177 (48.62%) PGs. There were 274 (75.27%) females and 90 (24.72%) males in the study.

The data was collected from Allied Medicine (n=96; 26.4%), Medicine (n=95; 26.1%), Allied Surgery (n=88; 24.2%); Surgery (n=52; 14.3%); Radiology (n=18; 4.9%) and Dentistry (n=15; 4.1%).

Overall, sleep deprivation was common in 287 (78.84%) of the respondents. Among the females, it was 224 (81.8%), while among the males it was 63 (70%).

The adverse effects of sleep deprivation in doctors were generalised weakness and bad performance in 115 (40%) respondents, anxiety in 110 (38%), frequent cold and infections in 107 (37%), personality changes in 93 (32%), depression in 87 (30%), risk of accidents in 68 (23%), and medical errors in 58 (20%) of the respondents.

The physical and mental health was also impaired because of weight changes reported by 53 (18.46%), insomnia by 52 (18%), decreased libido by 11 (3.8%), obstructive sleep apnoea by 8 (2.74%), blood pressure problem by 6 (2%) and post-menstrual dysmorphic

Table: Frequency of sleep deprivation.

			Sleep Deprivation		Total
			Yes	No	
Gender	Male	Count	63	27	90
		% Within Gender	70.0%	30.0%	100.0%
		% Within Sleep Deprivation	22.0%	35.1%	24.7%
		% of Total	17.3%	7.4%	24.7%
	Female	Count	224	50	274
		% Within Gender	81.8%	18.2%	100.0%
% Within Deprivation		78.0%	64.9%	75.3%	
	% Of Total	61.5%	13.7%	75.3%	
Total		Count	287	77	364
		% Within Gender	78.8%	21.2%	100.0%
		% Within Deprivation	100.0%	100.0%	100.0%
		% Of Total	78.8%	21.2%	100.0%

disorder by 3 (1.09%) of the respondents.

## Discussion

Doctors are considered pillars of health services in any nation. To provide quality health services to the suffering humanity, the physical and mental health of doctors themselves must be perfect. Mental health is the ability of an individual to form harmonious relations with others and to participate in social and physical environment positively. For good mental health, 7-8 hours of peaceful sleep is required. Due to lack of sleep, mental health is impaired, and affects professional services. In general, sleep deprivation results in excessive daytime sleepiness and affects male and female of all ages keeping in view their job shifts and workloads.

Sleep deprivation is found to be most common in doctors because of prolonged duty hours. In the current study, 78.8% reported sleep deficit. Disrupted sleep affects memory processes and ones' learning capability, and therefore junior doctors' opportunity to extract maximum knowledge from the training system is compromised.<sup>8</sup> Researches have found that task performances tend to decline with sleep deprivation.<sup>6,8</sup> In our survey, 20% PGs and HOs admitted that medication errors on patients had been committed by them in long shifts due to poor sleep and altered state of mind. The aspect of poor medical knowledge and ill-experience may be an important reason on which the report failed to comment. In US, medication errors cost \$4 billion a year, and thousands of lives are lost.<sup>9</sup> Doctor's health is also an integral component and if the doctors themselves are not in a proper state of mind, who would lend safe care and treatment to the patients? In the view of the general public, reducing the work hours of doctors appears to be a better option in improving a patient's safety.<sup>8</sup>

The high prevalence of sleep deprivation among HOs and PGs have created strong objections on long duty periods which is considered a root cause of bad circumstances on their educational and environmental lives. Medicine (n=76) and Allied Surgery (n=76) HOs and PGs were the most significantly sleep-deprived. Previous reports have explained that doctors' training have been punctuated with immense work load, stress, fatigue and limited rest, thereby causing sleep deprivation.<sup>7</sup>

Results suggested that the social activities of a significant number of doctors were compromised. The study was limited and did not explore the family relationships. One of the documented studies, however, pointed to the fact that poor sleep quality can come up with life dissatisfaction in future.<sup>10</sup> The research held on UK junior doctors also showed their reduced family time.<sup>11</sup> The

report revealed the high occurrence rate of sluggish attitude and they needed adequate sound sleep to omit fatigue, relatively causing disturbances in life. In one paper, a resident said: "Relationships are put on hold during residency."<sup>12</sup>

Sleep deprivation works as a slow poison on the human body. Studies have shown that sleep deprivation is associated with blood pressure changes and may lead to a variety of cardiovascular consequences, and that for a healthy heart, a person must have balanced sleep.<sup>13</sup> The immune system is also regulated while the person is asleep and, therefore, poor sleep may reduce immunity, increasing the tendency of catching infections.<sup>14</sup> Infections affect a person's mental state by altering the internal environment of the body. Moreover, sleep also maintains the levels of various hormones like ghrelin and leptin which regulate appetite.<sup>14</sup> Thus, sleep is essential for body's mechanisms to stay in equilibrium, and inadequate sleep may interrupt normal body processes.

Sleep acts as a recharger of a human's well-being, and disrupted sleep may lead to mood-related symptoms. Anxiety and depression are also experienced by doctors due to sleep deprivation and they put enormous strain over the lives of HOs and PGs. They impair their professional as well as social life and, in doctors' view, long working hours, immense load and stress conjugated with limited salaries exacerbated the impact on their anxiety and depression. Sleep also affects the sexual life<sup>4</sup> and, in our study, over 3% of doctors reported decreased libido due to unhealthy sleep. Personality and behaviour are also under the influence of sleep, the lack of which may cause unethical and non-professional behaviour. Poor sleep sometimes may be harmful to the doctor-patient relationship and restless doctors showed lack of compassion towards their patients.<sup>12</sup> Our report suggested that 32% of the doctors had personality and behavioural problems. This all, in turn, increases stress and frustrations in life and the emotional stress developed among the junior doctors may force them to ruin their own life as in one report, 2 residents of internal medicine had attempted suicide during their leave of absence.<sup>15</sup>

The study showed high frequency of sleep deprivation among HOs and PGs and consequences of sleep deprivation which are modifiable. Few respondents believed that increasing faculty supervision may aid in times of fatigue, while the rest strictly stuck to the fact that only decreased work hours can settle their life problems. However, in a developing country like Pakistan, more researches on similar subjects are required to bring to the knowledge of health officials the climate and

exploitation of doctors so that new policies can be formulated. Furthermore, experimental researches should be conducted to investigate whether their training and opportunity for better education is being compromised through sleep deprivation.

### Conclusion

Prolonged duty hours of doctors badly impact their mental and physical health and also their professional services. Steps should be taken by the relevant authorities to minimise the duty hours of doctors so that they can provide better care to the patients.

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