Original Article

JHSMR Journal of Health Science and Medical Research

Improving Sleep Quality and General Health through a Sleep Promotion Program: Evidence from Institutionalized Older Adults in Punjab and Chandigarh

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Received 10 November 2024 ● Revised 5 December 2025 ● Accepted 23 December 2025 ● Published online 4 September 2026

Abstract:

Objective: Older adults living in institutional settings face multiple challenges to maintain good sleep, including environmental noise, irregular routines, reduced sunlight exposure, and psychosocial stressors such as loneliness. This study evaluated the effect of the Sleep Promotion Program on sleep quality and general health among older adults.

Material and Methods: A true experimental pre-test and post-test research design was adopted with a sample size of 94. A sleep promotion program was administered to the experimental group for four weeks, focusing on sleep hygiene, guided imagery, and aerobic exercises. The effect of the intervention was measured at baseline and on the 31st day through the scales: Pittsburgh Sleep Quality Index and General Health Questionnaire-28 (GHQ-28). Data were analysed using descriptive and inferential statistics.

Results: Post-intervention assessment after 4 weeks revealed improvement in sleep quality (U=772.00, Z=-2.565, p-value=0.010) and general health (Z=-2.074, p-value=0.038) among the older adults. The waitlist control group showed no significant change in either measure. A positive correlation was observed between better sleep quality and improved general health outcomes.

Conclusion: The Sleep Promotion Program effectively enhanced sleep quality and general health in institutionalized older adults. This low-cost, non-pharmacological intervention can be incorporated into routine elder care to promote healthy ageing.

Keywords: general health, older adults, sleep promotion program, sleep quality

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J Health Sci Med Res
doi: 10.31584/jhsmr.20261405
www.jhsmr.org

Introduction

Aging is a natural, continuous, and irreversible process marked by progressive physiological, psychological, and social transformations, which may start as early as the third decade of life. These transformations affect multiple body systems, including cardiovascular, neurological, musculoskeletal, and integumentary systems, ultimately affecting the overall health and quality of life of older adults[1,2]. The World Health Organization defined healthy aging as the process of developing and maintaining the functional ability that enables well-being in older age[2,3].

Globally, the aging population is increasing rapidly, with the number of older adults (≥60 years) expected to reach 1.5 billion by 2050. India alone will host over 104 million elderly individuals, representing 8.6% of its population[4]. This demographic shift, driven by sociocultural changes, such as the transition from joint to nuclear families and the migration of younger members for employment, has increased reliance on institutional care like old-age homes. While such facilities provide basic support, they often fall short in addressing the psychological, emotional, and health-related needs of the elderly, particularly sleep disturbances[5-6].

Sleep is a vital component of physical and mental health, playing a crucial role in memory consolidation, emotional regulation, immune function, and metabolic balance[6,7]. However, aging is associated with significant changes in sleep architecture and circadian rhythms, resulting in shorter sleep durations, increased nighttime awakenings, and difficulty falling or staying asleep.[8] These sleep disturbances are further exacerbated by comorbidities, medication use, psychosocial stressors, and environmental factors such as noise, inadequate lighting, and uncomfortable bedding—conditions frequently reported in institutional settings.[9,10]

In India, the Longitudinal Ageing Study (LASI) revealed a 13% prevalence of poor sleep quality among adults aged 45 and above, with higher rates among those aged ≥60 years[11]. Region-specific studies from North India, including those from Punjab and Chandigarh, indicate even higher prevalence of sleep-related problems among the institutionalized elderly, attributed to factors like limited physical activity, chronic diseases, loneliness, bereavement, and poor environmental conditions[12-14].

Non-pharmacological interventions have emerged as effective and sustainable alternatives to sedative-hypnotic medications for improving sleep among older adults. Interventions such as sleep hygiene education, guided imagery, relaxation techniques, and physical exercise have shown significant improvements in sleep quality, duration, sleep efficiency, and reduction in sleep latency[15-17]. These strategies also contribute to enhanced cognitive functioning, reduced depressive symptoms, and better overall health outcomes, thereby offering cost-effective and sustainable approaches for elderly care[18-20].

Although many older adults living in care facilities experience sleep difficulties that significantly affect their overall health, sleep problems often remain underrecognized in elderly care, particularly in India[21]. There is a pressing need for culturally appropriate, evidence-based programs that can be implemented in old-age homes. Most Indian studies focus on the prevalence and factors associated with poor sleep, yet few have tested comprehensive, multi-component interventions[22-23]. Furthermore, there is limited longitudinal research, inadequate caregiver training, and minimal integration of sleep health into care-home policies[24-25]. Notably, no studies have examined the effectiveness of a combined approach, integrating sleep education, guided imagery, and physical exercise on improving sleep and overall health among institutionalised older adults in Punjab and Chandigarh. To bridge this gap, the present study assessed the effectiveness of a sleep promotion program: an integrated approach combining guided imagery and physical exercises on sleep quality and general health among older adults residing in care institutions.

Material and Methods

Study design

An experimental approach and true experimental research (pre-test/post-test) design were used to achieve the objectives of the study. Both outcome variables (sleep quality and general health) were measured before starting the intervention and at the end of the intervention, i.e., on the 31st day. The selected settings of the study were old-age homes in Punjab and Chandigarh, India. These settings were at an appropriate distance to avoid the contamination of subjects.

Study population and sampling

The target population comprised older adults aged 50 years and above, with the accessible population being those residing in the selected old-age homes.

The sample size was calculated using power analysis (Cohen's d=μ1-μ2/ σ), assuming a medium effect size of 0.6 and power of 0.80, and a significance level of 0.05. The calculated minimum required sample size was 47 participants per group, resulting in a total sample of 94 older adults (47 in the experimental and 47 in the waitlist control group). The sample included 94 older adults who met the inclusion criteria (PSQI score >5 and willingness to participate) and exclusion criteria (not on psychotropic medication). Cluster random sampling was employed to reduce contamination between participants. A sampling frame of 10 old-age homes: 4 from Patiala, 3 from SAS Nagar (Mohali), and 3 from Chandigarh, with a population of 550 (55 older adults in each old-age home). Four clusters were randomly selected by lottery slips (alternating allocation to control and experimental groups). Two clusters were assigned to the experimental group (n=47) and two clusters to the waitlist control (n=47) groups (Figure 1).

Instruments

In the investigation, the following tools were used to collect the data from the participants: (i) The Socio-demographic questionnaire comprises questions regarding age, gender, marital status, education, BMI, source of income, duration of stay in old-age home, diagnosed health condition, and any co-morbidity. (ii) The Pittsburgh Sleep Quality Index (PSQI)[26] was used to evaluate overall sleep quality and patterns of sleep over one month. It consists of 19 self-rated questions grouped into seven components: subjective sleep quality (1 item), sleep latency (2 items), sleep duration (1 item), sleep efficiency (3 items), sleep disturbances (9 items), use of sleeping medications (1 item), and daytime dysfunction (2 items), each measuring a different aspect of sleep quality. PSQI uses four-point response alternatives tailored to each item to assess sleep quality. Response alternatives vary with the question; participants respond using frequency-based options ('not during the past month' to 'three or more times a week'), severity ratings ('very good' to 'very bad'), or difficulty levels ('no problem' to 'a very big problem'). Time-based categories are also used for items assessing sleep latency and duration. The scoring criteria of PSQI is 5-7 (mild sleep disturbances), 8-14 (moderate sleep disturbances), to 15-21 (severe sleep disturbances); (iii) the General Health Questionnaire-28 (GHQ-28)[27] was used to screen for risk of developing psychiatric disorders, and it had 28 items across four sub-scales: somatic symptoms, anxiety and insomnia, social dysfunction and severe depression, with each domain containing 7 items. Respondents rate their experiences using four response alternatives: 'not at all', 'no more than usual', 'rather more than usual', and 'much more than usual'.

Both the instruments used in the study demonstrated satisfactory reliability, with the PSQI showing reliability of r=0.83, and the GHQ-28 showing r=0.90. The content validity index was strong: demographic variables (Scale-CVI=0.90), PSQI (Scale-CVI=1), and GHQ-28 (Scale-CVI=1).

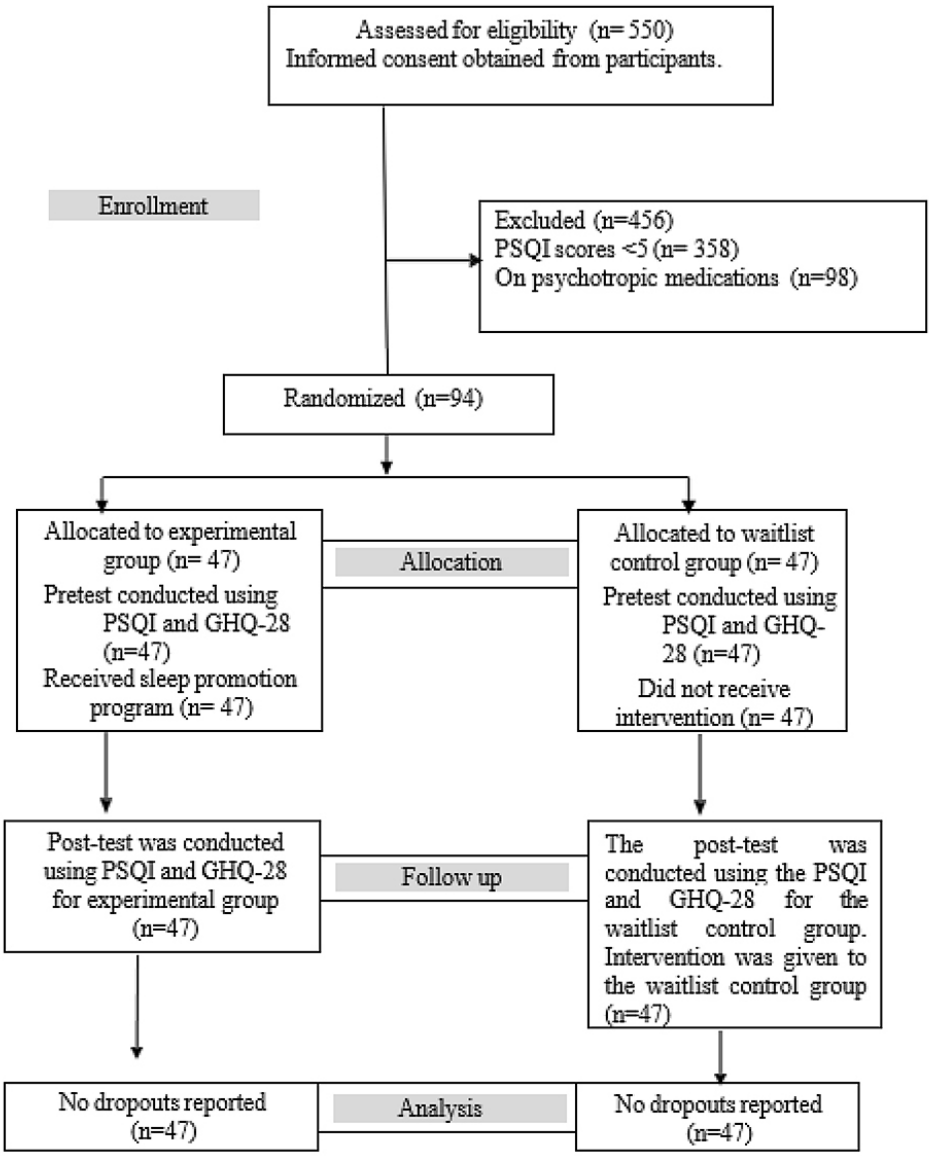

Figure 1 CONSORT flow diagram

Intervention (sleep promotion program)

The researcher possessed formal certification and experience in delivering guided imagery and aerobic exercise interventions. Furthermore, the sleep promotion program was validated by a panel comprising a psychologist, psychiatrist, and physiotherapist. The validation was based on relevance, suitability, content, language, and feasibility.

The Sleep Promotion Program was a multi-component intervention that comprised three components, i.e., sleep hygiene education, guided imagery, and aerobic exercises, all implemented over a period of 4 weeks.

Sleep Hygiene Education: On day 1, participants underwent a small group interactive session for 45 minutes. The session focused on maintaining a regular sleep-wake

schedule, creating an ideal sleep environment, and engaging in activities that induce relaxation before bedtime, using visual aids and practical demonstrations.

Guided Imagery: Guided imagery sessions were conducted in groups, twice a week, 15 minutes each, over 4 weeks (a total of 8 sessions). The sessions were personally conducted by the researcher, who provided verbal instructions in a calm tone with soothing background music. Participants were seated comfortably in a quiet room and were encouraged to visualise calming natural scenes, like a flowing river and open meadows. Each session included deep breathing, visualisation, and progressive relaxation.

Aerobic Exercises: They were also conducted twice a week, for four weeks, for 30 minutes under the supervision of the researcher. Exercises included low-impact movements like brisk walking, heel/toe/knee taps, arm circles, and deep breathing.

Procedure

Data collection was carried out from 1st January to 15th February 2025, after obtaining administrative approval. On the first day, baseline assessment of sleep quality and general health was conducted for both experimental and waitlist control groups using the interview technique. The average time taken for the completion of the research tools was approximately 40 minutes. The Sleep Promotion Program was administered to a small group of older adults (10–15) for 4 weeks, while no intervention was provided to the waitlist control group. The post-test was conducted using PSQI and GHQ-28 on the 31st day for both groups. After completion of the data collection from the waitlist control group, the sleep promotion program was subsequently administered to them as well.

Attendance was taken at all the sessions to maintain participant regularity. The caregivers in the facilities were trained to remind the participants to attend each session and to motivate them to continue participating. A session log was maintained by the researcher to record duration, participant responsiveness, and deviation (Table 1).

Ethical consideration

Ethical clearance to conduct this research was granted by the Institutional Ethics Committee (IEC), Chitkara University, Punjab (Reference No: IHEC/DHR/CU/PB/24/268). Formal permission was obtained from the old-age home authorities, and informed consent was obtained from the participants.

Table 1 Description of components under the sleep promotion program

S.No.	Components of sleep promotion program	Objective of Components	Time	Frequency
1	Awareness about Sleep Hygiene - Sleep environment optimization	To understand the importance of sleep and its impact on overall health, particularly in the elderly.	45 minutes	Given once at day one of the sleep promotion program
2	Guided imagery	To reduce stress, promote relaxation, and support better sleep among older adults	15 minutes	8 (twice a week)
3	Aerobic exercise - Brisk walking - Heel/toe/knee taps - Out-out/in-in - Deep breathing	To enhance sleep quality in older adults by involving them in aerobic exercises, emphasizing accessible exercises and highlighting the health and sleep benefits of physical activity	30 minutes	8 (twice a week)

Data analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) 24. Data were reviewed for outliers and missing values. For descriptive statistics, i.e., mean, standard deviation, median, and percentage were used. Data normality was assessed using the Kolmogorov–Smirnov test, and data were found not to be distributed normally (p–value<0.05). Therefore, non–parametric statistical tests were used for further data analysis.

For baseline comparison of the variables, the chi–squared test was used. Differences in sleep quality and general health between the two groups were assessed using the Mann–Whitney U–test. The Wilcoxon signed–rank test was used for paired comparison. An acceptable level of significance for the study was set at p–value<0.05.

Results

Baseline characteristics of older adults

Demographic characteristics of older adults are described and compared in Table 2. This true–experimental study included 94 participants with a PSQI score of more than 5. The demographic characteristics of older adults were matched by applying the chi–square test. All the variables were matched; hence, the older adults in the experimental and waitlist control groups were similar in terms of the above demographic characteristics, except for duration of stay in the old age home and diagnosis of a health condition.

The comparison of mean pretest scores of sleep quality and general health in the experimental and waitlist control groups was made using the Mann–Whitney U–test, and the difference was found to be non–significant at p–value<0.05 level. The baseline comparison revealed that groups were homogenous at the baseline level in terms of sleep quality and general health.

Effect of sleep promotion program on sleep quality and general health

The experimental group showed improvement in sleep quality, with increased sleep duration. Participants sleeping <5 hours decreased from 29.7% to 2.1%, and those sleeping 5–6 hours increased from 66% to 80.9%. Sleep efficiency improved with participants shifting from 17% to 23.4%, and sleep disturbances were reduced with more participants reporting fewer disturbances, from 61.7% to 74.5%. Daytime dysfunction was also reduced in the participants, while the waitlist control group showed minimal or no improvement (Table 3).

The Sleep Promotion Program led to a slight improvement in sleep quality in the experimental group (moderate sleep disturbances shifted from 95.7% in the pretest to 89.4% in the posttest), while the control group showed minimal changes. Regarding general health, the experimental group showed a favourable shift. Pretest to posttest, older adults reporting no distress increased from 38.3% to 44%, while those with distress declined from 61.7% to 55.4%. In the waitlist control group, no change was observed in the pretest–to–posttest assessment (Table 4).

Comparison of pretest and posttest sleep quality scores and general health in both groups was done using the Wilcoxon signed–rank test. Results indicated improvement in the experimental group for both sleep quality (z=–3.851, p–value <0.001) and general health (Z=–5.366, p–value<0.001), with lower posttest mean ranks showing reduced sleep disturbances and better health status. In contrast, the waitlist control group showed no statistical change in sleep quality and general health (p–value>0.05) (Table 5).

To compare post–test sleep quality scores and the general health of older adults between the groups, the Mann–Whitney U–test was applied. The experimental group showed significant improvement over the waitlist control group, showing improved sleep quality (U=772.00, Z=–2.56, p–value=0.010) and enhanced general health (Z=–2.07, p–value=0.038) after the sleep promotion program (Table 6).

Table 2 Frequency and percentage distribution of socio-demographic characteristics (n=47)

Sr. No.	Demographic variables	Experimental group (n=47) f (%)	Waitlist control group (n=47) f (%)	df	χ^2	p-value
1	Age (In years)			3	0.41	0.93
	50-61	8 (17)	6 (12.8)			
	62-73	14 (29.8)	16 (34.0)			
	74-85	17 (36.2)	17 (36.2)			
	86-95	8 (17.0)	8 (17.0)			
2	Gender			1	0.17	0.67
	Male	24 (51.0)	26 (55.4)			
	Female	23 (49.0)	21 (44.6)			
3	Marital status			3	3.55	0.29
	Married	7 (14.8)	8 (17.8)			
	Unmarried	2 (4.2)	7 (14.8)			
	Separated/divorced	2 (4.2)	1 (2.12)			
	Widow /widower	36 (76.8)	31 (65.19)			
4	Education level			5	6.16	0.29
	No formal education	9 (19.5)	13 (27.6)			
	Primary education	10 (21.2)	6 (12.7)			
	Secondary education	15 (31.9)	17 (36.4)			
	Higher education	7 (14.8)	7 (14.8)			
	Graduation	3 (6.3)	4 (8.5)			
	Post-graduation or above	3 (6.3)	0			
5	BMI			3	7.80	0.05
	>18.5	0	5 (10.8)			
	18.5-24.9	30 (64)	30 (63.8)			
	25-29.9	14 (29.7)	10 (21.2)			
	30-34.9	3 (6.3)	2 (4.2)			
6	Source of income				0.33	0.94
	Pension	38 (80.8)	34 (72.4)	1		
	Saving	9 (19.2)	13 (27.6)			
7	Duration of stay			3	10.29	0.02*
	1 month-2.5 years	24 (51.2)	20 (42.8)			
	2.6 Years-5 Years	21 (44.6)	18 (38.2)			
	5.1 Years-7.5 Years	0	7 (14.8)			
	7.6 Years-10 Years	2 (4.2)	2 (4.2)			
8	Diagnosed health condition			1	4.41	0.04*
	Yes	30 (63.9)	39 (83)			
	No	17 (36.1)	8 (17.0)			
9	Any co-morbidity			1	0.94	0.33
	Yes	9 (19.2)	13 (27.6)			
	No	38 (80.8)	34 (72.4)			

*=statistically significant (p-value<0.05), BMI=body mass index

Correlation between sleep quality and general health

Study results concluded that there is a weak but significant positive correlation (r=0.275, p-value=0.007), suggesting that poorer sleep quality (higher PSQI scores) was associated with worse general health (higher GHQ scores).

Table 3 Frequency and percentage distribution of domain-wise sleep quality scores of older adults in the experimental group and waitlist control group (n=47)

Domains of PSQI	Pretest		Post-test	
	Experimental group (n=47) f(%)	Waitlist control group (n=47) f(%)	Experimental group (n=47) f(%)	Waitlist control group (n=47) f(%)
Sleep duration (hours)				
<5	14 (29.75)	16 (34.0)	1 (2.1)	13 (27.7)
5-6	31 (66.0)	27 (57.5)	38 (80.9)	30 (63.8)
6-7	2 (4.25)	4 (8.5)	8 (17.0)	4 (8.5)
>7	0	0	0	0
Sleep efficiency (%)				
<65	35 (74.5)	31 (66.0)	34 (72.3)	34 (72.3)
65-74	8 (17.0)	9 (19.1)	11 (23.4)	5 (10.7)
75-84	3 (6.4)	7(14.9)	2 (4.3)	7 (14.9)
>85	1 (2.1)	0	0	1 (2.1)
Sleep disturbances				
1-9	29 (61.7)	21 (44.7)	35 (74.5)	21 (44.7)
10-18	17 (36.2)	25 (53.2)	11 (23.4)	26 (55.3)
19-27	1 (2.1)	1 (2.1)	1 (2.1)	0
Use of sleep medication				
Not during the past	47 (100)	47 (100)	47(100)	47 (100)
Daytime dysfunction				
Not during the past	4 (8.5)	6 (12.7)	8 (17.0)	5 (10.6)
Less than once a week	29 (61.7)	28 (59.6)	33 (70.2)	29 (61.7)
Once or twice a week	14 (29.8)	10 (21.3)	6 (12.8)	10 (21.3)
Three or more times a week	0	3 (6.4)	0	3 (6.4)

PSQI=Pittsburgh sleep quality index

Table 4 Frequency and percentage distribution of sleep quality scores of older adults (n=47)

Variable	Level	Experimental group		Waitlist control group	
		Pretest f (%)	Post test f (%)	Pretest f (%)	Post test f (%)
Sleep quality	Mild sleep disturbance (5-7)	1 (2.14)	4 (8.50)	0(0.00)	0 (0.00)
	Moderate sleep disturbance (8-14)	45 (95.75)	42 (89.36)	43 (91.49)	42 (89.36)
	Severe sleep disturbance (15-21)	1 (2.14)	1 (2.14)	4 (8.51)	5 (10.64)
General health	No distress (<23)	18 (38.3)	21 (44.6)	8 (17.10)	8 (17.10)
	Presence of distress (≥23)	29 (61.7)	26 (55.4)	39 (82.90)	39 (82.90)

Table 5 Comparison of pre-test and post-test sleep quality and general health scores of older adults in both groups

Variable	Experimental Group				Waitlist Control group			
	Mean rank Pretest	Mean rank Post test	W (sum of ranks)	Z-value (p-value)	Mean Rank Pretest	Mean rank post test	W (Sum of ranks)	Z-value (p-value)
Sleep quality	15.94	12.63	414.50	-3.85 (0.00)	11.44	9.73	103.0	-0.07 (0.94)
General health	21.21	7.00	806.0	-5.36 (0.00)	11.46	7.50	137.50	-1.72 (0.09)

Table 6 Comparison of posttest sleep quality and general health scores of older adults in both groups

Group	Variable (n=47)	Mean rank	Mann-whitney U	Z-value	p-value
Sleep quality	Experimental group	40.43	772.00	-0.25	0.01
	Waitlist control group	54.57			
General health	Experimental group	41.67	830.50	-2.07	0.03
	Waitlist control group	53.33			

Association of sleep quality and general health with demographic variables

Association of sleep quality with demographic variables was determined with the use of the Kruskal-Wallis test. The results of the study show that there was no statistically significant association of the variables with the post-test sleep quality score in the experimental group among older adults, except age (in years). The higher the age, the poorer the sleep quality. The results indicate a significant association between marital status and source of income with the post-test general health score of the older adults in the experimental group.

Discussion

The findings of the present study show that the multicomponent Sleep Promotion Program significantly improved sleep quality and general health among older adults. The rationale for including guided imagery and aerobic exercises is supported by the established theoretical and empirical evidence. Guided imagery promotes relaxation by activating the parasympathetic nervous system, reducing cognitive arousal, and lowering stress, which leads to improvement in sleep onset and sleep maintenance. [28] Aerobic exercises enhance sleep quality through physiological mechanisms like improved thermoregulation, increased sleep, and regulation of circadian rhythms, as well as a reduction in anxiety and depressive symptoms[29,30].

Several studies in India and internationally have explored the effectiveness of non-pharmacological interventions for sleep enhancement in older adults[31,32]. However, despite the high prevalence of sleep disturbances among institutionalised older adults, sleep problems often receive limited attention in routine care practices in India[33]. The present study, therefore, addresses a significant gap by implementing a structured evidence-based program within residential care facilities.

The sleep promotion program significantly improved sleep quality and general health among older adults in the experimental group compared to the waitlist control group. Post-intervention: sleep disturbances decreased, and general health improved. Wilcoxon signed-rank test confirmed these improvements were statistically significant for both sleep quality (p-value<0.001) and general health (p-value<0.001), consistent with prior studies in multicomponent sleep promotion interventions[34, 35]. The gender-based findings depict a higher prevalence of sleep difficulties among adult females due to hormonal influences, caregiving stress, and higher rates of anxiety[35]. The intervention in this study was effective for older adults, irrespective of gender.

The study found a weak, significantly positive correlation between sleep quality and general health (r=0.0275, p-value=0.007), indicating that poorer sleep quality was associated with poor general health among older adults. Although the correlation was modest, this finding aligns with existing evidence that sleep disturbances contribute to psychological distress and decrease overall well-being in older populations[36]. These results underscore

the importance of addressing sleep problems as a part of holistic interventions aimed at improving the general health of institutionalized older adults.

Implications for practice

The findings underscore the importance of incorporating structured sleep promotion programs into geriatric practice, particularly in institutional settings. Non-pharmacological interventions, including sleep hygiene education, relaxation techniques, and environmental modifications, are beneficial to sleep quality and overall health in the elderly. Geriatric nurses should actively educate older adults and caregivers about effective sleep hygiene practices and lifestyle changes that contribute to overall health.

Strength of the study

This study is among the few to evaluate the effectiveness of the Sleep Promotion Program on both sleep quality and general health among older adults residing in old-age homes, adding valuable evidence from an underrepresented population. The use of a truly experimental design enhances the reliability of the findings by allowing effective comparisons. The intervention used was non-pharmacological and cost-effective, making it suitable for integration into routine geriatric nursing practices.

Conclusion

The present study showed that the Sleep Promotion Program is an effective non-pharmacologic approach for improving sleep quality, as well as general health in older individuals in an institutional environment. Moderate sleep disturbances were significantly reduced, sleep efficiency and duration improved, and psychological well-being increased in the experimental group, with no such changes in the waitlist-control group. Due to the affordability and feasibility of its implementation, it would be advantageous to introduce similar programs into everyday geriatric nursing care to help promote healthy aging.

Acknowledgement

The authors would like to acknowledge all the older adults who participated in the study.

Conflict of interest

The authors declare no conflict of interest.

Funding sources

No external funding or financial support was received for this study.

References

1. World Health Organization. World report on ageing and health. [homepage on the Internet] Geneva: WHO; 2015. [cited 2025 Nov 3]. Available from: https://iris.who.int/bitstream/handle/10665/186463/9789240694811_eng.pdf
2. Amarya S, Singh K, Sabharwal M. Ageing process and physiological changes in Gerontology [monograph on the Internet] 2018 [cited 2025 Nov 3]. Available from: https://www.intechopen.com/chapters/60564
3. United Nations. World Population Ageing 2023. [homepage on the Internet] New York: UN; 2023 [cited 2025 Nov 3]. Available from: https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/undesa_pd_2024_wpa2023-report.pdf
4. Soni A, Lodha RS. Comparative study of quality of life among elderly in old age homes and families. Int J Community Med Public Health 2024;11:2656–60.
5. Kumari R, Mahesh M. Breakdown of traditional joint family system and its impact on elderly care in India. Int J Curr Res Acad Rev 2025;13:112–20.
6. Thomas R. Quality of Life (QOL) of the institutionalized Elderly: A Comparative Study. HelpAge India Res Dev J 2025;27:18–25.
7. Kim JH, et al. Circadian rhythm sleep-wake disorders in older adults. Sleep Med Clin 2022;17:241–52.
8. Grandner MA. Sleep, health, and society. Sleep Med Clin 2017;12:1–22.

9. International Institute for Population Sciences. Longitudinal Ageing Study in India (LASI) Wave 1. Mumbai: IIPS; 2020.
10. Raja I, Sardar JC. Sleep quality and associated factors among elderly in rural West Bengal. Int J Community Med Public Health 2022;9:1360–5.
11. Kaur R. A comparative study on physical health problems of Institutionalized and non- institutionalized elderly in selected communities of amritsar. Indian J Appl Res 2018;8:24-5.
12. Kaushal NY, Kausal NR, Sharma NI, Mittal NS. Assessment of sleep habits and quality among elderly in rural Patiala: a community-based survey. Int Healthc Res 2021;5:OR1–4. doi: 10.26440/ihrj/0507.10466.
13. Papadopoulos D, Sosso FAE. Socioeconomic status and sleep health: a narrative synthesis. J Clin Sleep Med 2023;19:605–20.
14. Rosewood-nursing.com. How nursing homes address sleep challenges in seniors. [homepage on the Internet] New York: Rosewood Nursing; 2023. [cited 2025 Nov 3]. Available from: https://www.rosewood-nursing.com/post/how-nursing-homes-address-sleep-challenges-in-seniors
15. Hassan M. Effect of sleep hygiene program on sleep quality, depression, anxiety and stress among resident older adults. IOSR J Nurs Health Sci 2020;9:45–56.
16. Capezuti E, et al. Non-pharmacological interventions to improve nighttime sleep in long-term care: a systematic review. BMC Geriatr 2018;18:143.
17. Jung SO, et al. Effects of non-pharmacological interventions on sleep among older adults in Korean long-term care facilities. J Korean Acad Community Health Nurs 2022;33:340–9.
18. Hariprasad VR, Sivakumar PT, Koparde V, Varambally S, Thirthalli J, Varghese M, et al. Effects of yoga intervention on sleep and quality-of-life in elderly: a randomized controlled trial. Indian J Psychiatry 2013;55(Suppl3):S364-8.
19. Singh M, Raj S. Poor sleep and functional independence among elderly residents of care homes. J Aging Health 2021;33:547–59.
20. Verma S, et al. Circadian rhythm disruption and sleep quality in institutionalized older adults. Sleep Med Rev 2019;45:123–30.
21. Das S, Singh R. Policy frameworks for integrating sleep health in geriatric care in India. Health Policy 2023;127:548–55.
22. Sandooja C, Panda M, Kumar V, Kishore J. Sleep quality index among elderly in Delhi: a community-based cross-sectional study. Int J Community Med Public Health 2023;10:1537–42.
23. Raja I, Sardar JC. Sleep quality and associated factors among elderly in rural West Bengal. Int J Community Med Public Health 2022;9:1360.
24. George S, Paul G, Paul N. Sleep quality and psychosocial factors among elderly in rural Kerala. Int J Community Med Public Health 2018;5:526.
25. Than NH, Le TVM, Nguyen TTT, Nguyen TV, Nguyen TC, Nguyen TV. Poor sleep quality and associated factors among community-dwelling older adults in Vietnam. Aging Med Healthc 2023;14:130–7. doi: 10.33879/amh.143.2022.02016.
26. Shahid A, Wilkinson K, Marcu S, Shapiro CM. Pittsburgh sleep quality index (PSQI). In: Springer eBooks [serial on the Internet]. 2011 [cited 2025 Nov 3];p.279–83. Available from: https://doi.org/10.1007/978-1-4419-9893-4_67
27. Sterling M. General health questionnaire–28 (GHQ-28). J Physiother 2011;57:259. doi: 10.1016/s1836-9553(11)70060-1.
28. Roffe L, Schmidt K, Ernst E. A systematic review of guided imagery as an adjuvant cancer therapy. Psychooncology 2005;14:607–17.
29. Posadzki P, Ernst E. Guided imagery for musculoskeletal pain: a systematic review. Clin J Pain 2011;27:648–53.
30. Reid KJ, Baron KG, Lu B, Naylor E, Wolfe L, Zee PC. Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia. Sleep Med 2010;11:934-40.
31. Kaewlue A, Banharak S, Panpanit L, et al. Multisensory sleep-promotion program effectiveness among hospitalized older adults: a quasi-experimental study. Behav Sleep Med 2022;1–16.
32. Patel N, Chokroverty S. Sleep intervention outcomes in elderly populations: a comparative analysis. J Clin Sleep Med 2020;16:889–96.
33. Mokhlesi B, Sanders MH. Treatment of insomnia in older adults: review of pharmacological and non-pharmacological interventions. Sleep Med Rev 2021;50:101265.
34. Li J, Wang Z. Structured sleep hygiene interventions and sleep disturbances in the elderly: a quasi-experimental study. BMC Geriatr 2020;20:315.
35. Martin S, Brown J. Effectiveness of sleep interventions on quality of life and health in elderly: a systematic review. Int J Nurs Stud 2019;96:65–78.
36. Kamel NS, Gammack JK. Insomnia in the elderly: cause, approach, and treatment. Am J Med 2006;119:463–9.