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RESEARCH ARTICLE

SLEEPING PATTERNS, DAY TIME SLEEPINESS AND ITS EFFECTS ON HOUSE OFFICERS AND RESIDENTS WORKING IN PUBLIC SECTOR HOSPITALS OF KARACHI.

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Abstract

OBJECTIVES:
To assess and compare the sleep patterns, day time sleepiness and its effects on daily routine of house officers and residents working in public sector hospitals of Karachi.

METHODOLOGY:
Through Stratified Based Convenient Sampling technique we collected a sample of 732 from house officers and residents working in three public sector hospitals of Karachi namely Civil Hospital Karachi (CHK), Jinnah Postgraduate Medical Centre (JPMC) and Abbasi Shaheed Hospital (ASH) from April to September, 2011. A self-administered questionnaire was used as a study tool assessing the sleep patterns, day time sleepiness and the effects of sleep loss on their daily routine. Epworth Sleepiness Scale was used to assess day time sleepiness. Reliability Analysis was done by Cronbach's Alpha. Frequency and Percentages were calculated for categorical variables. Mean ± SD was computed for measurement variables. Non-Parametric analyses were performed for comparing attributes among three hospitals and between two designated target populations.

RESULTS:
House officers and residents in public sector hospitals of Karachi were found to take inadequate amount of sleep with a median of 6-8hours and 2 hours on non-call and on call nights respectively. On Epworth sleepiness scale 66% of the total sample scored in normal range with 33% in the range for which clinical consultancy is indicated. Among the three hospitals respondents in CHK reported highest level of day time sleepiness with ASH and JPMC ranking 2nd and 3rd, respectively. Resident's perceptions of adverse effects of sleep were consistent across three hospitals. Their sleep loss has adverse effects on their learning abilities, behavior, physical, psychological and emotional well-being and relationship with their family and their sleep loss is hampering most of their social activities.

CONCLUSION:
This study added to the growing body of evidence that trainee's long working hours and hectic schedule has adverse consequences on their sleep affecting their personal and professional lives. There is a need to reevaluate training programs to tailor policy according to human physiology since one cannot tailor physiology according to man-made policies.

INTRODUCTION

Since long, house officers and residents have been known to work for long hours which exceeds 24hours, when on call, that adversely affects their sleep. Medical trainees work in continuous shifts with minimum time to restore. The quality of patient care is jeopardized when doctors are sleep deprived. The well-being of residents is also at risk due to the same reason. This is the matter of grave concern since these medical trainees are integral part of health system. Accreditation (ACGME) imposed strict duty hour's restriction in all of its accredited medical institutes in United States [1].The recent advances in sleep biology raises important concerns about the long working hours of medical internees.

Sleep patterns of medical trainees working in Pakistan has not been identified. This study will elaborate the sleep patterns, level of sleepiness and its effects on personal and professional life of medical internees working in public sector hospitals of Karachi.

LITERATURE REVIEW:

Circadian rhythm which controls sleep wake cycle promotes wakefulness and increased vigilance, which is maximum during day and markedly reduced at night and this, exist independent of duration of prior sleep. The more time a person spent awake, the more is the drive to sleep. This drive cause involuntary sleep. Sleep inertia which is characterized by confusion, poor judgment, and inappropriate decision making. Impaired recall of events occurring during the awakening period results from incomplete arousal following a period of 3 or more hours of sleep. The understanding of this phenomenon holds an important position in determining optimal working schedules for house officers and residents [2].

Sleep is important for memory consolidation and learning [3] [4].Sleep deprivation results in decreased Working memory capacity (WMC) [5] [6].This ability enables to retain and manipulate information or sensory input to perform multiple tasks[7].Understanding these effects is necessary since they all apply to a sleep deprived medical interns[8][9][10].

In a study conducted on house officers in Singapore [11] to determine their sleep patterns founded that the subjects had a median of 8.0 hours and 6.5hours sleep during pre-university and final year of their medical education, respectively. They were found to sleep a median of only 1h per night on call and 6.0 h per non-call night with median of 5 interruptions during sleep on one night call. These findings lead towards a conclusion than house officers enter the profession chronically sleep-deprived. In another study conducted on residents and internees in Korea found mean sleep duration to be 5.0 ± 1.2 h/night with work duration of 14.9 ± 2.7 h/day [8].

Various studies have discussed the level of day time sleepiness in medical trainees with different proportions. According to them medical trainees do have excessive day time sleepiness to the extent that requires medical supervision[12].This is comparable to patients with narcolepsy and sleep apnea[13].Level of daytime sleepiness following call were found to increase with the time spent at work after call[11]. Residents' daytime sleepiness in both baseline and post-call conditions was near or below levels associated with clinical sleep disorders[13]In a study conducted in U.S., 84% of sample scored on ESS in the range for which clinical intervention is indicated[14].In another study, more than half of residents reported excessive daytime sleepiness[15].

Sleep deprived residents may pose a hazard to themselves. A study conducted on a population based sample revealed that the sleepiness is related to motor vehicle crashes with highest number of accidents caused by those who were excessively sleepy [16]. A study on medical interns reported an increase in monthly risk of motor vehicle crash or near-miss incident due to sleep deprivation especially during the commute from work [17]. Those interns who were driving post call being more at risk [18].There was also a significant increase in the risk that they would fall asleep while driving or while stopped in traffic in months in which they worked five or more extended shifts [17].

A prospective study conducted in U.S. concluded that neurobehavioral performance of residents after heavy call (90 hours' work/week + night call every 4^{th} or 5^{th} night) was found to be equal to or worse than performing with a blood alcohol level of 0.04% to 0.05% during a light call (daytime clinic and backup night call) rotation[10].

A study conducted in Pakistan found that long duty are associated with deterioration in cognitive and behavioral status of resident which they are unable to appreciate themselves[9].Studies support that the physicians working

>24hours on-call shift make substantially more significant medical errors compared to those working 16 hours shift. [19][20] and have more attention failures when working overnight [20].The sleep loss affects the clinical performance of residents [21].Eliminating interns' extended work shifts significantly increases sleep and decreases attentional failures during night work hours [22].

Residents believe that their long tiring schedule has major impact on their personal life and on their relationship with their parent's wife and children. Long busy schedules many times lead to postponement of many meaningful social activities and personal pleasures [14].

There is scarcity of such data available in Pakistani setup. This study, thus, designed to identify sleep patterns of medical trainees working in public sector hospitals of Karachi. It also compared the sleep pattern and effects of sleep deprivation between house officers and residents and among different kind of hospitals in Karachi.

RATIONALE:

Sleep is the fundamental feature of life and a need that must be met. Medical internees are an integral part of health system their health is important for the whole health care system, and has direct implications on the quality of patient care. As described above, many nations made policy for the working hours of medical trainees to avoid effects of sleep loss. With intense literature, it was found lack of research in this area in Pakistan with possible chances of intervention and improvement we conducted this research to find the sleep patterns, level of sleepiness and the effects of sleep loss on the personal and professional lives of trainees.

OBJECTIVES:

To assess the sleep pattern, day time sleepiness and its effects on daily routine of house officers and residents working in public sector hospitals of Karachi

To compare the sleep pattern in three different hospitals of Karachi

SIGNIFICANCE:

This study would help us to find the sleep patterns, day time sleepiness and its effects that medical trainees may be suffering from. It may help authorities concerned with graduate medical training to reevaluate the training program and tailor policy according to normal human physiology. These limited duty hours will help them to perform their duties more diligently and in a healthy way, reducing the chances of possible medical errors and hazards to their own life. On the other hand fresh and active internees will be able to learn more during their duty hours. It will improve quality of learning and patient care.

METHODOLOGY

STUDY SETTING:

Study was conducted in three public sector hospitals of Karachi that were CIVIL HOSPITAL, JINNAH POSTGRADUATE MEDICAL CENTRE and ABBASI SHAHEED HOSPITAL.

SAMPLE SIZE:

Earlier analysis revealed that overall mean sleep duration among residents and trainees in Korea was 5.0 ± 1.2 h/day [8]. Thus, using 97% confidence interval, 0.1 unit margin of error, the calculated sample size was 678.Adding 15% non-response rate, the cumulative sample size was 780 with the division of 3:2 for House officers and residents. However, we distributed 794 questionnaires among 476 house officers and 318 residents across specialties.

DATA COLLECTION:

A self-administered questionnaire was filled by respondents after verbal consent.

INCLUSION CRITERIA:

Medical trainees present at the time of study

EXCLUSION CRITERIA:

All those who refused to fill the questionnaire

SAMPLING TECHNIQUE:

Stratified Based Convenient Sampling

STUDY DESIGN:

Cross sectional study

STUDY DURATION:
From April to September, 2011
DATA INSTRUMENT:
Questionnaire comprising of four sections was used as study tool. First section encompassed the demographic characteristics, second part consisted of sleep patterns, and third one included Epworth Sleepiness Scale (ESS) calculating the day time sleepiness and in the last part effects of sleep deprivation over the personal and professional life of participants was asked.

1. DEMOGRAPHIC CHARACTERISTICS:
In this part, general bio data was taken including name, gender, age, marital status, household income, residential area, working hospital, current department mode of travelling to hospital, designation of participant as house officer or resident and year/month of training encompassed.

2. SLEEP PATTERNS:
It included five questions regarding the amount of sleep internees used to have before university, in final year and during on call night and non on call nights of their present training. The numbers of interruptions they have during on call nights and what they prefer to do on reaching home after on call night duty was also asked in this section.

3. EPWORTH sleepiness SCALE (ESS):
Epworth sleepiness scale (ESS) was used to assess daytime sleepiness of residents and house officers. It is a simple and reliable self-administered questionnaire which is used to provide a measurement of subject's general level of daytime sleepiness [12].It was introduced in 1991 by Dr. Murray Johns of Epworth Hospital in Melbourne, Australia [23]. There are eight different situations given in the questionnaire which are sitting and reading, watching TV, sitting in public place, as a passenger in car, lying down to rest in after noon, sitting and talking to someone, sitting quietly after lunch and as a driver.
The subjects have to fill their chances of dozing off or fall asleep on a scale from 0 to 3 with 0 = no chance of dozing off or sleep, 1 = *slight* chance of dozing or sleeping, 2 = *moderate* chance of dozing or sleeping, 3 = *high* chance of dozing or sleeping. The score is to be added with 0 being lowest possible and 24 being highest possible score. Score in the range of 0-10 is considered normal and score above 24 indicates that clinical intervention is required.

4. EFFECTSOF SLEEP DEPRIVATION:
This portion of the questionnaire was designed to know the effects of sleep deprivation as being perceived by trainees. It comprised of 16 questions which were about effects of sleep deprivation on their ability and motivation to learn, cognition ,interaction with patients their family members and with staff, empathy & concern towards patients, chances of medical errors, diligence in performing basic medical responsibilities, their physical psychological and emotional health and their relationships with their family members.

STATISTICAL ANALYSIS
Data were entered in Epi Data software and analyzed in Predictive Analytical Software (PASW). Cronbach's Alpha was computed to determine the reliability of the data structure. Frequency and Percentages were calculated for categorical variables like gender, designation, marital status, household income, mode of travelling and different sleep pattern, Epworth ranges and related effects. Mean ± standard deviation were computed for measurement variables such as age, Epworth score and effects of sleep deprivation score. Median was calculated when comparison made between categorical variables and skewed measurement variables. Non-parametric analyses were run for the comparison of these attributes. Kruskal Wallis test was performed for the comparison among different hospitals and Mann-Whitney U test was run for the comparison between different medical trainees. P value less than 0.05 were considered significant.

RESULTS:

A total of 732 respondents gave consent and fill the questionnaire. Among these, total house officers who participated were 436(59.6%) and residents were 296(40.4%).

Total sample collected:

CHK=310
JPMC=318

ASH=104

The reliability value of the questionnaire obtained from Cronbach's Alpha was 79.9% which was higher than the normal range of reliability.

The data obtained about age is 529 with 203 not reported. The mean age calculated was 25.23 with standard deviation ±4.38.

Total male participants were 266 (36.3%) and female were 466 (63.7%). Married participants were 220 (30.1%); unmarried 508(69.6%); 2 (0.3%) were divorced and 2 were unknown. Participants having overall house hold Income below 30,000 were 216 (30.6%); between 31,000-40,000 were 69 (9.8%); between 41,000-50,000 were 85 (12%); between 51,000-60,000 were 96 (13.6%); above 60,000 were 240 (34%) and 26 remained unknown. Those who travelled by car were 257 (35.9%), by bus were 322 (46.4%), both bus and car were 39 (5.5%), and those who took other modes were 87 (12.2%) with 17 unknown. Nearly half of the participants were first in their family in medical profession (Figure 1).

In Pre University those house officers who slept less than 5 hours were 15(3.4%), between 5-6 hours 33(7.6%), 6-8hours 142(32.6%), 8-10 hours 187(42.9%) and more than 10 hours were 59(13.5%).

About 10% of the participants who slept less than 5 hours belonged to final year. Those who slept between 5-6 hours were 135 (31%), 6-8hours were 161 (36.9%), 8-10 hours 72 (16.5%) and more than 10 hours were 25 (5.7%).

During on call duty those who sleep less than 1 hour were 81 (18.8%), for 2 hours 161 (37.4%), for 3hours 107 (24.8%), for 4hours 55 (12.8%) and 24 (5.6%) slept for 5 hours.

During non-call duty those who slept for less than 5 hours were 81(18.8%), between 5-6hours 118(27.4%), between 6-8hours 145(33.6), 8-10hours 53(12.3%) and more than 10hours were 32(7.4%), with 2 non applicable and 5 unknown.

There was found a gradual decrease in median sleeping hour of medical trainers from pre-university, final year and on-call nights. Participants take more sleep in non-call night then other inquest nights.

On call duty those who never get interrupted during sleep were 30(7.0%), about 1-2 times 127(29.5%), 3-4 times 146(33.9%) and 5-6 times were 124(28.8%) with 4 non applicable and 5 unknown.

Every three out of four house officers prefer going to sleep after getting off from on-call duty, Seventy one (16.5%) spend time with their family, Fourteen (3.2%) go to social gathering and those who do other activity were 17 (3.9%) with 5 did not reply.

The above findings in case of residents were not much different as of house officers. These facts and figures can be seen in Table (1) of the report.

Exploring daytime sleepiness in our study using Epworth scale, the mean score was 8.79 ± 4.16. Sorting this scale on standard classification, we compared scores, according to which 99 (22.7%) house officers and 63 (21.3%) residents were desirable, 198 (45.4%) house officers and 130 (43.9%)residents had mild sleepiness, 113 (25.9%) house officers and 86 (29.1%) residents had moderate sleepiness and 26 (6%) house officers and 17 (5.7%) residents had severe sleepiness. (Table 2)

Within three hospitals, CHK had score of 70(22.6%) desirable, 129 (41.6%) mild sleepiness, 86 (27.7%) moderate sleepiness and 25 (8.1%) severe sleepiness. ASH had 26 (25.0%) desirable, 52 (50%) mild sleepiness, 24 (23.1%) moderate sleepiness and 2(19%) severe sleepiness. JPMC had 66 (20.8%) desirable, 147 (46.2%) mild sleepiness, 89 (28%) moderate sleepiness and 16(5%) severe sleepiness. (Table 2)

Stratifying each factor of Epworth scale, we found that during sitting and reading house officers who have no chance of dozing were 147 (33.7%), slight chance of dozing were 141 (32.3%), moderate chance of dozing 93 (23.3%) and high chance of dozing were 55 (12.6%). Residents during sitting and reading who have no chance of dozing were 82 (27.8%), slight chance of dozing were 81(25.5%), moderate chance of dozing 93 (31.5%) and high chance of dozing were 39(13.2%) with 1 unknown. In CHK and ASH there is highest frequency of No chance of dosing while JPMC has the highest frequency of slight chance of dozing.

During watching TV, house officers, who have no chance of dozing were 191 (45.8%), slight chance of dozing were 145 (33.3%), moderate chance of dozing 71 (16.3%) and high chance of dozing were 29 (6.1%). Residents during sitting and reading who have no chance of dozing were 125 (42.2%), slight chance of dozing were 93 (31.4%), moderate chance of dozing 63 (21.3%) and high chance of dozing were 15 (5.1%). In all the 3 hospitals we found no chance of dozing as highest.

While sitting inactive in a public place House officers who have no chance of dozing were 147 (33.7%), slight chance of dozing were 141 (32.3%), moderate chance of dozing 93 (23.3%) and high chance of dozing were 55 (12.6%). Residents during sitting and reading who have no chance of dozing were 82 (27.8%),slight chance of dozing were 81 (25.5%),moderate chance of dozing 93 (31.5%) and high chance of dozing were 39 (13.2%) with 1 non-response. In all the three hospitals we found no chance of dozing as highest reported incident.

As a passenger of car without a break those house officers who have no chance of dozing were 126 (28.9%), slight chance of dozing were 102 (23.4%), moderate chance of dozing 113 (25.9%) and high chance of dozing were 95 (21.8%). Residents as a passenger of car without break who have no chance of dozing were 83 (28%), slight chance of dozing were 87 (29.4%), moderate chance of dozing 83 (28%) and high chance of dozing were 43 (14.5%). In CHK we found moderate chance of dozing as highest, in JPMC no chance of dozing while in ASH slight chance of dozing.

Lying down to rest after lunch those house officers who have no chance of dozing were 41 (9.4%), slight chance of dozing were 53 (12.2%),moderate chance of dozing 125 (28.7%) and high chance of dozing were 217 (49.8%). Lying down to rest Residents who have no chance of dozing were 29 (9.8%),slight chance of dozing were 43 (14.5%),moderate chance of dozing 92 (31.1%) and high chance of dozing were 132 (44.6%).In all the 3 hospitals we found high chance of dozing as highest.

While sitting and talking to someone house officers who have no chance of dozing were 297 (68.1%), slight chance of dozing were 88 (20.2%), moderate chance of dozing 42 (9.6%) and high chance of dozing were 9 (2.1%). Those Residents who have no chance of dozing were 193 (65.2%), slight chance of dozing were 67 (22.8%), moderate chance of dozing 26 (8.8%) and high chance of dozing were 10 (3.4%). In all the 3 hospitals we found high chance of dozing as highest.

While sitting quietly after lunch those house officers who have no chance of dozing were 98 (22.5%), slight chance of dozing were 146 (32.1%), moderate chance of dozing 116 (26.6%) and high chance of dozing were 82 (18.8%). Residents who have no chance of dozing were 67 (22.6%), slight chance of dozing were 85 (28.7%),moderate chance of dozing 85 (28.7%) and high chance of dozing were 59 (19.7%).In CHK we found slight chance of dozing as highest frequency, JPMC moderate chance of dozing and in ASH no chance of dozing.

As a driver of car while stopped for few minutes those house officers who have no chance of dozing were 353 (82.1%),slight chance of dozing were 46 (10.7%),moderate chance of dozing 19 (4.4%) and high chance of dozing were 12 (2.8%). Residents who have no chance of dozing were 235 (79.7%), slight chance of dozing were 34 (11.5%), moderate chance of dozing 18 (6.1%) and high chance of dozing were 8 (2.7%) and not applicable was reported by one. In all the 3 hospitals we found no chance of dozing as highest frequency. (Table 3)

We analyzed sleep deprivation effect among house officers and residents in all the 3 hospitals and found that in CHK those who strongly agree that sleep loss has affected their motivation and ability to learn were 94(30.3%), 123(39.7%) agree,41(13.2%) neutral, 42(13.5%) disagree and 10(3.2%) strongly disagree. In ASH 34(32.7%) strongly agree, 39(37.5%) agree, 16(15.4%) neutral, 12(11.5%) disagree and 3(2.9%) strongly disagree. In JPMC 80(25.2%) strongly agree, 139(43.7%) agree, 50(15.7%) neutral, 38(11.9%) disagree and 11(3.5%) strongly disagree.

In CHK those who strongly agree that they come only to mark their attendance and avoid being penalized were25 (8.1%), 6.8(21.9%) agree, 51(16.5%) neutral, 118(38.1%) disagree, 48(15.5%) strongly disagree. In ASH 2(1.9%) strongly agree, 19(18.3%) agree, 23(22.1%) neutral, 40(38.5%) disagree and 20(19.2%) strongly disagree. In JPMC 31(9.7%) strongly agree, 74(23.3%) agree, 61(19.2%) neutral, 102(32.1%) disagree and 50(15.7%) strongly disagree.

The rate of agreement for loss of cognitive skills due to sleep deprivation is more in JPMC as compare to CHK and ASH. The acknowledgment of being in attentive and abrupt to interact with patients and staffs rated more JPMC than CHK and ASH.

In CHK those who strongly agree that their interaction with staff is effected were28 (9.0%), 96(31.0%) agree, 64(20.6%) neutral, 96(31.0%) disagree, 26(8.4%) strongly disagree. In ASH 4(3.8%) strongly agree, 33(31.7%) agree, 24(23.1%) neutral, 37(35.6%) disagree and 6(5.8%) strongly disagree. In JPMC 29(9.1%) strongly agree, 85(26.7%) agree, 84(26.4%) neutral, 102(32.1%) disagree and 18(5.7%) strongly disagree.

Sleep loss causes loss of empathy and concern more in JPMC than CHK and ASH.

In CHK those who strongly agree that they are reluctant of performing basic medical responsibilities were32 (10.3%), 77(24.8%) agree, 45(14.5%) neutral, 120(38.7%) disagree, 36(11.6%) strongly disagree. In ASH 3(2.9%) strongly agree, 22(21.2%) agree, 28(26.9%) neutral, 42(40.4%) disagree and 9(8.7%) strongly disagree. In JPMC 33(10.4%) strongly agree, 88(27.7%) agree, 54(17%) neutral, 118(37.1%) disagree and 25(7.9%) strongly disagree.

When asking about conduct of medical errors due to sleep loss, JPMC were more agree. CHK and ASH posed similar proportions. On the other hand, CHK trainees try more to use cut corners in work.

Physical, psychological and emotional health were more disturbed in JPMC's medical trainees than other hospitals. Though, they have less constricted life than CHK and ASH medical interns.

Around 12% in CHK were agreed that they were worried of having car accident after post call. This ratio is same in JPMC. However, ASH trainees were least agreement on the same concern.

The proportion of having family complains of not giving time to them was reported more or less in all the three hospitals by these medical trainers.

In CHK those who strongly agree that their relationship with partner is suffering were 16(16.8%), 26(27.4%) agree, 22(23.2%) neutral, 23(24.2%) disagree, 8(8.4%) strongly disagree with 215 not applicable. In ASH 4(9.1%) strongly agree, 15(34.1%) agree, 12(27.3%) neutral, 10(22.7%) disagree and 10(22.7%) strongly disagree. In JPMC 20(18.7%) strongly agree, 36(33.6%) agree, 22(20.6%) neutral, 23(21.5%) disagree and 6(1.9%) strongly disagree with 211 not applicable.

In CHK those who strongly agree that their relationship with children is suffering were 11(13.6%), 31(39.2%) agree, 16(20.3%) neutral, 15(19%) disagree, 6(7.6%) strongly disagree with 231 not applicable. In ASH 5(12.5%) strongly agree, 19(47.5%) agree, 6(15%) neutral, 7(17.5%) disagree and 3(7.5%) strongly disagree with 64 not applicable. In JPMC 11(14.3%) strongly agree, 30(39%) agree, 18(23.4%) neutral, 15(19.5%) disagree and 3(3.9%) strongly disagree with 241 not applicable. (Table 4)

In the end most of the house officers suggested that their duty hours should be of 12-14 hours with 5-6 calls a month or 8 hours duty with 3 shifts per day. After call next day should be off. Duty should be regarding international law. Emergency calls should be of 8 hours. House job is bull shit. Night duty less than 32hours. Post call should be over by 8 am and off should be given next day.

On comparing house officers and residents we found that residents are more likely to be sleep deprived as they agreed for the factors like decreased cognition and intellect, poor interaction and decreased concerned with the patient and impaired coordination with staff.

Residents also reported about their reluctant behavior in performing their basic medical responsibilities, they try to cut corners in their work. Sleep loss has badly affected their health; they are worried of having accidents after post call. They have disturbed relationship with all of their family members.

Significant p values obtained for factors like cognition 0.016, family complain 0.05, relationship with parents 0.03, with partner 0.04 and children 0.08.

In the end most of the house officers suggested that their duty hours should be of 12-14 hours with 5-6 calls a month or 8 hours duty with 3 shifts per day. After call next day should be off. Duty should be regarding international law. Emergency calls should be of 8 hrs. House job is bull shit. Night duty less than 32hrs. Post call should be over by 8 am and off should be given next day.

DISCUSSION:

This study was first with its specifications including different factors, related to sleep pattern and effect of sleep deprivation. There were several covariates considered and quantitative and qualitative aspects were asked. Though, some of them were presented in this report.

Initiating from sleep patterns we found that both house officers and residents had similar median hours of sleep in all three hospitals with a decrease in number of hours being slept from pre-university to present medical training. According to National Sleep Foundation an adults requires an average of 7-9 hours of sleep .In our study, house officers and residents were found to have adequate amount of sleep during pre-university and final year of M.B.B.S. with median of8-10 hours and 6-8 hours, respectively. During non-call nights of their present training they were found to sleep a median of 6-8hours, a near normal value. During call median sleep hours were 2 with a median of 3-4 interruptions. These results combined with the knowledge that in our set up there are an average of 4-10 nights per month, it can be concluded that medical trainees are suffering from cumulative sleep deprivation. Our results were concurrent with the findings of another study conducted in Singapore where the subjects were found to sleep a median of 6 hours and 2 hours on non-call night and when on-call, respectively with a median of 5 interruptions. This cumulative sleep deprivation can't be independent of neurobehavioral and physiological consequences which include attention failures, decreased working memory capacity poor cognition abilities [24] [25] depressed mood and adverse metabolic endocrine and immune response which all are the adverse effects of sleep loss [25] [26]

Significant numbers of subjects were found to have day time sleepiness. Epworth mean for entire sample was found to be 8.77± 4.18 near to the mean for obstructive sleep apnea syndrome(11.7±4.6) [12].This mean is lower then what was found in another study where it was 14.6 ±4.4[14].In our setup, it was found that 66% of the sample scored in the normal range(score=0-10) 33% scored in the range for which clinical intervention is required(score=11-24) which is less than as reported in another study where 16% scored in normal range and 64% in not normal range. With 35.8%, CHK had the highest percentage for abnormal score and ASH had the lowest (25%). JPMC ranked third with 33%.It is probably because CHK has maximum number of admissions and also has less number of health care providers compared to the number of patients and also when compared with other hospitals.

It is evident from results that sleep loss has major impacts on internees' ability and motivation to learn and their cognitive abilities, also they feel like having constricted life space and having no leisure time and their long hectic

duty is affecting their family relationships. Sleep loss also has impact on their behavior and they are abrupt in their interaction with their patients their family and hospital staff. Significant difference of opinion was not found regarding these questions by respondents of all three hospitals.

There was agreement among respondents of all the three hospitals that sleep loss is affecting their physical and psychological health and emotional well-being.

Majority of the respondents in all 3 hospitals disagreed that their sleep loss is not becoming a cause for them to lose empathy, make medical errors, show reluctance and taking shortcuts in their work. This is in contradiction to other studies which have associated medical errors with long duty hours and night calls [19] [20].This contrast may be because of poor recall by the respondents or they may not want to mention in opt of non-disclosure of their own negligence. Other reason could be they might not be giving importance to minor errors or it may be because they perform most of tasks multiple times and their practice have make them more versed in their job, so it remains unaffected by sleep loss.

A work hour limitation is one of the most reported suggestions. Night float system can also be thanked of since it has worked well according to many researches[27][28][29].New York was the first state to take legislative actions to reduce trainees work hours after the unfortunate death of Libby Zion at a New York City teaching hospital in 1984. The Bell commission highlighted trainee fatigue, as well as inadequate supervision as factors contributing to adverse outcome in Zion case and subsequently recommended IN 1989 to limit training to 80 hours on duty per week (averaged over a four-week period) and 24 consecutive hospital duty hours[30].In July 2003 the Accreditation Council for Graduate Medical Education (ACGME)[1] adopted similar regulations for all accredited medical training institutions in the United States. These recommendations include limitation of duty to an average of 80 hours per week, a maximum of 24 consecutive hours on call, 10 hours off between shifts, and maximum on-call frequency of every third night [1]. The studies conducted to evaluate the effectives of ACGME recommendations showed positive impacts of reducing work hours on patient mortality[31 and patient's outcomes[32] which are the impacts of reduced patient fatigue.

In our set-ups trainees are working for more than hundred hours per week (personal correspondence).Sidney Zion father of Libby Zion when came to know that the doctors dealing with her daughter were on duty for more than 24hours and trainees usually work for 36 hours he sued the hospital and mentioned in New York times, "You don't need kindergarten to know that a resident working a 36-hour shift is in no condition to make any kind of judgment call -- forget about life-and-death[33][34]."

CONCLUSIONS:

This study added to the growing body of evidence that trainee's long working hours and hectic schedule has adverse consequences on their sleep affecting their personal and professional lives. We can assume that the results of our study can be generalized to all public sector hospitals since we collected sample across specialties and from three major public sector hospitals. This study supported the idea that medical trainees are simple normal human beings who cannot acclimate to the effects of sleep loss. Training programs should be re-evaluated to tailor policy according to human physiology since one cannot tailor physiology according to man-made policies.

LIMITATIONS:

Due to less consents and difficulties in tackling the non-corporation and misbehavior from target population and area, the achievement of desired sample size delayed. Consequently, this report strictly focused on main objectives related to the title of the study. This advanced statistical analysis could not be performed to see the confounding effect of demographic and other life style factors accumulated by study tool and data.

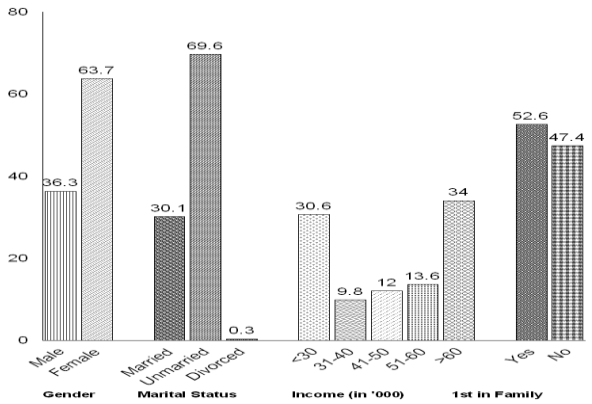

Fig. 1: Demographic Characteristics of Medical Trainees Working in Public Sector Hospitals of Karachi

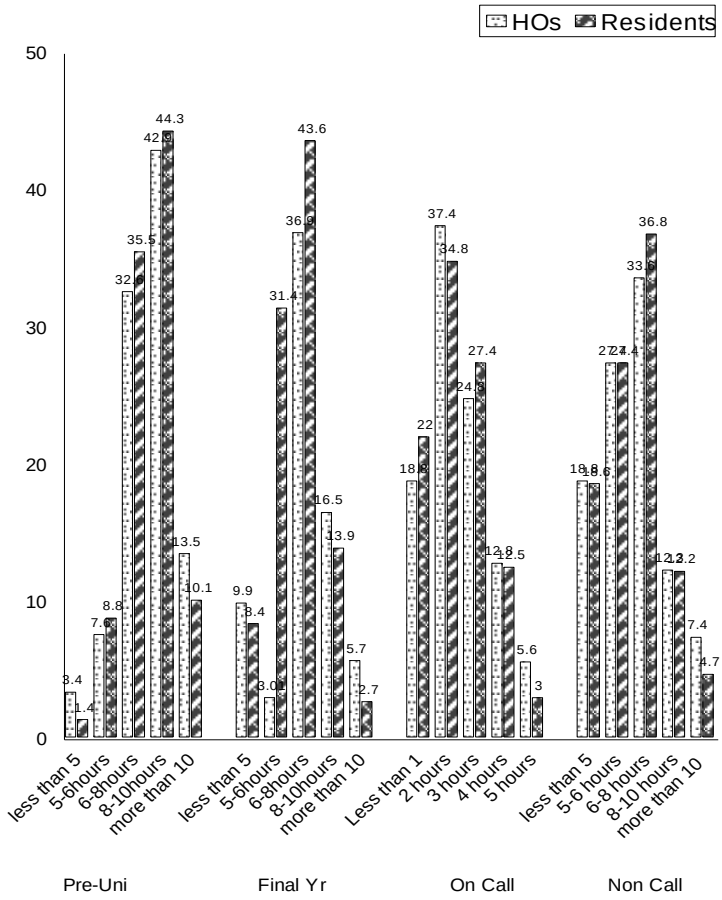

Fig. 2: Percentages of Sleep Patterns on Different Era of Training Stages among House Officers and Residents Working in Public Sector Hospitals of Karachi

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