Sleep Evaluation among Adults: A Community Survey

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Introduction

- About thirty percent of human life is spent through sleeping which is one of the important behaviours in humans.
- For effectual functioning of the brain, adequate sleep is essential.
- Sleep has associations with increased activation of brain.
- Sleep functions as a physiological and regulatory mechanism for the physical as well as psychological growth and development both in children and adults.
- Serious health implications, both mental and physical, may ensue with as repercussions of the disruption in the sleep patterns due to bad sleep hygiene and quality.

Literature review

- According to the technical meeting held by WHO in 2004 on sleep and health, lifestyle, environmental and psychological stressors have an impact on inability to fall asleep, non-refreshing sleep and awakenings with short, medium and long term effects being release of stress hormones, increased blood pressure/hypertension and increased risk of accidents.

- And according to D. Leger et al, chronic insomnia can have effects of increased risk of mortality, gastrointestinal and cardiovascular disorders, increased hospital visits and hospitalizations and reduced quality of life, at family, work and school.

- According to Prof. Nevsimalova, prolonged insomnia can have behavioural, psychiatric and medical consequences and even increased risk of death.

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- The results of the study support the propounded and standardized questionnaires, SHI, ISI, PSQI and ESS. In the non-clinical setting, on analysis, SHI proved to be steady with a good reliability, suggesting its use in non-clinical population. The results of the study are substantiated with the results of the study David F. Mastin et al. (2006)

- Though not assessing the beliefs, our study established the usage of the indices SHI, ISI, PSQI and ESS in confirming with the results of attitudes and practices related to the sleep behaviours as that of assessed in the study Michael A. Grandner et al. (2014).

Research Question

1. Is there any relationship between sleep hygiene and quality of sleep (behaviours of sleep)?

2. What are the impacts of sleep disturbances on selected behaviours?

3. What is the reliability of various indices used i.e. Sleep Hygiene Index (SHI), Insomnia Severity Scale (ISI), Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS)?

Objectives

1. To determine the relationship between sleep hygiene and quality of sleep (behaviours of sleep).

2. To assess the impacts of sleep disturbances on selected behaviors.

3. To assess the selected psychometric properties of Sleep Hygiene Index (SHI), Insomnia Severity Scale (ISI), Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS).

Methodology

- **Study design:** Study design of this study is a cross-sectional study.
- **Sample size:** Sample size calculated for the study was 84.
- **Sampling technique**: Convenience Sampling
- **Study population:** The study population belongs to a society in Gurgaon which have 4 blocks, so 21 respondents from each block were interviewed after explaining about the aim and objectives of the study and taking informed consent.
- **Inclusion criteria:** Adults between the age of 25 years and 65 years of age are included in the study. Adults with major medical disorders where in due to medication sleep could be affected are excluded from the study.

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- **Exclusion criteria:** Those aged below 25 years and above 65 years are excluded. One person from each family are included in the study.

Survey was conducted by giving questionnaire to fill by themselves with the response in Likert's scale.

Description of study tool

- **<u>Demographics:</u>**

First section of the questionnaire consists of demographic data such as age, sex, height, weight and waist circumference.

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- **Sleep Hygiene Index (SHI):**

Consist of thirteen questions which was developed by the American Sleep Disorders Association. Each response is graded according to the Likert's scale with the rating from 0 to 4 (0-never, 1-rarely, 2-sometimes, 3-frequently, 4-always). The scores of all the questions are aggregated to a total score. The total scoring is graded from 0 to 52, higher scores implying poor sleep hygiene/mal-adaptive hygiene of sleep.

- **Insomnia Severity Index(ISI):**

It is an insomnia evaluation tool which was designed by Prof. Charles M. Morin of Universite Laval of Canada. It consists of 7 questions with the responses in Likert's scale ranging from 0 to 4. All the scores are summed up to a total score graded from 0 to 28. The total scoring - 0 to 7 indicating no clinically significant insomnia, 8 to 14 indicating sub-threshold insomnia, 15 to 21 indicating moderately severe clinical insomnia and 22 to 28 indicating severe clinical insomnia.

- **Pittsburgh Sleep Quality Index (PSQI):**

It is an assessment tool of sleep quality and a self-reporting questionnaire developed by the researchers of University of Pittsburgh. It consists of nineteen questions to constitute seven components (with a scoring graded from 0 to 1) signifying various elements of sleep quality, namely subjective sleep quality, latency of sleep, duration of sleep, habitual sleep sufficiency, disturbances of sleep, use of medication of sleep and daytime dysfunction. All the scores of seven components are added to get a global score ranging from 0 to 21 indicating no difficulty to severe difficulty.

- **Epworth Sleepiness Scale (ESS):**

Epworth Sleepiness Scale is used to assess sleepiness in daytime. It is developed by Dr Murray Johns in 1991. ESS comprises eight questions with a response scoring graded from 0 to 3 signifying from never falling asleep to high chance of falling asleep during daytime. All the scores of eight questions are summed up to a total score graded from 0 to 9 indicating normal and from 10 to 15 indicating mild to moderate sleep apnoea and from 16 to 24 indicating severe sleep apnoea.

Data Analysis

1. Frequency of impacts of sleep disturbances was tabulated.

1. Correlation between various indices i.e. SHI,ISI,PSQI,ESS was done.

3. Reliability of the study tools was estimated using chronbach’s alpha.

The above analysis was done using MS Excel and SPSS and presented in the form of tables.

Result

- Regarding the sleep hygiene 52 reported good sleep hygiene and 31 reported moderate sleep hygiene and no one had reported mal-adaptive sleep hygiene.

- 53 participants (50.6%) had no clinically significant insomnia, 30 participants with sub threshold insomnia, 10 of them had clinical insomnia with moderate severity and one participant had severe clinical insomnia.

- 65 of them had good sleep quality, 16 of them had moderate sleep quality and 2 of them had bad sleep quality with 15 and 16 PSQI scores.

- 60 of them were normal regarding day time sleepiness, 17 of them had mild to moderate sleep apnoea and 6 of them had severe sleep apnoea.

Inter indices correlation

Correlations					
		SHI	ISI	PSQI	ESS
SHI	Pearson Correlation	1	0.402**	0.443**	0.157
	Sig. (2-tailed)		0.000	0.000	0.157
	N	83	83	83	83
ISI	Pearson Correlation	0.402**	1	0.763**	0.232*
	Sig. (2-tailed)	0.000		0.000	0.034
	N	83	83	83	83
PSQI	Pearson Correlation	0.443**	0.763**	1	0.244*
	Sig. (2-tailed)	0.000	0.000		0.026
	N	83	83	83	83
ESS	Pearson Correlation	.157	.232*	.244*	1
	Sig. (2-tailed)	.157	.034	.026	
	N	83	83	83	83

- All indices correlated positively among each other except between SHI(Sleep Hygiene Index) and ESS(Epworth Sleepiness Scale).

Frequency distribution of impacts of poor sleep

Poor Sleep Impacts	Never	Rarely	Sometimes	Frequently
Feel sleepy all the day	38.5%	52.6%	6.4%	2.6%
Feel tired all the day	26.9%	57.7%	11.5%	3.8%
More worried about sleep	52.6%	38.5%	6.4%	2.6%
Decreased concentration	33.8%	54.5%	9.1%	2.6%
Increased mood swings than before	37.2%	51.3%	10.3%	1.3%
It takes more efforts to do things than before	29.9%	57.1%	7.8%	5.2%
Alcohol dependency due to sleeplessness	88.3%	9.1%	2.6%	-

Correlation between impacts of poor sleep and the indices

Poor Sleep Impacts	SHI	ISI	PSQI	ESS
Feel sleepy all the day Karl Pearson	r=0.280 p<0.05	r=0.354 p<0.01	r=0.284 p<0.05	r=0.535 p<0.01
Feel tired all the day Karl Pearson	r=0.224 p<0.01	r=0.505 p<0.01	r=0.373 p<0.01	r=0.458 p<0.01
More worried about sleep Karl Pearson	r=0.284 p<0.05	r=0.598 p<0.01	r=0.618 p<0.01	r=0.384 p<0.01
Decreased concentration Karl Pearson	r=0.255 p<0.05	r=0.464 p<0.01	r=0.436 p<0.01	r=0.532 p<0.01
Increased mood swings than before Karl Pearson	insignificant p>0.05	r=0.572 p<0.01	r=0.555 p<0.01	r=0.295 p<0.01
It takes more efforts to do things than before Karl Pearson	r=0.255 p<0.05	r=0.464 p<0.01	r=0.436 p<0.01	r=0.532 p<0.01
Alcohol dependency due to sleeplessness Spearman rho	insignificant p>0.05	insignificant p>0.05	r=0.303 p<0.01	r=0.401 p<0.01
BMI Spearman rho	insignificant p>0.05	insignificant p>0.05	insignificant p>0.05	Insignificant p>0.05

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- **Reliability:**

- Sleep Hygiene Index has a good reliability with Cronbach's alpha 0.716 with positive correlation among all the thirteen items of the scale.
- Insomnia Severity Index has a good reliability with Cronbach's alpha 0.818 with a positive correlation among all the seven items of the scale.
- Pittsburgh Sleep Quality Index has a good reliability with Cronbach's alpha 0.767 with a positive correlation among all the seven components of the scale.
- Epworth Sleepiness Scale has a good reliability with Cronbach's alpha 0.840 with a positive correlation among all the eight items.

Conclusion

- All indices correlated positively among each other except between SHI(Sleep Hygiene Index) and ESS(Epworth Sleepiness Scale).

- The results of the study demonstrated reliability of the indices used, namely SHI, ISI, PSQI and ESS.

- Along with the valid psychometric properties of indices the study showed the impacts of the poor sleep like it takes more efforts to do things, feel tired all day etc. associated with the behaviours of sleep in a community.

Limitations

- The results of the study are not generalizable as the sample population is very low and it is indicative only in non-clinical population.

- Its usefulness in the clinical setting may be questionable as it is related to the behaviours of sleep and many other causal factors may be involved in evaluation of sleep clinically.

- The whole questionnaire is based on self-reporting of the participants. So, there may be recall bias and subjectivity in giving the responses.

Recommendations

- A comprehensive study involving both the qualitative and quantitative measures is recommended to assess the sleep.
- The sleep evaluation techniques could be utilized in the screening in public health settings to reduce and prevent sleep related health implications.
- The socio- demographic and socio-cultural factors need to be included to evaluate sleep in different groups of people.
- There ensues the need of inclusion of causal factors associated to assess poor sleep impacts.

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THANK YOU

Questionnaire

Section 1: Demographics							
1	Gender	Male ☐		Female ☐			
2	Age group in years	25-35 ☐	36-45 ☐	46-5 ☐	56-65 ☐		
3	Height in feet and inches						
4	Weight in kilograms						
5	Waist Circumference in inches						

Section 2: Sleep Hygiene Index						
0-Never, 1-Rarely, 2-Sometimes, 3-Frequently, 4-Always		0	1	2	3	4
1	Do you take daytime naps lasting two or more hours?					
2	Do you go to bed at different times from day to day?					
3	Do you get out of bed at different times from day to day?					
4	Do you exercise to the point of sweating within 1 h of going to bed?					
5	Do you stay in bed longer than you should two or three times a week?					
6	Do you use alcohol, tobacco, or caffeine within 4 h of going to bed or after going to bed?					
7	Do you do something that may wake you up before bedtime (for example: play video games, use the internet, or clean)?					
8	Do you go to bed feeling stressed, angry, upset, or nervous?					
9	Do you use your bed for things other than sleeping or sex (for example: watch television, read, eat, or study)?					
10	Do you sleep on an uncomfortable bed (for example: poor mattress or pillow, too much or not enough blankets)?					
11	Do you sleep in an uncomfortable bedroom (for example: too bright, too stuffy, too hot, too cold, or too noisy)?					
12	Do you do important work before bedtime (for example: pay bills, schedule, or study)?					
13	Do you think, plan, or worry when you are in bed?					

Questionnaire

Section 3: Insomnia Severity Index						
0-None, 1-Mild, 2-Moderate, 3-Severe, 4-Very Severe		0	1	2	3	4
1	Do you have difficulty in falling asleep?					
2	Do you have difficulty staying asleep?					
3	Do you have problems waking up too early?					
0-Very Satisfied; 1-Satisfied; 2-Moderately Satisfied; 3-Dissatisfied; 4-Very Dissatisfied						
4	How satisfied/dissatisfied are you with your CURRENT sleep pattern?					
0-Not at all noticeable; 1-A little; 2-Somewhat; 3-Much; 4-Very much noticeable						
5	How NOTICEABLE to others do you think your sleep problem is in terms of impairing quality of your life?					
0-Not at all worried; 1-A little; 2-Somewhat; 3-Much; 4-Very much worried						
6	How WORRIED/DISTRESSED are you about your current sleep problem?					
0-Interfering; 1-A little; 2-Somewhat; 3-Much; 4-Very much interfering						
7	To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?					
Section 4: Pittsburgh Sleep Quality Index						
1	During the past month, what time have you usually gone to bed at night? BED TIME					
2	During the past month, how long (in minutes) has it usually taken you to fall asleep each night? NUMBER OF MINUTES					
3	During the past month, what time have you usually gotten up in the morning? GETTING UP TIME					
4	During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) HOURS OF SLEEP PER NIGHT					
5	During the past month, how often have you had trouble sleeping because you . . .					
0-Not during the past month;1-Less than once a week; 2-Once or twice a week; 3-Three or more times a week		0	1	2	3	4
a	Cannot get to sleep within 30 minutes					
b	Wake up in the middle of the night or early morning					
c	Have to get up to use the bathroom					
d	Cannot breathe comfortably					
e	Cough or snore loudly					
f	Feel too hot					
g	Had bad dreams					

h	Have pain					
i	Other reason(s), please describe.....					
6	During the past month, how would you rate your sleep quality overall? 0-Very good; 1-Fairly good; 2-Fairly bad; 3-Very bad					
7	During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")? 0-Not during the past month; 1-Less than once a week; 2-Once or twice a week; 3-Three or more times a week					
8	During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity? 0-Not during the past month; 1-Less than once a week; 2-Once or twice a week; 3-Three or more times a week					
9	During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done? 0-No problem at all; 1-Only a very slight problem; 2-Somewhat of a problem; 4-A very big problem					
10	Do you have a bed partner or roommate? 0-No bed partner or roommate; 1-Partner/roommate in other room; 2-Partner in same room, but not same bed; 4-Partner in same bed					
Section 5: Epworth Sleepiness Scale						
0 – would never fall asleep in that situation; 1 – there is a slight chance of falling asleep in that situation; 2 – there is a medium chance of falling asleep in that situation; 3 – there is a high chance of falling asleep in that situation			0	1	2	3
1	Sitting and reading					
2	Watching TV					
3	Sitting, inactive in a public place like a theatre or meeting					
4	As a passenger in a car for an hour without a break					
5	Lying down to rest in the afternoon when circumstances permit					
6	Sitting and talking to someone					
7	Sitting quietly after lunch without alcohol					
8	In a car, while stopped for a few minutes in traffic					
Section 6: Impacts of Poor Sleep						
	0-Never; 1-Sometimes; 2-Frequently; 3-Always		0	1	2	3
1	More worried about sleep					
2	Feel sleepy all the day					
3	Feel tired all the day					
4	Increased mood swings than before					
5	Decreased concentration or thinking capacity					
6	I feel it takes more effort to get things done than before					
7	Alcohol dependency due to difficulty in sleeping					