

Sleep Evaluation Among Adults: A Community Survey

By

Niharika Jain

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2017-2019



The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: www.iihmr.edu.in

Sleep Evaluation Among Adults: A Community Survey

By

Niharika Jain

*Dissertation submitted in partial fulfillment of award of
MBA Hospital and Health Management*

Academic year, 2017-2019

IQVIA, New Delhi



The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: www.iihmr.edu.in

TO WHOMSOEVER MAY CONCERN

This is to certify that **Niharika Jain** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **IQVIA, NEW Delhi** from **4th February 2019 to 3rd May 2019**.

The Candidate has successfully carried out the study on **Sleep Evaluation among adults: A community Survey** assigned to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



Col.(Dr.) Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur



Dr. Sameer Phadnis

Associate Professor

The IIHMR University, Jaipur

IQVIA Consulting and Information Services India Pvt. Ltd.
Unit No.902, 9th Floor, 'B' Wing
Supreme Business Park, Supreme City
Hiranandani Gardens, Powai
Mumbai 400 076, India
Tel : +91 22 7109 7200, Fax +91 22 7109 7222
CIN: U74140MH2003PTC142482
iqvia.com

Date May 16, 2019

PROVISIONAL CERTIFICATE

This is to certify that **Niharika Jain** is associated with **IQVIA Consulting and Information Services India Pvt. Ltd** as an **Intern** and the internship period is from **Feb 04, 2019** till **June 03, 2019**.

This certificate is issued in recognition of successful completion of his/her **Dissertation** in the department of **Public Health**.

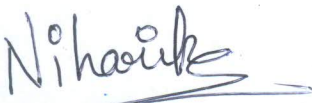
Yours Sincerely,
For IQVIA Consulting and Information Services India Pvt. Ltd



S. Yamini Krishnan
Director Human Resources, South Asia

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **Sleep Evaluation among Adults: A community survey** and submitted by **Niharika Jain Enrollment No. -IIHMR-609** under the supervision of **Dr.Sameer Phadnis** for award of MBA in Hospital and Health of the University carried out during the period from 4th February to 4th May embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature

Niharika Jain

Table of Content

Abstract.....	5
Introduction.....	6
Background.....	8
Rationale.....	8
Research Question and Objectives	9
Results and Interpretations.....	23
Discussion.....	26
Conclusion and Recommendations.....	27
References.....	28
Annexure.....	29

Acknowledgement

My vision at the time of starting my dissertation is to explore about Public Health research and opportunities in this sector.

I am obliged to thank to Mr. Lokesh Sharma (Senior Principle) for proving me this opportunity to carry out my study as dissertation and for his continuous support and motivation.

I wish to express my special gratitude to Mr. Hemant Choudhary (organization mentor) for his guidance and support regarding study. His step by step instructions help me a lot in doing a fruitful study. He has continuous source of new and innovation idea and a different kind of professionalism and work style. I am thankful to him for the faith he put on me which boost my confidence level.

My heartfelt thanks to Dr. Sameer Phandis (Institute Guide) for always being path locator when I got struck at some point. Without him I was not able to complete my dissertation.

I am also thankful to all my colleagues at **IQVIA consulting and information services India private limited** for their support and coordination in completion of my study. Collective action by all provides me this opportunity to complete my dissertation.

SLEEP EVALUATION AMONG ADULTS: A COMMUNITY SURVEY

Abstract

Introduction: 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.

Aim:

The principal aim of this study is to evaluate sleep among the adults through survey in a community in Greater Noida.

Methodology:

The descriptive cross-sectional study was conducted by taking the sample of 84 respondents aged between 25 years to 65 years. A self-administered tool was used to conduct the study. The study instrument includes Demographics, Sleep Hygiene Index (SHI), Insomnia Severity Index (ISI), Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS) sections.

Results:

Reliability-SHI, ISI, PSQI, ESS has a good reliability as their Cronbach's alpha lies above 0.5 indicating positive relation among the components.

Validity-The SHI has significant positive correlation with ISI and PSQI. But SHI's correlation with ESS is insignificant. ISI correlated positively with SHI, PSQI and ESS. PSQI has positive correlation with SHI, ISI and ESS

All indices correlated positively among each other except between SHI and ESS.

Recommendations:

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.

Introduction:

About thirty percent of human life is spent through sleeping which is one of the important behaviours in humans. This behaviour has been evinced universally in each and every species of animals, from mammals to insects. For effectual functioning of the brain, adequate sleep is essential. This is a process (which appears as a passive process) which is required for the normal brain physiology. The perpetuating deprivation of sleep may bring about drastic impairment of both cognitive and physical physiognomy, in due course leading towards death. 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.

In this modern era of busy life and in the chase of the rat race, adequate sleep is compromised. Several environmental and behavioural factors are imputable to the sub optimization of sleep. This is causing a major public health concern due to sleep associated health implications ascribable to inadequacy in sleep hygiene and quality. This study is based on the the rising health concerns with the insufficient sleep among the adults in the context of sleep hygiene and quality; severity of sleeplessness; sleepiness and the attributable consequences.

Background and Rationale:

In order to know about various implications of poor sleep, it becomes imperative to learn about the normal sleep, different types of sleep disturbances and the type of scales utilized to relate those types of sleep disturbances such as sleep arousals, awakenings, effects of secretion of cortisol, etc. And also, the endpoints of health that could be attributed to the disturbances of sleep. Sleep is one of the bare necessities of humans which is necessary for optimum health, good quality of life and carry out all the activities well during the day time. For the optimum functioning of the body functions, an adult human requires about seven to eight hours of sleep. Children below the age of 2 years require more amount of sleep than the older children and by the age of 5 years they tend to have typical adult patterns of sleep. The duration of sleep tends to reduce as the age increases from adulthood to old age. Older ones and younger ones have a tendency of having lighter sleep when compared to teenagers and adults.

Sleep pattern consists of cycles and each cycle is characterised by phases. Each cycle has duration of about 1 and a half hour to 2 hours. Two main types of sleep are rapid eye movement sleep (REM sleep) and non-rapid eye movement sleep (non-REM). REM sleep is marked as active sleep with quick eye movements and deep sleep of dreams. Non-rapid eye movement sleep is marked as quite sleep and comprised of stages or phases. Physiological activities / vitals of the body such as body temperature, blood pressure, O₂ levels, CO₂ levels, glucose levels are reduced during sleep. Vitals such as heart rate, respiration/breathing and brain wave activity are varying during rapid eye movement sleep and wakefulness but they are constant/ regular during non-rapid eye movement sleep. Non-REM sleep has synchronous and coordinated pattern. Repairing of the tissues happens during the rapid eye movement.

The sleep-wake cycle has a circadian rhythm and it is a homeostatic process. Perturbations of sleep patterns disturb the circadian and homeostatic processes. The sleep deprivation has serious health implications at the levels of physical, cognitive and mental health domains. Physically, it may have health consequences such as tiredness/fatigue, sleepiness during daytime, increased blood pressure. Cognitive functions may be impaired – diminishing performance levels, reduced attention spans, declining concentration and mental abilities. Sleep deprivation has effects on mental health over time. Continued and prolonged sleep deprivation could lead to cascade of events gradually – reduced cognitive abilities, difficulty in dealing with emotions and stress and hampered immune system.

According to the technical meeting held by WHO in 2004(1) 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; decreased cognitive capacities and cardiovascular functions; and reduced immunity, detrimental effects on mental and cardiovascular functions respectively.

Long term exposure to noise can have impacts on quality of life and cardiovascular functions through nonspecific aggression related to stress (Alain Muzet). According to Prof. Nevsimalova,(1) prolonged insomnia can have behavioural, psychiatric and medical consequences and even increased risk of death. 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. Billiard in the WHO technical meeting (1)on sleep and health, the combination of predisposing, precipitating and perpetuating determinants are accountable for the pathophysiology of primary insomnia. These determinants or modifiers are termed as noises, specifically in environmental sleep disorders, whether it may be sleeplessness or sleepiness. These stressors modify both the quantity and quality of sleep. Various standardized questionnaires with validation have been developed to evaluate the sleep disturbances due to environmental noises.

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)?

Aim and Objectives of the Study:

The principal aim of this study is to evaluate sleep among the adults. The main objectives of the study are:

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 behaviours.
3. To assess 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.

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 the study tools

Demographics:

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

Sleep Hygiene Index (SHI):

Sleep Hygiene Index is a self-reporting questionnaire consisting of thirteen questions. SHI was developed by the American Sleep Disorders Association in International classification of sleep disorders,(2) the questions derived according to the diagnostic criteria of the poor sleep habits/hygiene. 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):

Insomnia Severity Index is an insomnia evaluation tool which was designed by Prof. Charles M. Morin of Universite Laval of Canada.(3) ISI is used as an assessment tool in both observational studies and clinical settings. 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):

Pittsburgh Sleep Quality Index is an assessment tool of sleep quality. It is a self-reporting questionnaire developed by the researchers of University of Pittsburgh.(4) 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.(5) 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.
2. Correlation between various indices i.e. SHI, ISI, PSQI, ESS was done.
3. Reliability of the study tools was estimated using cronbach's alpha.

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

Results:

A total of 84 members participated in the study. One of the participants skipped many questions, so it was not considered for analysis. The sample of participants ranged from the age of 25 years to 65 years. Of them, 26 participants (14.1%) belonged to 25-35 years age group, 51 participants (27.7%) belonged to 36-45 years age group, 3 participants (1.6%) belonged to 46 to 55 years age group and 3 participants (1.6%) belonged to 56 to 65 years age group. In the sample, 45 of them were females and 38 of them were males.

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.

SHI has positive correlation with ISI (Pearson correlation=0.402, $p<0.01$, significant at 0.01 level) and PSQI (Pearson correlation=0.443, $p<0.01$, significant at 0.01 level). But SHI's correlation with ESS is insignificant as $p>0.05$ with $p=0.157$ though $r=0.157$.

ISI correlated positively with SHI (Pearson correlation=0.402, $p<0.01$, significant at 0.01 level), PSQI (Pearson correlation=0.763, $p<0.01$, significant at 0.01 level) and ESS (Pearson correlation=0.232, $p<0.05$, significant at 0.05 level).

PSQI has positive correlation with SHI (Pearson correlation=0.443, $p<0.01$, significant at 0.01 level), ISI (Pearson correlation=0.763, $p<0.01$, significant at 0.01 level) and ESS (Pearson correlation=0.244, $p, 0.05$, significant at 0.05 level).

All indices correlated positively among each other except between SHI and ESS.

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

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 1: Inter indices correlation

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 subthreshold 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.

Table 2: Sleep quality components frequency distribution

Subjective Sleep Quality	Very Good	Fairly Good	Fairly bad	Very Bad
--------------------------	-----------	-------------	------------	----------

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%	-
	21.3%	55%	20%	3.8%
Sleep Latency (0 to 3 with increasing latency)	0	1	2	3
	31.3%	47%	15.7%	6%
Sleep Duration	>7 hours	6-7 hours	5-6 hours	<5 hours
	13.9%	72.2%	10.1%	3.8%
Habitual Sleep Efficiency	>85%	75-84%	65-74%	<65%
	60.5%	25.9%	11.1%	2.5%
Sleep Disturbances (0 to 3 with increasing disturbances)	0	1	2	3
	2.4%	75.6%	18.3%	3.7%
Use of Sleep Medication	Not during past month	Less than once a week	Once or twice a week	Three or more times a week
	88.9%	8.6%	1.2%	1.2%
Day time Dysfunction (0 to 1 with increasing dysfunction)	0	1	2	3
	31.3%	49.4%	16.9%	2.4%

Table 3: Frequency distribution of impacts of poor sleep(6)

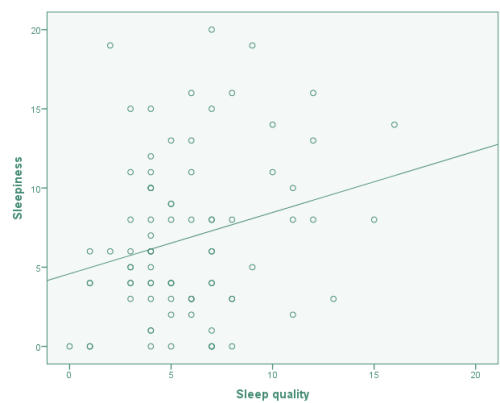
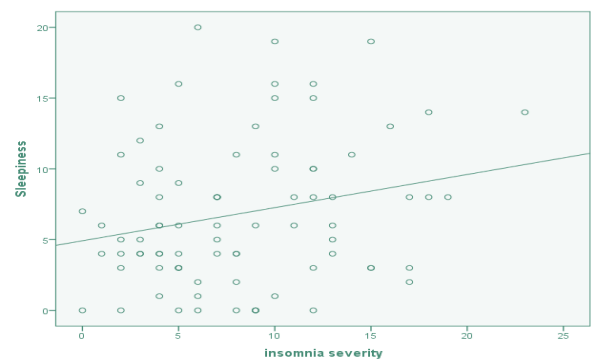
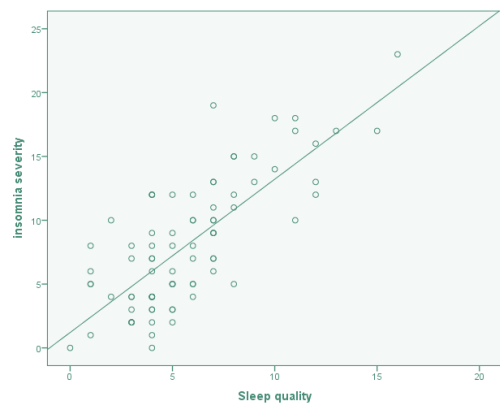
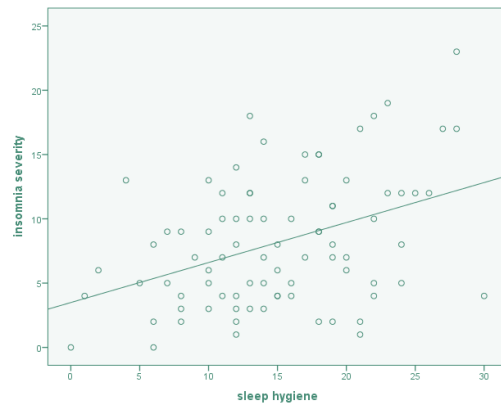
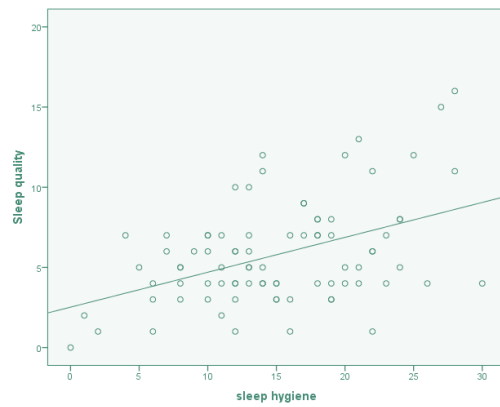
Table 4: Correlation between impacts of poor sleep and the indices**Discussion:**

The results of the study support the propounded and standardized questionnaires, SHI, ISI, PSQI and ESS.(7) 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).(8) 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).(9)

The questionnaires comprehend the significance of the behavioural factors which are alterable. The research findings can be used to identify the determinants of inadequate sleep in wide variety of settings in public health on a broader scale. All the indices correlated well among themselves in recognizing the sleep inadequacies, except between SHI and ESS. There is a moderate positive correlation between the sleep hygiene and the quality of sleep suggesting their use in non-clinical population settings in modifying the mal-adaptive sleep behaviour.

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

There is strong correlation between the quality of sleep and the insomnia severity indicating that perpetuating poor quality of sleep plays a vital role in the persistence of insomnia which could be modified by the adaptation of good behaviours of sleep. This is even substantiated with the results of the positive association between the insomnia severity and daytime sleepiness.



The impacts of poor sleep such as feeling sleepy and tired all the day have positive association with the scales implying short term effects of the sleep inadequacy. Through the results, subjective sleep quality perception with worrying more about sleep is also shown to have positive correlation with all the indices used, especially sleep quality. And so are the decreased concentration, increased mood swings and taking more efforts to do things indicating the cognitive, emotional and physical implications of the sleep respectively. The results showed insignificant relationship between the mood swings and sleep hygiene suggesting other causal associations as well but not the habits of sleep hygiene. Similarly, there is insignificant relation between alcohol dependency and sleep hygiene and insomnia

severity but positively associated with sleep quality and daytime sleepiness. The results of associations of BMI are insignificant recommending inclusion of more indicator items in the questionnaire.

Conclusion:

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 associated with the behaviours of sleep in a community. Thus, this study can be used in a wide variety of settings for the evaluation of the sleep through the assessment of sleep hygiene, sleep quality, insomnia severity and daytime sleepiness.

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.

References:

1. Germany B. WHO technical meeting on sleep and health [Internet]. 2004 [cited 2019 May 6]. Available from: http://www.euro.who.int/__data/assets/pdf_file/0008/114101/E84683.pdf
2. Sleep hygiene index. [cited 2019 May 8]; Available from: <http://ehssentials.com/PDFs/presentations/ucla2015/SLEEP-HYGIENE-INDEX-DrWendieRobbins.pdf>
3. Insomnia severity index. [cited 2019 May 8]; Available from: https://www.ons.org/sites/default/files/InsomniaSeverityIndex_ISI.pdf
4. Pittsburgh Sleep Quality Index (PSQI) [Internet]. [cited 2019 May 8]. Available from: http://www.goodmedicine.org.uk/files/assessment_pittsburgh_psqi.pdf
5. EPWORTH SLEEPINESS SCALE [Internet]. [cited 2019 May 8]. Available from: <https://www.mid-yorks.nhs.uk/download.cfm?doc=docm93jijm4n462.pdf&ver=549>
6. Dysfunctional Beliefs and Attitudes About Sleep (DBAS-16) Morin CM; Vallières A; Ivers H. Dysfunctional Beliefs and Attitudes about Sleep (DBAS): Validation of a Brief Version [Internet]. [cited 2019 May 8]. Available from: <https://pdfs.semanticscholar.org/304f/59754005f2db54b0282ba83159e8b04de284.pdf>
7. Appendix 6. Insomnia measuring instruments (questionnaires) ISI 81 : Insomnia Severity Index [Internet]. [cited 2019 May 7]. Available from: <http://www.guiasalud.es/egpc/traduccion/ingles/insomnio/completa/documentos/anexos/anexo6.pdf>
8. Mastin DF, Bryson J, Corwyn R. Assessment of Sleep Hygiene Using the Sleep Hygiene Index. J Behav Med [Internet]. 2006 Jun 24 [cited 2019 May 7];29(3):223–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16557353>
9. Grandner MA, Jackson N, Gooneratne NS, Patel NP. The Development of a Questionnaire to Assess Sleep-Related Practices, Beliefs, and Attitudes. Behav Sleep Med [Internet]. 2014 Mar 4 [cited 2019 May 7];12(2):123–42. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23514261>

Annexure 1: Consent Form:

<u>CONSENT FORM</u>		
Please tick to indicate your consent to the following:		
I have read or have had read to me in my first language, and I understand the Participant Information Sheet.	Yes ☐	No ☐
I have been given sufficient time to consider whether or not to participate in this study.	Yes ☐	No ☐
I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet.	Yes ☐	No ☐
I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without this affecting my medical care.	Yes ☐	No ☐
I consent to the person collecting and processing my information, including information about my health.	Yes ☐	No ☐
If I decide to withdraw from the study, I agree that the information collected about me up to the point when I withdraw may continue to be processed.	Yes ☐	No ☐
I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.	Yes ☐	No ☐
I know who to contact if I have any questions about the study in general.	Yes ☐	No ☐
I understand my responsibilities as a study participant.	Yes ☐	No ☐
I understand that my anonymised data will be kept for future research purposes such as publications related to this study.	Yes ☐	No ☐

Declaration by participant:

I hereby consent to take part in this study.

Participant's name: _____

Designation: _____

Signature: _____ Date: _____

Declaration by the member of the research team:

I have given a verbal explanation of the research project to the participant and have answered the participant's questions about it.

I believe that the participant understands the study and has given informed consent to participate

Researcher's name: _____

Signature: _____ Date: _____

Annexure 2: Questionnaire:

<u>Questionnaire</u>						
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?					

Annexure 3: Questionnaire (Contd.):

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					

Annexure 4: Questionnaire (Contd.):

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					