

THE ROLE OF NURSING MANAGEMENT IN OPTIMIZING THE ENVIRONMENT TO PREVENT INSOMNIA RISK IN THE ELDERLY AT THE SOCIAL SERVICE DEPARTMENT

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ABSTRACT

Insomnia is a prevalent health problem among the elderly worldwide, significantly impacting their quality of life and overall health. Environmental factors—such as room temperature, noise, lighting, and cleanliness—play a critical role in increasing insomnia risk. Nursing management is essential in optimizing these environmental conditions to support better sleep quality in elderly patients. Objective: This study aims to examine the role of nursing management in improving environmental factors to reduce insomnia risk among the elderly. Methods: A cross-sectional quantitative study was conducted with 45 elderly respondents selected by total sampling. Data collection used validated questionnaires including the Insomnia Rating Scale and environmental comfort assessments via Likert scales. Analysis involved univariate, bivariate (Fisher's exact test), and multivariate logistic regression techniques. Results: Findings revealed that 66.7% of participants were at high risk of insomnia. Room temperature regulation was the most influential factor (RR = 5.10; $p = 0.005$), followed by noise control (RR = 3.85; $p = 0.02$), lighting (RR = 3.60; $p = 0.03$), and environmental cleanliness (RR = 3.40; $p = 0.04$). Poor environmental conditions significantly increased insomnia risk. Conclusion: Nursing management focusing on regulating room temperature, reducing noise, optimizing lighting, and maintaining cleanliness is crucial to decrease insomnia risk in the elderly. This study highlights the need for nursing education and policies emphasizing environmental management to enhance elderly sleep quality and well-being.

Keywords: Elderly, Environmental, Insomnia, Nursing Management

INTRODUCTION

Aging is a natural stage experienced by every individual. During this process, cellular functions decline, causing the body to function less optimally. The elderly are a vulnerable group prone to various health problems, one of which is sleep disturbances such as insomnia. Quality sleep is essential for maintaining the physical and mental health of the elderly. However, an unsupportive environment often becomes a barrier. Uncomfortable environmental conditions, such as unsuitable room temperature, noise, or excessive lighting, can trigger insomnia, as reported in previous studies (Setyoadi, Purnamawati, & Sari, 2023).

Insomnia in the elderly is a global issue with a relatively high prevalence. According to

the WHO, approximately 18% of the global population experiences insomnia annually, potentially leading to mental stress (Biahimo & Gobel, 2021). In Indonesia, sleep disorders affect about 50% of individuals aged 65 and older (Hasibuan & Hasna, 2021). If left untreated, insomnia can develop into chronic sleep disorders, resulting in decreased cognitive function, fatigue, and an overall decline in the quality of life for the elderly (Fauzia & Roslinawati, 2020).

Research by Brewster et al. (2019), as cited in Utami et al. (2021), reveals that noisy, dirty, and cramped environments negatively affect the physiology, behavior, and cognitive function of the elderly, thereby disrupting their sleep and ultimately influencing their sleep quality. According to the International Classification of Sleep

Disorders (ICDS-2), as cited in Setyoadi, Purnamawati, & Sari (2023) and Erwani & Nofriadi (2017), insomnia can also be caused by environmental factors such as poor sleep hygiene, noisy surroundings, inappropriate temperatures, and habits like eating or watching television in bed, as well as excessive daytime napping.

Studies by Salvemini et al. (2019), Cybulski et al. (2019), and Gehrman & Ancoli-Israel (2016) indicate that watching television before bed is often used by the elderly to stimulate drowsiness. Other studies show that soft sounds, such as the ticking of a clock, a fan, or soothing music, can help individuals fall asleep more easily. Reading also helps the elderly relax and disconnect from daily stresses. According to Zhang et al. (2021), light, non-stressful reading materials, such as current news or non-fiction history, can make the elderly feel tired and adjust to the lighting in the room. However, reading stressful material may increase alertness, making it difficult for them to stop reading (McCarthy, 2021).

Insomnia in the elderly refers to a condition where individuals experience changes in the quantity and quality of sleep, causing discomfort or interfering with their desired lifestyle. If untreated, sleep disturbances in the elderly can lead to severe consequences, such as chronic sleep disorders. Physiologically, insufficient sleep can cause memory issues, confusion, decreased concentration, disorientation, and fatigue, disrupting daily activities (Fauzia & Roslinawati, 2020; Safitri & Supriyanti, 2021; Gehrman & Ancoli-Israel, 2016).

In elderly care services, nursing management plays a crucial role in creating an environment that supports quality sleep. Nursing management involves regulating environmental conditions, such as ventilation, lighting, noise control, and bed cleanliness, and fostering healthy sleep habits. Previous studies have shown that interventions like playing soft music, reading before bed, or creating a calm sleeping environment can help improve sleep quality in the elderly (Zhang et al., 2021).

Preliminary studies at the UPTD Social Protection Center of the Social Service Office of Banten Province found that several elderly individuals experienced sleep disturbances due to environmental factors, such as hot room temperatures, noise from other residents, and excessive lighting. These complaints highlight the need for a nursing management-based approach to address environmental factors influencing the risk of insomnia.

Therefore, this study focuses on the role of nursing management in optimizing the environment to prevent the risk of insomnia among the elderly at the UPTD Social Protection Center of the Social Service Office of Banten Province in 2024. This research is expected to contribute to the development of environment-based interventions that support the quality of sleep in the elderly.

METHOD

Research Design

This study employed a quantitative approach with a cross-sectional design.

Data and Research Samples. The research was conducted from December 2023 to June 2024 on the elderly population in the Social Service Department of Banten Province. The elderly residing at the UPTD Social Protection Center represent a vulnerable group experiencing social and economic limitations. These conditions can impact their quality of life, including sleep quality, which is the focus of this study. The sampling technique used was total sampling, involving 45 respondents who met the inclusion criteria: elderly individuals without dementia and those willing to participate by signing informed consent. Primary data were collected directly by the researcher using questionnaires containing questions and statements.

Research Variables

The study variables consisted of: Dependent variable: Insomnia risk in the elderly. Independent variable: Nursing management in optimizing the environment, focusing on the comfort of the living environment.

Data collection utilized two questionnaires with constructs deemed reliable when Cronbach's alpha > 0.60.

Insomnia risk was measured using the Jakarta Insomnia Rating Scale (KSBPJ IRS) from the Biological Psychiatry Study Group, which had a Cronbach's alpha value of 0.981. Scores ≤ 10 were categorized as "no insomnia," while scores >10 were categorized as "insomnia."

Environmental comfort was assessed using a Likert-scale questionnaire with 24 questions, achieving a Cronbach's alpha value of 0.985. Scores <8 were categorized as "non-

RESULTS

Table 1. Percentage of Insomnia Risk and Environmental Management Variables

Variable	Category	Frequency (n)	Percentage (%)
Insomnia Risk	High Risk	30	66.7
	Low Risk	15	33.3
Nursing Management Role in Optimizing Environment			
Room Temperature Control	Not Optimal	28	62.2
	Optimal	17	37.8
Noise Control	Not Optimal	25	55.6
	Optimal	20	44.4
Lighting Control	Not Optimal	27	60.0
	Optimal	18	40.0
Environmental Cleanliness	Not Optimal	22	48.9
	Optimal	23	51.1%

The study revealed that 66.7% of elderly respondents were at high risk of insomnia. Key factors related to environmental management were predominantly suboptimal, contributing to this risk. Specifically, room temperature control was reported as not optimal by 62.2% of respondents, noise

optimal," and scores ≥ 9 were categorized as "optimal."

Data Analysis

The data analysis in this study included univariate and bivariate analyses. Univariate Analysis: Presented in frequency distribution tables to capture categorical data. Bivariate Analysis: Also focused on categorical data and used Fisher's exact test. Multivariate analysis employed logistic regression to determine relationships between independent and dependent variables, with a confidence interval (CI) of 95% and a significance level of $p < 0.05$.

control by 55.6%, lighting control by 60.0%, and environmental cleanliness by 48.9%. These findings highlight the significant role of environmental conditions in influencing the risk of insomnia among the elderly.

Table 2. Relationship Between Environmental Management and Insomnia Risk

Variable	Category	High Insomnia Risk (n)	Low Insomnia Risk (n)	p-value	RR
Room Temperature Control	Not Optimal	23	5	0.01	4.92
	Optimal	7	10		
Noise Control	Not Optimal	20	5	0.03	3.60
	Optimal				

	Optimal	10	10		
Lighting Control	Not Optimal	21	6	0.02	3.50
	Optimal	9	9		
	Optimal	9	9		
Environmental Cleanliness	Not Optimal	18	4	0.04	3.40
	Optimal	12	11		
	Optimal	12	11		

The analysis demonstrated that several environmental factors significantly influenced the risk of insomnia among elderly respondents. Room temperature control emerged as the most impactful factor, showing a significant association with high insomnia risk ($p = 0.01$; $RR = 4.92$). Noise control also had a notable effect ($p = 0.03$; RR

$= 3.60$), followed by lighting control ($p = 0.02$; $RR = 3.50$). Additionally, environmental cleanliness significantly contributed to insomnia risk ($p = 0.04$; $RR = 3.40$). These findings underscore the importance of optimizing environmental conditions to reduce the risk of insomnia in the elderly population.

Tabel 3. Most Influential Factors on Insomnia Risk

Variable	Category	p-value	RR	95% CI
Room Temperature Control	Not Optimal	0.005	5.10	1.70–15.33
	Optimal			
Noise Control	Not Optimal	0.02	3.85	1.18–12.53
	Optimal			
Lighting Control	Not Optimal	0.03	3.60	1.10–11.80
	Optimal			

Based on the table above, room temperature control is the most dominant factor influencing the risk of insomnia ($RR = 5.10$; $p = 0.005$).

DISCUSSION

The results of this study indicate that suboptimal room temperature significantly increases the risk of insomnia by 5.1 times. This finding supports the research by Lan et al. (2016), who stated that environmental temperature greatly affects the sleep patterns of the elderly, particularly in tropical regions where extreme temperatures are common. They concluded that a comfortable temperature range (between 18–22°C) improves sleep quality. Room temperature plays a significant role in influencing sleep quality, especially for the elderly, who have reduced thermoregulatory capabilities and are more vulnerable to extreme temperature changes.

The research by Lan et al. (2016) also showed that extreme temperatures, whether too hot or too cold, disrupt the normal sleep cycle, making it difficult to fall asleep and increasing the frequency of nighttime awakenings. Comfortable temperatures, between 18–22°C, allow the body to maintain optimal thermal balance and support physiological processes such as the release of melatonin, which is essential for deep, restorative sleep. This highlights the importance of appropriate temperature regulation in creating a sleep environment that supports elderly health.

In addition to room temperature, noise is a significant factor affecting sleep quality, particularly in the elderly. The study found that nighttime noise exposure, such as traffic or environmental activity, can significantly disturb sleep. A recent study by Lee et al. (2023) noted that a 10 dB increase in

nighttime noise was associated with a doubling of the risk of sleep disturbances in elderly individuals. This is supported by findings in the European Public Health Journal (2023), which showed that nighttime noise exposure consistently increases the risk of disrupted sleep cycles in the elderly compared to younger populations. The elderly are more sensitive to noise due to changes in their auditory mechanisms and sleep physiology. Continuous noise can trigger a stress response through the activation of the autonomic nervous system, inhibiting the body from entering deep or REM sleep. The WHO Noise Guidelines also note that noise levels above 40 dB at night significantly affect sleep disturbances, particularly in populations living in densely urbanized areas.

The finding that suboptimal lighting increases the risk of insomnia (RR 3.6) is consistent with the study by Cho et al. (2015), which reported that bright light at night or insufficient exposure to natural light during the day can disrupt circadian rhythms, leading to insomnia. Research by Meléndez-Fernández et al. (2023) also demonstrated that artificial light exposure at night can disrupt circadian rhythms, which are critical in regulating sleep patterns. Excessive brightness at night or lack of natural daylight exposure during the day can reduce melatonin production, the hormone that regulates the sleep-wake cycle, thereby increasing the risk of sleep disturbances, including insomnia.

Further studies by Wang et al. (2023) emphasized that artificial light at night (ALAN) has a significant impact on physical and mental health, including sleep disorders. The study found that ALAN, especially from electronic devices or inappropriate lighting, disrupts natural sleep patterns and the biological rhythm balance. This underlines the importance of proper lighting management in supporting sleep quality, especially for vulnerable groups such as the elderly.

Although environmental cleanliness had a lower RR value compared to other factors

(3.40), it remains significant. Research by Yalçın et al. (2018) highlighted that an unclean environment can create physical and psychological discomfort, disrupting sleep quality, such as through odors, germs, or dust that irritate respiration. The finding that room temperature is the dominant factor with an RR of 5.1 reaffirms the study by Okamoto-Mizuno and Mizuno (2012), who explained that extreme temperatures can disrupt the body's thermoregulatory mechanisms, causing difficulty falling asleep or frequent awakenings. Based on these findings, interventions such as using air conditioning, noise reduction devices, and appropriate lighting adjustments could offer practical solutions. These findings support the World Health Organization (WHO) recommendations regarding the importance of environmental management for promoting healthy sleep among the elderly. This study emphasizes the importance of a holistic approach to sleep environment management. A study by Grandner et al. (2017) showed that environmental factors work synergistically, and neglecting one factor may reduce the overall effectiveness of interventions.

This study shows that suboptimal nursing management in environmental settings affects sleep quality. Research by Chan (2018) stressed the importance of nursing-based interventions, such as environmental management training, to enhance comfort for patients in nursing homes. The elderly are at higher risk of insomnia due to physiological changes, such as decreased melatonin production. This finding aligns with Crowley's (2011) research, which showed that environmental interventions are an effective way to improve sleep without the need for pharmacological treatments.

Nursing management plays a crucial role in optimizing the environment to improve sleep quality, particularly for the elderly at high risk of insomnia. Studies show that effective nursing management can create an environment that supports good sleep processes. Chan (2018) highlighted the importance of nursing-based interventions in

environmental settings in nursing homes, such as training staff to adjust environmental factors (temperature, noise, light) to meet the individual needs of patients. This training helps staff understand the impact of the environment on the elderly's sleep quality and introduces strategies to enhance their comfort.

Furthermore, the theory supporting the role of nursing management in environmental settings comes from Florence Nightingale's environmental theory, which asserts that a clean, safe, and comfortable environment is the foundation for patient healing and health. In this context, nursing management is responsible for ensuring that environmental settings in healthcare facilities or nursing homes support patients' sleep quality. Crowley (2011) also found that environmental interventions, including regulating lighting, reducing noise, and adjusting temperature, can improve the sleep quality of the elderly without pharmacological interventions. Thus, the role of nursing management in ensuring an optimal sleep environment significantly impacts the quality of life for the elderly, especially those in care facilities.

Effective implementation of nursing management requires institutional support. This study is relevant to research by O'Connor et al. (2020), which stated that social organizations play an important role in providing training and resources to facilitate environmental improvements. The combination of various factors found in this study demonstrates the complexity of insomnia in the elderly. This research reinforces the idea that an environment-based approach, supported by effective nursing management, has great potential to prevent insomnia. These findings also pave the way for further research to examine specific interventions, such as the effects of natural lighting, noise reduction through technology, or the psychological impact of a clean and comfortable environment.

CONCLUSION

This study indicates that suboptimal nursing management in environmental settings, such

as room temperature, noise, lighting, and cleanliness, significantly increases the risk of insomnia in the elderly. The most dominant factor is room temperature, followed by noise and lighting. These findings are consistent with previous theories and studies that emphasize the importance of nursing-based interventions to create an environment that supports the sleep quality of the elderly. This highlights the need for training and policies based on nursing management to ensure a comfortable and safe care environment, which ultimately improves the health and quality of life of the elderly.

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