

Seniors and Sleep Health: An Eye-opener Study from the North of India

Subramani Jagadeesan¹, Muthathal Subramanian², Pranav Patel³, Namita Kamra⁴

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ABSTRACT

Introduction: Sleep is a basic human need and is imperative for good health, good quality of life (QoL), and performing well during the day. Along with the physiological changes that happen with aging, changes in sleep pattern is inexorable. Considering the implications of sleep quality and its relevance amid the elderly and the paucity of data from the region, a study is being undertaken to assess the sleep quality of aging adults and its importance, to analyze the results across socio-demographic and other factors in an urban setting.

Methodology: A community-based analytical study was done in an urban resettlement colony with 459 elders. Study tools include the Pittsburgh Sleep Quality Index (PSQI), Geriatric Depression Scale (GDS), and a pre-tested semi-structured questionnaire followed by a basic physical examination. Data were tabulated and analyzed with appropriate statistical measures.

Results: The point prevalence of insomnia among the participants was 82% with a mean PSQI score of 7.8. Most of them reported themselves to be not active physically and preferred drinking tea before slumber. Being a female [adjusted odds ratio (AOR) 0.48], having a television in the room (AOR 2.64), having no sleeping partner (AOR 10.2), having dyspepsia or reflux (AOR 68.7), racing thoughts or stressful (AOR 5.7), habitual daytime nap (AOR 0.14), being overweight or obese (AOR 2.5), and mild depression (AOR 2.5) had a significant role with poor sleep in the elders (p -value < 0.05).

Conclusion: With this study, it could be easy to infer that elderly dwelling in urban settlements abstain from habitual physical activity (PA) and tend to suffer from alarming levels of disturbed sleep. With advancing life expectancy and hence medical comorbidities, physicians may be required to include sleep health as much as any other assessment to heighten their QoL.

Keywords: Elderly, Epidemiology, Sleep quality.

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INTRODUCTION

Humans spend almost one-third of their life sleeping and “regenerative sleep” is a period of inactivity that aids in the restoration of physical and mental function.¹ Contrary to the common belief that sleep disturbances are normal with aging, medics must realize that although sleep schedule, latency, quantity, and architecture alter with age, they remain relatively normal unless a secondary physical, metabolic, or psychiatric illness deteriorates the former.² Numerous age-related medical illnesses like diabetes, systemic hypertension, renal failure, obesity (obstructive sleep apnea, OSA), gastroesophageal reflux disease (GORD), and degenerative skeletal ailments may put elderlies at risk for sleep disturbances and may amplify their existing risk for cardiovascular conditions and dementia acceleration has also been documented.³ Less is known about the sleep quality of seniors in community settings at large, and this study intends to assess subjective sleep disturbances and allied factors in Northern India.

METHODOLOGY

The present cross-sectional study over 6 months recruited older adults aged 60 years and above from an urban resettlement colony (Urban Field Practice Area of All India Institute of Medical Sciences, New Delhi) in the National Capital Territory (NCT) of India. With an estimated sleep disturbances rate of 30% among the elderly in an extensive review,⁴ the minimal sample size mandated in the study was 415, with a relative precision of 15% and accounting for a nonresponse rate of 20%, a final sample size of 550 was arrived at. From the health management information system database of

^{1,4}Department of Internal Medicine, Venkateshwara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India

²Department of Community and Family Medicine, All India Institute of Medical Sciences, Raipur, Chhattisgarh, India

³Department of Acute Medicine, North Middlesex University Hospital, London, United Kingdom

Corresponding Author: Subramani Jagadeesan, Department of Internal Medicine, Venkateshwara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India, Phone: +91 8667486472, e-mail: drjagadeesans@gmail.com

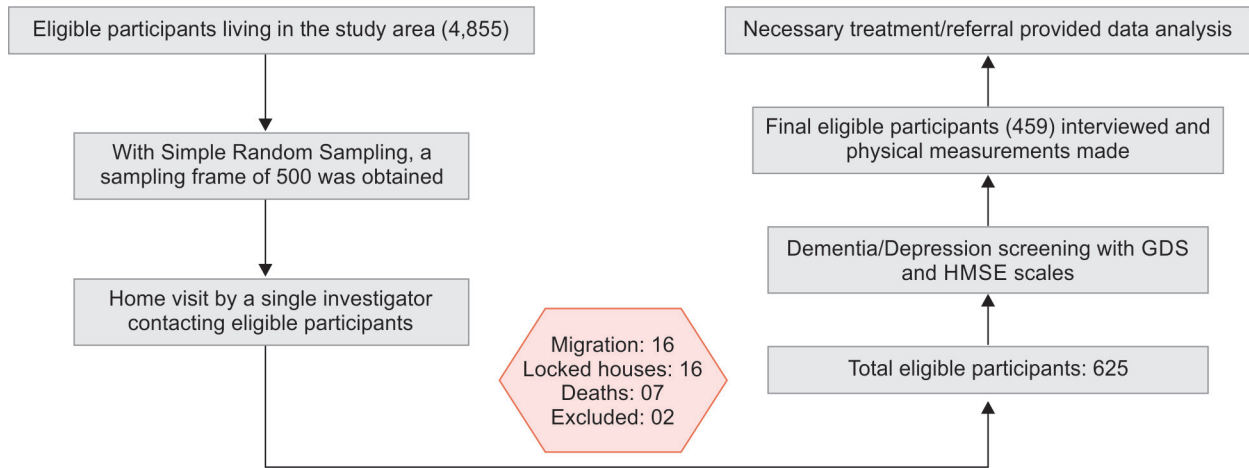
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the study area, a list of households with eligible participants was taken, following which a house-to-house visit was made by a single investigator accomplishing questionnaire-based data collection and interview scheduling. After written consent, details of sociodemographic, lifestyle, addictions, detailed medical history, and appropriate anthropometric measurements were taken as shown in [Flowchart 1](#). Geriatric depression scale in Hindi version,⁵ mini-mental scale examination in Hindi version (HMSE),⁶ and subsequently Pittsburgh Sleep Quality Index (PSQI)⁷ scales were administered to the potential participants to screen or identify severe syndromic depression or severe dementia that could have

Flowchart 1: Nature of the study and its flow



implications on the quality of sleep assessment. The data were collected via Google forms, later extracted into Excel worksheets, and cleaned for analysis with STATA 12.0. Necessary ethical approvals were obtained before the interviews, from the Institutional Ethics Committee (IEC) of the aforesaid institute vide IEC/PG-253/018.

RESULTS

There were 459 participants in this research with a mean standard deviation (SD) age of 67.1 years (±5.4). Men (67.5%, *n* = 310) were sizeable in number than female peers (32.5%, *n* = 149). The majority of them (84.7%) were married and the rest had to live either separated or lost their partner. More than half of the elders (59.3%) belonged to “extended families.” Most of the study participants (72%) were dependent on their family members financially. Although only a handful of them (3.5%) were dwelling alone, irrespective of the family type and cohabitation under the same roof, a significant proportion of them (23.3%) were sleeping alone. Among participants with sleep partners, 6.3% had a habit of snoring during sleep.

In the preceding month of the study, 57.1% (*n* = 262) of them did experience disturbed sleep subjectively. This was recorded to be due to “indigestion or acid reflux” (27%), “disturbing thoughts” (21.4%), mosquito bites (16.1%), and “the need for drinking water” (15.7%). Though 67.1% of participants had an air conditioner or warmer in their sleep area, only 18.7% used it in the past month due to diverse reasons (Table 1).

The mean duration of any physical activity (PA) per day was 55.6 (±10.7) minutes of which 55 undertook yoga practices by morning hours. A total of 97 (21.1%) of them had smoked tobacco at least once in life (not less than a year at least) of whom 19 quit the smoking habit in the past 5 (*n* = 10) to 6 (*n* = 9) years. Among the current smokers, 75 accepted to have smoked a tobacco product while or just before going to bed in the past month. There were 91 (19.8%) participants who used smokeless tobacco over an average year of use of 34.5 (SD = 4.3). About 68 participants among them reported the use of smokeless tobacco within four hours of sleep time. Alcohol was consumed by 34 elders after 8 p.m. and 27 elders consumed it before 8 p.m. habitually with 9 turning down the habit in the past year. Most of them drank tea at least once daily with almost all of them (*n* = 397, 86.5%) displaying a habit of drinking it within 4 hours of sleep 397 elders (86.5%). All the coffee consumers had coffee once a day in the past month (Table 2).

Table 1: Descriptive factors related to disturbed sleep among the study population (N = 459)

Variables	Frequency	Percentage
Turning off light		
Yes	326	71.0
No	133	29.0
Presence of TV or electronic devices in the sleeping room		
Yes	281	61.2
No	178	38.8
Use of air conditioner or warmer		
Yes	151	32.9
No	308	67.1
Reason for disturbed sleep*		
Need for drinking water	72	15.7
Mosquitoes bite	74	16.1
Indigestion or reflux history	124	27.0
Disturbed thoughts	98	21.4
Use of bathroom	400	87.2
Location of the bathroom		
Inside the house	142	30.9
Outside the house	317	69.1

*Multiple responses

Almost half of the participants (47.3%, *n* = 217) had medical comorbidities either self-reported or verified with the medical reports and medications. Diabetes mellitus was the most prevalent, trailed by essential hypertension and airway diseases. The average of the two readings of systolic and diastolic blood pressure (mm Hg) were 123.7 (11.1) and 81.2 (8.4), respectively, and was found to be well within the target for the elderly Asian population (Table 3).

Pittsburgh Sleep Quality Index Scale

The mean score of the global PSQI scale was 7.8 (±2.7). The highest and lowest global PSQI scores were 18 and 2, respectively. The median and interquartile range were 7 and 6, 9. Good quality of sleep (≤5) was found among 18.3% of the study population (Table 4).

With regression, there was no association identified between yoga or physical activity and sleep quality. The ever and current alcohol consumers, who consumed tea or coffee within 4 hours



Table 2: Day-to-day activities and habits of the study participants (N = 459)

Variables	Number	Percentage
Physical activity		
No	404	88.0
Yes	55	12.0
Mean minutes of PA (SD) per day		55.6 (10.7)
Mean days of PA (SD) per week		4.8 (0.6)
Yoga		
No	404	88.0
Yes	55	12.0
Median years of yoga; interquartile range (IQR)		2; 1–5
Mean days of yoga (SD) in the past week		4.2 (1.2)
TV or electronics use before sleeping		
No	407	88.7
Yes	52	11.3
Median minutes between screen watching and sleep; IQR		60; 30–99
Daytime nap		
No	277	61.4
Yes	174	38.6
Mean days of sleep for more than 30 minutes (SD) during day times per week		5.0 (1.1)
Median interval in hours between dinner and sleep; IQR		1; 1–1.5
Smoking history		
Current smoker	75	16.3
Ever smoker	97	21.1
Mean (SD) years of smoking		35.6 (3.9)
Alcohol		
Ever used alcohol	69	15.1
Current use of alcohol	57	12.4
Mean (SD) years of use of alcohol		32.2 (3.3)
Median interval in days for use of alcohol in the past week; IQR		2; 2–5
Tea drinkers	440	95.9
Coffee drinkers	117	25.5

of sleep time had significantly poor quality of sleep (*p*-value 0.000 by Chi-square). In addition, drinking tea (*p*-value 0.03 by Chi-square) and coffee (*p*-value 0.000 by Chi-square) were found to be significantly associate with poor quality of sleep. By multivariable model, it was found that sex, presence of television (TV) or electronic devices in the sleeping room, sleeping alone, indigestion or reflux history, disturbed or racing thoughts, daytime naps, obesity, and depression (mild) were associated with poor sleep quality among the study participants. The females had lower odds of having poor sleep quality than males. This could be due to the high male population (Table 5).

DISCUSSION

An average human being tends to spend almost one-third (20–40%) of their life sleeping. Alike other basic amenities complimentary for life, sleep fosters the physiological bodily process of rebooting the regulation of metabolism, memory

Table 3: Comorbidity history and physical examination findings of the study participants (N = 459)

Variables	Number	Percentage
Medical comorbidities*		
Diabetes mellitus	112	23.6
Essential hypertension	104	21.9
Airway diseases	96	20.3
Heart disease	41	8.6
Arthritis or arthralgia	12	2.5
Thyroid disease	21	4.4
Anemia	44	9.3
Skin infections (tinea, etc.)	8	1.7
Variables	Mean	SD
Physical examination findings		
Systolic blood pressure (mm Hg)	123.7	11.1
Diastolic blood pressure (mm Hg)	81.2	8.4
Waist circumference (cm)	92.3	6.8
BMI using arm span (kg/m ²)	23.2	2.8
WHR	0.97	0.02

*Multiple responses; WHR, waist-to-hip ratio

Table 4: Pittsburgh Sleep Quality Index component-wise distribution and sleep quality of the study participants (N = 459)

Component	Number (%)
1. Subjective sleep quality	
Very good	19 (4.1)
Fairly good	351 (76.5)
Fairly bad	72 (15.7)
Very bad	17 (3.7)
2. Sleep latency	
0	19 (4.1)
1–2	351 (76.5)
3–4	72 (15.7)
5–6	17 (3.7)
3. Sleep duration (hours)	
>7	2 (1.1)
6–7	146 (31.8)
5–6	279 (60.8)
<5	29 (6.3)
4. Sleep efficiency (%)	
>85	176 (38.3)
75–84	144 (31.4)
65–74	63 (13.7)
<65	76 (16.6)
5. Sleep disturbance	
0	0 (0.0)
1–9	407 (88.7)
10–18	52 (11.3)
19–27	0 (0.0)
6. Use of sleep medication	
Not during the past month	418 (91.1)
Less than once a week	18 (3.9)

(Contd...)

Table 4: (Contd...)

Component	Number (%)
Once or twice a week	8 (1.7)
Three or more times a week	15 (3.3)
7. Daytime dysfunction	
0	284 (61.9)
1–2	159 (34.6)
3–4	16 (3.5)
5–6	0 (0.0)
8. Sleep quality category	
≤5 – Good sleep quality	84 (18.3)
>5 – Poor sleep quality	375 (81.7)

consolidation, cognitive alignment, and combat mental fatigue. Deteriorating sleep health with advancing age is considered inevitable, although there exists scientific evidence contrary to it. Diverse research has invariably demonstrated that chronic insomnia had hastened cognitive decline and thus its binding complications.

The study recruited 459 seniors of various ethnicity and origins residing in the urban slum area of the NCT during the winter months. The basic social and demographic details are not deviant from an average Indian slum household consistent with contemporary studies. Noteworthy is that a remarkable chunk of elders (88%) in the study area were restrained from any form of physical activity on their usual days. Being a north Indian population, tea was found to be consumed by most of them.

Table 5: Association between sleep quality and selected variables among the study population (N = 459)

Variable category	Category-wise number	Poor quality of sleep (n = 375) n	Crude odds ratio, 95% CI	p-value	Adjusted odds ratio, 95% CI	p-value
Age category in years						
60–69	304	244	1.0	–	1.0	–
70–79	135	116	1.50, 0.85–2.63	0.15	1.02, 0.5–2.08	0.94
80 and above	20	15	0.73, 0.25–2.10	0.57	1.07, 0.28–3.99	0.91
Sex						
Male	310	261	1.0	0.04	1.0	0.03
Female	149	114	0.61, 0.37–0.99		0.48, 0.24–0.93	
Darken the room while sleeping						
No	133	112	1.0	0.37	–	
Yes	326	263	0.78, 0.45–1.34			
Presence of TV or electronic devices in the sleeping room						
No	178	130	1.0	0.000	1.0	0.002
Yes	281	245	2.51, 1.55–4.06		2.64, 1.43–4.86	
Sleeping alone in your room						
No	352	275	1.0	0.001	1.0	0.000
Yes	107	100	4.0, 1.78–8.96		10.2, 3.78–27.24	
Indigestion or reflux history						
No	335	255	1.0	0.000	1.0	0.000
Yes	124	120	9.4, 3.36–26.29		68.7, 19.48–242.14	
Disturbed or racing thoughts						
No	361	289	1.0	0.08	1.0	0.000
Yes	98	86	1.78, 0.92–3.44		5.7, 2.23–14.96	
Daytime nap						
No	277	239	1.0	0.000	1.0	0.000
Yes	174	133	9.41, 3.36–26.2		0.14, 0.06–0.29	
Presence of any comorbidity						
No	242	189	1.0	0.03	1.0	0.32
Yes	217	186	1.68, 1.03–2.73		0.7, 0.37–1.38	
Ever smoked						
No	362	286	1.0	0.006	1.0	0.9
Yes	97	89	2.95, 1.37–6.36		1.29, 0.16–3.54	
Current smoking						
No	384	308	1.0	0.06	1.0	0.9
Yes	75	67	2.06, 0.95–4.48		1.98, 0.99–2.88	

BMI category (using arm span)						
Normal and underweight (<24.9)	347	278	1.0	0.12	1.0	0.01
Overweight and obese (≥25)	112	97	1.6, 0.87–2.93		2.5, 1.16–5.51	
Geriatric depression score category (GDS score 30)						
No depression (≤9)	314	250	1.0	–	1.0	–
Mild depression (10–19)	142	122	1.5, 0.90–2.69	0.11	2.5, 1.21–5.10	0.01
Severe depression (≥20)	3	3	1.0	–	1.0	–

p-value less than 0.05 is considered significant (decided a priori to the conduct of the study)

A huge 81.7% of the study population had either form of sleep disturbances (or insomnia) *in toto* according to the tested PSQI scale. This is way disquieting in comparison with the existing community-based research at both Indian^{8–13} and international levels^{14–19} that ranged from a mere 8% (Taiwan)²⁰ to as high as 80% (the United States).²¹ On a frivolous look, there exists an urban–rural divide in sleep quality with the balance weighing toward the rural faction as anticipated.

Peculiar to note that male participants in contrast to their counterparts were less likely to have slept well in the past month. Although women were consistently found to be sleep deprived especially the heightened sleep latency that was attributed to household chores and hormonal disequilibrium in a colossal number of studies,^{22–25} yet it could not be reproduced in a few Indian studies.^{10,16} The latest meta-analysis²⁶ during the COVID-19 pandemic demonstrated an otherwise result indicating men are more insomniac. Likewise, elders with any medical comorbidities reported poor sleep health.

Largely ignored in most of the studies on sleep, electronic devices including but not limited to TV, had a deleterious effect on sleep initiation and maintenance and consequently frequent nocturnal awakenings. Sensory stimuli particularly bright and flickering light from the device may not only interfere with melatonin secretion but also the emotional component possibly prolonging the sleep latency.²⁷ Having a sleep partner (mostly spouse in this study), and seniors desisting daytime naps were found to significantly aid in promoting sleep health.¹¹

In unanimity with the existing literature,^{28–30} perceived mental stress in terms of “racing thoughts” and “acid reflux” tumbled sleep health in the participating elders. Establishing the temporality of either of them with sleep disturbances is arduous with a trans-sectional study as they are perceived to be bidirectional, that is, inadequate sleep may crumble gastritis, and the latter may harm sound sleep.

Being overweight and obese had an unfavorable association with sleep in this study alike the others.^{8,15,29,31,32} Central adiposity through various means notably OSA had a significant association with poor sleep in the elders. Obesity does come with the attending ailments like diabetes, essential hypertension, NAFLD, and coronary artery disease (CAD) that may further deteriorate the case that already exists.^{22,32} With the pandemic passing by, ignoring mental health issues is what the world could not afford, especially amidst the vulnerable faction of seniors. Participants with mild depression (by GDS-30 scale) were found to have troublesome sleep health when compared with their peers. This has been time and then backed by abundant research.^{10,12,13,18,20,22,30,33–35}

To the best of our knowledge, it is one of the first studies in the country assessing sleep quality in the elderly, alongside screening for depression and dementia as they may undermine the former most of the time. The study had an adequately calculated sample size with a positive response rate. Being a cross-sectional design, the temporality of sleep health, depression, and other factors assessed could not be endorsed. Eventually, it is imperative to note that this is a self-reported study that may carry a memory gap, particularly in reporting the sleep latency and hours of sleep. Also, employing polysomnography might have added objectivity to the study, nevertheless could not be done considering the resource constraints.

CONCLUSION

Momentous changes do occur in sleep patterns with advancing age. This community-based study estimated that the proportion of elderly with sleep disturbances is certainly huge, considering the growing life expectancy. A conducive environment for sleep besides correcting amenable ailments like depression, obesity, etc., may help immensely the sleep and hereto the overall quality of life in the elders. Further interventional research is warranted with objective sleep measurements and unidentified behaviors affecting sleep in later life.

ORCID

Subramani Jagadeesan  <https://orcid.org/0000-0003-3948-3604>
Muthathal Subramanian  <https://orcid.org/0000-0001-9653-3036>

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