



Original Research Article

# An Experimental Study to Evaluate the Effectiveness of Sleep Hygiene Behavioral Interventions in Improving Quality of Sleep Among Middle-Aged and Older Adults with Chronic Physical Diseases in A Selected Community Area, Kottayam, Kerala

Arun G. Plathottam<sup>1\*</sup>, Manoj Prajapati<sup>2</sup>

<sup>1</sup>PhD Scholar, Malwanchal University, Indore, Madhya Pradesh, India

<sup>2</sup>Research Guide, Malwanchal University, Indore, Madhya Pradesh, India

Abstract

**Introduction:** Quality of sleep among middle-aged and older adults with chronic physical diseases is often disturbed due to persistent symptoms, medication effects, and age-related changes. Conditions such as hypertension, diabetes, arthritis, and cardiac diseases negatively affect sleep patterns and overall well-being. Sleep hygiene behavioral interventions promote healthy sleep habits through structured education, regular sleep schedules, environmental modifications, and relaxation techniques. These non-pharmacological approaches are safe, cost-effective, and suitable for community settings. Early sleep-focused interventions can significantly improve sleep quality and overall health outcomes among individuals living with chronic illnesses.

**Methodology:** This experimental study used a one-group pre-test post-test design to evaluate the effectiveness of sleep hygiene behavioral interventions among 150 middle-aged and older adults with chronic physical diseases in a selected community area of Kottayam, Kerala. Participants were selected using a randomized sampling technique. Sleep quality was assessed using a standardized scale before and after the intervention. The intervention included sleep education, regular sleep routines, environmental adjustments, and relaxation techniques. Data were analyzed using descriptive statistics, paired *t*-test, and chi-square test with significance set at  $p < 0.05$ .

**Results:** Pre-test findings showed 79 (52.67%) participants had good sleep quality, and 71 (47.33%) had fair sleep quality. Post-test results indicated improvement, with 110 (73.33%) reporting good sleep quality and 24 (16.00%) achieving excellent sleep quality. The mean score increased from 60.73 to 71.58, with a mean enhancement of 10.85. The paired *t*-test value of 13.118 ( $p < 0.001$ ) confirmed significant effectiveness. Only the type of chronic illness showed a significant association with pre-test sleep quality.

**Conclusion:** Sleep hygiene behavioral interventions were effective in improving the quality of sleep among middle-aged and older adults with chronic physical diseases. The findings support integrating structured sleep hygiene programs into community health nursing practice.

**Keywords:** Experimental study, Sleep hygiene behavioral interventions, Quality of sleep, Chronic physical diseases, Middle-aged and older adults, Community-based intervention, Kottayam, Kerala.

## INTRODUCTION

Sleep is a fundamental biological process essential for physical restoration, cognitive functioning, and emotional regulation. Adequate sleep plays a significant role in maintaining overall

**Address for correspondence:** Arun G. Plathottam,

PhD Scholar, Malwanchal University, Indore, Madhya Pradesh, India

E-mail: plathottam@gmail.com

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**Table 1:** Distribution of the adolescent's students based on socio- demographic variables N=150

<i>Demographic variables</i>	<i>No. of Samples (n)</i>	<i>Percentage (%)</i>	
Age (In years)	40–49	60	40.00
	50–59	38	25.33
	60–69	24	16.00
	70 and above	28	18.67
Gender	Male	82	54.67
	Female	68	45.33
Marital Status	Married	108	72.00
	Unmarried	21	14.00
	Widowed	12	8.00
Educational Qualification	Divorced / Separated	9	6.00
	No formal education	23	15.33
	Primary	41	27.33
	Secondary	28	18.67
	Higher secondary	25	16.67
	Graduate	20	13.33
Occupation	Postgraduate	13	8.67
	Unemployed	26	17.33
	Daily wage worker	18	12.00
	Private employee	29	19.33
	Government employee	19	12.67
	Retired	32	21.33
	Homemaker	15	10.00
Family Monthly Income (in INR)	Other	11	7.33
	Below ₹15,000	28	18.67
	₹15,001–25,000	31	20.67
	₹25,001–35,000	29	19.33
	₹35,001–45,000	27	18.00
Type of Family	Above ₹45,000	35	23.33
	Nuclear Family	85	56.67
	Joint Family	50	33.33
	Extended Family	15	10.00
Type of Chronic Illness	Hypertension	38	25.33
	Diabetes mellitus	36	24.00
	Arthritis	34	22.67
	Cardiac disease	19	12.67
	Respiratory illness	11	7.33
Duration of Illness (in years)	Other	12	8.00
	Less than 1 year	48	32.00
	1–3 years	35	23.33
	4–6 years	28	18.67
	More than 6 years	39	26.00

Cont..

Current Treatment Source	Government hospital	75	50.00
	Private hospital	38	25.33
	Traditional/Alternative	25	16.67
	None	12	8.00

health, particularly among middle-aged and older adults who commonly experience sleep disturbances due to aging and chronic physical illnesses. Studies indicate that individuals suffering from chronic diseases such as hypertension, diabetes mellitus, cardiovascular disorders, and arthritis frequently report poor sleep quality, insomnia, and fragmented sleep patterns, which negatively affect disease outcomes and quality of life<sup>1</sup>. Age-related physiological changes combined with illness-related discomfort, medication effects, and psychological stress contribute substantially to sleep impairment among older adults.<sup>2</sup>

Sleep hygiene behavioral interventions, including maintaining regular sleep schedules, limiting stimulants, improving sleep environment, and promoting relaxation techniques, have emerged as effective non-pharmacological strategies to improve sleep quality. Behavioral approaches are particularly important because long-term pharmacological treatment for insomnia may lead to dependency and adverse effects in older populations<sup>3,4</sup>. Evidence suggests that structured sleep hygiene education and behavioral modification programs significantly improve sleep efficiency, reduce sleep latency, and enhance daytime functioning among individuals with chronic health conditions.<sup>5,6</sup> Therefore, evaluating the effectiveness of sleep hygiene behavioral interventions within community settings is essential to promote healthy aging and improve sleep outcomes among middle-aged and older adults living with chronic diseases.<sup>7,8</sup>

**Objectives**

- To assess the pre-intervention quality of sleep among middle-aged and older adults with chronic physical diseases.
- To assess the post-intervention quality of sleep among middle-aged and older adults with chronic physical diseases.
- To determine the effectiveness of sleep hygiene behavioral interventions in improving the quality of sleep among middle-aged and older adults with chronic physical diseases.

**Table 2:** Pre-test level of quality of sleep among the middle-aged and older adults with chronic physical diseases (N=150)

Level of quality of sleep	Quality of sleep scores	Experimental group (N=150)	
		f	%
Excellent sleep quality	81–100	0	0.00%
Good sleep quality	61–80	79	52.67%
Fair sleep quality	41–60	71	47.33%
Poor sleep quality	21–40	0	0.00%
Very poor sleep quality	20	0	0.00%
Total		150	100.0%

**Table 3:** Post-test level of quality of sleep among the middle-aged and older adults with chronic physical diseases (N=150)

Level of quality of sleep	Quality of sleep scores	Experimental group (N=150)	
		f	%
Excellent sleep quality	81–100	24	16.00
Good sleep quality	61–80	110	73.33
Fair sleep quality	41–60	16	10.67
Poor sleep quality	21–40	0	0.00
Very poor sleep quality	20	0	0.00%
Total		150	100.0%

- To find the association between pre-intervention quality of sleep scores and selected socio-demographic and clinical variables.

**Hypothesis**

H<sub>1</sub>: There is a statistically significant difference between the pre-intervention and post-intervention quality of sleep scores among middle-aged and older adults with chronic physical diseases following sleep hygiene behavioral interventions.

H<sub>2</sub>: There is a statistically significant association between pre-intervention quality of sleep scores and selected socio-demographic and clinical variables among middle-aged and older adults with chronic physical diseases.

**Table 4:** Pre-test and post-test mean, mean %, sd, and cv of quality of sleep scores among the middle-aged and older adults with chronic physical diseases. (N=150)

Domains	No. of Items	Minimum	Maximum	Range	Mean	Mean%	Standard deviation	Coefficient of variation
Pre-test	20	45	75	30	60.73	60.73%	6.29	10.36%
Post-test	20	41	88	47	71.58	71.58%	8.68	12.13%



**Table 5:** Mean and mean% of pre-test, post-test, and enhancement quality of sleep scores among middle-aged and older adults with chronic physical diseases (N=150)

Domains	Mean			Mean%			Calculated paired t-test value
	Pre test	Post test	Enhancement	Pre-test	Post-test	Enhancement	
Overall	60.73	71.58	10.85	60.73%	71.58%	10.85%	13.118 (S) df= 149 p <0.001

**Table 6:** Association between pre-test quality of sleep level of study participants and their selected demographic variables (N=150)

Demographic variables	Pre-test level of quality of sleep		Calculated chi-square values	df	p-value	
	Good	Fair and Poor				
Age (In years)	40–49	35	25	1.137 (NS)	3	0.768
	50–59	18	20			
	60–69	14	10			
	70 and above	13	15			
Gender	Male	32	50	1.812 (NS)	1	0.178
	Female	28	40			
Marital status	Married	42	66	3.281 (NS)	3	0.350
	Unmarried	10	11			
	Widowed	05	06			
	Divorced/Separated	04	05			
Educational qualification	No formal education	13	10	5.935 (NS)	5	0.369
	Primary	21	20			
	Secondary	13	15			
	Higher secondary	11	14			
	Graduate	11	09			
	Postgraduate	06	07			
Occupation	Unemployed	12	14	8.859 (NS)	6	0.439
	Daily wage worker	10	08			
	Private employee	14	15			
	Government employee	09	10			
	Retired	17	15			
	Homemaker	06	09			
	Other	05	06			
Family monthly income (in INR)	Below ₹15,000	13	15	2.316 (NS)	4	0.678
	₹15,001–25,000	16	15			
	₹25,001–35,000	12	17			
	₹35,001–45,000	13	14			
	Above ₹45,000	16	19			
Type of family	Nuclear Family	45	40	3.382 (NS)	2	0.184
	Joint Family	26	24			
	Extended Family	07	08			

Type of chronic illness	Hypertension	18	20	11.427 (S)	5	0.044
	Diabetes mellitus	17	19			
	Arthritis	15	19			
	Cardiac disease	10	09			
	Respiratory illness	06	05			
	Other	06	06			
Duration of illness (in years)	Less than 1 year	18	30	1.474 (NS)	3	0.688
	1–3 years	16	19			
	4–6 years	13	15			
	More than 6 years	19	20			
Current treatment source	Government hospital	35	40	0.540 (NS)	3	0.909
	Private hospital	18	20			
	Traditional/Alternative	12	13			
	None	06	06			

## Operational Definitions

### Evaluate

Evaluate refers to systematically measuring and comparing pre- and post-intervention sleep quality scores to determine changes following the implementation of sleep hygiene behavioral interventions.

### Effectiveness

Effectiveness refers to the extent to which sleep hygiene behavioral interventions produce a statistically significant improvement in sleep quality scores among participants after the intervention period.

### Sleep Hygiene Behavioral Interventions

Sleep hygiene behavioral interventions refer to structured educational and behavioral strategies, including sleep schedule regulation, environmental modification, and lifestyle adjustments, provided to improve healthy sleep practices.

### Quality of Sleep

Quality of sleep refers to the overall sleep experience measured in terms of duration, latency, continuity, depth, and restfulness using a standardized sleep assessment scale.

### Middle-Age

Middle-aged refers to adults between 40 and 59 years of age residing in the selected community area of Kottayam, Kerala, participating in the study.

### Older Adults

Older adults refer to individuals aged 60 years and above living in the selected community area of Kottayam, Kerala, diagnosed with chronic physical diseases.

### Chronic Physical Diseases

Chronic physical diseases refer to long-term medical conditions such as hypertension, diabetes mellitus, arthritis,

or cardiovascular disorders diagnosed by a physician and persisting for six months or more.

## METHODOLOGY

### Research Design and Approach

In this study, a quantitative experimental research design with a pre-test and post-test approach was used to evaluate the effectiveness of sleep hygiene behavioral interventions in improving quality of sleep among middle-aged and older adults with chronic physical diseases.

### Study Setting and Population

This study was conducted in a selected community area of Kottayam, Kerala. The study population consisted of middle-aged and older adults aged 40–70 years who were diagnosed with chronic physical diseases and residing in the selected community area.

### Sample and Sampling Technique

A total of 150 middle-aged and older adults with chronic physical diseases were selected using a randomized sampling technique. Participants who met the inclusion criteria and were willing to participate were included in the study.

### Data Collection Tool

A standardized and validated sleep quality assessment scale was used to collect data from participants. The tool was used to assess the quality of sleep before and after the sleep hygiene behavioral intervention.

### Intervention Procedure

A pre-test was conducted to assess the baseline quality of sleep. Sleep hygiene behavioral interventions were then administered through structured sessions, including sleep education, maintenance of regular sleep schedules,



environmental modification, relaxation techniques, and lifestyle adjustments. A post-test was conducted after the intervention period to evaluate improvement in the quality of sleep.

### Ethical Considerations

Ethical approval was obtained from the concerned authority. Informed consent was obtained from all participants. Confidentiality, anonymity, and privacy of participants were maintained throughout the study.

### Data Analysis

Data were analyzed using descriptive and inferential statistics. Mean, standard deviation, and paired t-test were used to evaluate the effectiveness of sleep hygiene behavioral interventions. The level of significance was set at  $p < 0.05$ .

## RESULTS

### Hypothesis Testing

$H_1$ : To test the stated hypothesis, the pre-test and post-test quality of sleep scores were compared using a paired t-test. The calculated t value was 13.118 with 149 degrees of freedom, and the obtained p value was less than 0.001. Since the calculated t value was significant at the 0.001 level, the null hypothesis ( $H_0$ ) was rejected and the research hypothesis ( $H_1$ ) was accepted (Tables 1-6).

### Hypothesis Testing

$H_2$  - Chi-square analysis showed that only one type of chronic illness had a statistically significant association with pre-intervention quality of sleep scores ( $\chi^2=11.427$ ,  $p=0.044$ ). All other socio-demographic and clinical variables were not significant ( $p > 0.05$ ). Therefore,  $H_2$  was partially accepted.

## DISCUSSION

The current study showed that sleep hygiene behavioral interventions significantly improved the quality of sleep for middle-aged and older persons with chronic physical conditions. Due to age-related changes, illness symptoms, and drug side effects, many participants reported only fair sleep quality in the pre-test.<sup>9</sup>

The majority of participants achieved satisfactory to exceptional sleep quality, according to post-intervention results. The t-test results and the notable rise in mean scores attest to the intervention's efficacy. These results are in line with other research emphasizing the advantages of sleep hygiene activities, such as consistent sleep schedules, environmental control, and relaxing methods.

Increased awareness and adoption of healthy sleep practices, which assist in controlling sleep patterns and lessen disruptions, may be the cause of the observed improvement. Furthermore, there was a strong correlation between baseline sleep quality and the kind of chronic illness.<sup>8</sup>

Overall, the study is in favor of community health nurses using sleep hygiene interventions as a straightforward, affordable, and useful strategy to enhance sleep and general well-being.

## CONCLUSION

The current study showed that among middle-aged and older persons with chronic physical conditions, sleep hygiene behavioral interventions greatly enhanced the quality of their sleep. The significant improvement in post-test sleep ratings suggests that structured interventions, such as regular sleep schedules, relaxation techniques, environmental changes, and sleep education, are successful in improving sleep outcomes. These non-pharmacological approaches are ideal for community-based adoption since they are easy to use, safe, and economical. The study also emphasizes how the type of chronic illness affects the quality of sleep. Therefore, encouraging improved sleep and general welfare among people with chronic diseases can be greatly aided by including sleep hygiene programs in community health nursing practice. To improve the generalizability of the evidence and conclusions, more research with control groups is advised.

## NURSING IMPLICATION

### Nursing Practice

The study highlights the vital role of nurses in improving the quality of sleep among middle-aged and older adults with chronic physical diseases through sleep hygiene behavioral interventions. Nurses can identify individuals experiencing poor sleep quality and provide structured sleep education, guidance on maintaining regular sleep schedules, environmental modifications, relaxation techniques, and healthy lifestyle practices. Community health nurses can conduct awareness programs, counseling sessions, and follow-up visits to promote healthy sleep behaviors and enhance overall well-being.

### Nursing Research

This study provides a foundation for further nursing research on sleep hygiene behavioral interventions and sleep quality among individuals with chronic physical diseases. Future studies can assess long-term effectiveness, compare various non-pharmacological sleep interventions, and examine their impact on disease control, mental health, and quality of life. Research may also focus on developing culturally appropriate and community-based sleep promotion models.

### Nursing Administration

Nursing administrators should integrate sleep hygiene behavioral intervention programs into community health services for individuals with chronic physical diseases. They should ensure proper training of nurses, availability of educational materials, and systematic monitoring of sleep outcomes. Administrators should also support policies that

recognize sleep health as an essential component of chronic disease management.

### **Nursing Education**

The study emphasizes the importance of including sleep hygiene and behavioral sleep management strategies in nursing curricula. Nursing students should be trained in sleep assessment, counseling techniques, and non-pharmacological sleep promotion methods. This will equip future nurses to provide holistic care and effectively manage sleep-related problems in community and clinical settings.

### **CONCLUSION**

The study concluded that sleep hygiene behavioral interventions were effective in improving the quality of sleep among middle-aged and older adults with chronic physical diseases in a selected community area of Kottayam, Kerala. The significant improvement in post-test sleep quality scores confirmed the effectiveness of the intervention. The findings highlight the importance of integrating sleep hygiene practices into community health nursing to promote better sleep and overall health outcomes.

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### **CONFLICTS OF INTEREST**

The author declares that they have no conflict of interest with regard to the content of the report.

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