



Association Between Activities of Daily Living and Sleep Quality Among Older Adults: A Cross-Sectional Study

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Abstract

Background: Aging is accompanied by progressive physiological decline that reduces older adults' functional capacity and independence in performing activities of daily living (ADL). Limitations in basic activities, such as walking, dressing, bathing, and transferring, may increase physical discomfort, dependence on others, and psychological distress, which can ultimately impair sleep quality. **Aims:** This study aimed to examine the relationship between activities of daily living and sleep quality among older adults in Lajo Lor Village, Singgahan District. **Methods:** A quantitative study with a non-experimental correlational design and cross-sectional approach was conducted among older adults in Lajo Lor Village. The study population consisted of 109 older adults, of whom 86 participants were selected using probability sampling with a simple random sampling technique. ADL independence was assessed using the Katz Index, while sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using Spearman's rank correlation test with a significance level of $\alpha = 0.05$. **Results:** The analysis demonstrated a statistically significant relationship between activities of daily living and sleep quality ($p < 0.001$), with a very strong positive correlation ($r = 0.871$). Older adults who were more independent in performing daily activities tended to report better sleep quality. These findings indicate that maintaining functional independence may contribute to healthier sleep patterns, possibly through increased physical activity and reduced functional dependence. **Conclusions:** Activities of daily living are strongly associated with sleep quality among older adults. Greater independence in ADL is linked to better sleep quality, emphasizing the importance of interventions aimed at maintaining or improving functional independence to promote healthy sleep and enhance overall well-being in the aging population.

Keywords: Activities of Daily Living (ADL); older adults; sleep quality; Katz Index; Pittsburgh Sleep Quality Index (PSQI)

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Introduction

Older adulthood represents the final stage of the human life cycle and is characterized by progressive physiological and psychological decline. As individuals age, reductions in functional capacity adversely affect their ability to perform activities of daily living (ADL). Impairments in ADL, including walking, dressing, bathing, and transferring, may lead to increased fatigue and physical discomfort, ultimately contributing to poor sleep quality (Laili et al., 2025). Sleep disturbances among older adults commonly manifest as difficulty initiating sleep, frequent nocturnal awakenings, and early morning awakening (Dewi et al., 2024).

According to the World Health Organization (WHO, 2021), individuals aged 60 years and older are classified as older adults. In Southeast Asia, the older adult population accounts for approximately 8% of the total population, equivalent to around 142 million people, and is projected to triple by 2050. In Indonesia, data from the Central Bureau of Statistics (Badan Pusat Statistik [BPS], 2023) indicate that East Java Province has a population of 36,516,035, of whom 15.57% are aged 60 years and above. Globally, the WHO (2021) reported that approximately 18% of the population has experienced sleep-related problems, while the prevalence of poor sleep quality among older adults in Indonesia reaches 67% (Fatmawati, 2020).

Activities of daily living (ADL) encompass the routine self-care activities performed by older adults throughout the day, from waking in the morning until going to bed at night (Situngkir, 2021). The ability to perform ADLs is substantially influenced by age-related degenerative processes, which progressively impair musculoskeletal function, neurological function, and cognitive capacity. Sleep quality refers to an individual's ability to achieve and maintain restorative sleep, encompassing both quantitative and qualitative dimensions, including sleep duration, sleep latency, nocturnal awakenings, and perceived sleep satisfaction upon awakening (Aisyah, 2023). Poor sleep quality has been associated with physical fatigue, reduced mobility, an increased risk of falls, emotional disturbances, and a greater likelihood of developing chronic diseases (Napitupulu & Wahyu, 2025).

A preliminary survey conducted by the researchers on June 29, 2025, involving eight older adults in Lajo Lor Village revealed that six participants reported poor sleep quality, characterized by excessive morning sleepiness, physical weakness, frequent nocturnal awakenings, and prolonged sleep latency. All participants also reported experiencing anxiety before bedtime. Nevertheless, non-pharmacological approaches that promote greater independence in activities of daily living may facilitate natural physical fatigue, thereby improving the ability to initiate and maintain sleep (Novitarum et al., 2025). Based on this background, the present study aimed to examine the relationship between the level of independence in activities of daily living and sleep quality among older adults in Lajo Lor Village, Singgahan District.

Methods

This study employed a quantitative approach using a non-experimental correlational analytical design with a cross-sectional approach, in which the independent and dependent variables were measured simultaneously. The study population consisted of all older adults residing in Lajo Lor Village, Singgahan District, Tuban Regency, totaling 109 individuals. The sample size was determined using the Slovin formula with a margin of error (d) of 0.05, resulting in a final sample of 86 respondents. Participants were selected using a probability sampling technique, specifically simple random sampling, ensuring that each member of the population had an equal opportunity to be included in the study.

The study was conducted in February 2026 in Lajo Lor Village, Singgahan District, Tuban Regency. The independent variable was Activities of Daily Living (ADL), which was assessed using the Katz Index of Independence in Activities of Daily Living (Katz Index). This instrument evaluates an individual's level of independence across six basic functional activities: bathing, dressing, toileting,

transferring, continence, and feeding. ADL scores were classified into three categories: independent (score = 6), mildly dependent (scores = 3–5), and severely dependent (scores = 0–2). The dependent variable was sleep quality, which was measured using the Pittsburgh Sleep Quality Index (PSQI). This instrument assesses seven components of sleep quality, including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Based on the total score, sleep quality was categorized into high (31–40), moderate (21–30), and low (10–20).

The collected data were processed through the stages of editing, coding, scoring, and tabulation. Univariate analysis was performed to describe the frequency distribution of respondents' characteristics and each study variable. Bivariate analysis was subsequently conducted using Spearman's rank correlation test to examine the relationship between the level of independence in activities of daily living and sleep quality among older adults. Statistical significance was set at $\alpha = 0.05$. Ethical approval for this study was obtained from the Health Research Ethics Committee of the Nahdlatul Ulama Institute of Health Sciences (IIKNU) Tuban under approval number 304/0084223523/LEPK.IIKNU/III/2026.

Results

As shown in Table 1, the majority of respondents were female (63; 73.3%), while males accounted for 23 respondents (26.7%). Regarding age, most respondents were between 75 and 89 years old (63; 73.3%), followed by those aged 60–74 years (23; 26.7%). No respondents were aged 90 years or older. The majority of respondents were classified as mildly dependent in terms of Activities of Daily Living (ADL), accounting for 45 individuals (52.3%), followed by those who were independent (27; 31.4%) and those who were severely dependent (14; 16.3%). Regarding sleep quality, most respondents exhibited a moderate level of sleep quality (45; 52.3%), followed by high sleep quality (29; 33.7%) and low sleep quality (12; 14.0%).

Table 1. Demographic Characteristics of the Respondents (n = 86)

Characteristic	Frequency (n)	Percentage (%)
Sex		
Male	23	26.7
Female	63	73.3
Age		
60–74 years	23	26.7
75–89 years	63	73.3
≥0 years	0	0.0
Activities of Daily Living		
Independent	27	31.4
Mildly dependent	45	52.3
Severely dependent	14	16.3
Sleep quality		
High	29	33.7
Moderate	45	52.3
Low	12	14.0

Table 2 demonstrates that respondents who were independent in performing Activities of Daily Living predominantly exhibited high sleep quality, with 25 individuals (92.6%) classified in this category, whereas only 2 respondents (7.4%) had moderate sleep quality, and none reported low sleep quality. Among respondents with mild dependency, the majority had moderate sleep quality (40;

88.9%), while 4 respondents (8.9%) had high sleep quality and only 1 respondent (2.2%) had low sleep quality. In contrast, respondents with severe dependency were predominantly characterized by low sleep quality, with 11 individuals (78.6%) falling into this category, whereas 3 respondents (21.4%) had moderate sleep quality and none demonstrated high sleep quality.

The results of Spearman's rank correlation analysis revealed a correlation coefficient of $r = 0.871$ with a significance value of $p = 0.001$ ($p < 0.05$), indicating a statistically significant association between Activities of Daily Living (ADL) and sleep quality among older adults. The correlation coefficient indicates a very strong positive relationship, suggesting that higher independence in performing daily activities is associated with better sleep quality. Conversely, greater dependence in daily activities is associated with poorer sleep quality.

Table 2. Association Between Activities of Daily Living (ADL) and Sleep Quality Among Older Adults (n = 86)

Activities of Daily Living	Sleep Quality			<i>r</i>	<i>p</i> value
	High Sleep Quality n (%)	Moderate Sleep Quality n (%)	Low Sleep Quality n (%)		
Independent	25 (92.6)	2 (7.4)	0 (0.0)	0.871	0.001
Mildly dependent	4 (8.9)	40 (88.9)	1 (2.2)		
Severely dependent	0 (0.0)	3 (21.4)	11 (78.6)		

Discussion

This study involved 86 older adults residing in Lajo Lor Village, Singgahan District. Most participants were female (73.3%) and aged 75–89 years (73.3%). The predominance of the oldest-old age group is clinically relevant because advancing age is associated with progressive physiological degeneration, including reduced muscle strength, impaired balance, and diminished motor coordination, all of which contribute to declining independence in activities of daily living (ADL) (Helvetia et al., 2024). The assessment of activities of daily living showed that more than half of the participants (52.3%) were categorized as having mild dependence, while 31.4% were independent and 16.3% had severe dependence. These findings are consistent with those reported by Yuliana and Setyawati (2021), who found that most older adults living in Hargodedali Nursing Home, Surabaya, also exhibited mild dependence in ADL (41%). The decline in ADL among older adults can be explained by age-related degenerative changes affecting the musculoskeletal, neurological, and cognitive systems, which progressively reduce functional capacity. Setiawati et al. (2024) further demonstrated that increasing age is significantly associated with lower levels of functional independence. Moreover, female older adults are particularly susceptible to sarcopenia following menopause due to hormonal changes, accelerating the decline in physical performance and the ability to perform daily activities independently (Helvetia et al., 2024).

Regarding sleep quality, the majority of participants (52.3%) had moderate sleep quality, followed by good sleep quality (33.7%) and poor sleep quality (14.0%). Sleep disturbances among older adults are commonly attributed to physiological changes associated with aging, including reduced slow-wave sleep (NREM stage IV), decreased rapid eye movement (REM) sleep, and increased nocturnal awakenings, resulting in fragmented and less restorative sleep (Wahyu Ilahi et al., 2024). Psychological factors also contribute substantially to sleep quality. Hasibuan and Hasna (2021) reported that anxiety activates the sympathetic nervous system, increasing norepinephrine secretion and disrupting both NREM and REM sleep. In addition, hormonal changes after menopause make older women more vulnerable to sleep disturbances than men (Leba, 2023). Spearman's rank correlation analysis demonstrated a statistically significant relationship between activities of daily living and sleep quality ($p < 0.001$), with a correlation coefficient of $r = 0.871$, indicating a very strong positive association. Cross-

tabulation further showed that 92.6% of older adults who were independent in ADL had good sleep quality, whereas 88.9% of those with mild dependence predominantly experienced moderate sleep quality. Among participants with severe ADL dependence, 78.6% reported poor sleep quality. These findings indicate that greater independence in performing daily activities is associated with better sleep quality.

The observed relationship can be explained through both physiological and psychological mechanisms. Older adults who remain physically active and functionally independent expend more energy during daily activities, promoting natural physical fatigue that facilitates sleep initiation and maintenance. Regular engagement in activities such as walking, bathing independently, dressing, and performing household tasks also helps maintain circadian rhythm stability, improves circulation, and supports metabolic regulation, thereby enhancing sleep quality (Situngkir, 2021). Conversely, functional dependence often leads to reduced physical activity, prolonged sedentary behavior, diminished self-efficacy, and increased psychological distress, particularly anxiety, all of which may contribute to poorer sleep quality.

The present findings are consistent with previous studies conducted in different settings. Dewi et al. (2024), involving 59 older adults in Guwang Village, Gianyar, reported a significant association between ADL and sleep quality using the Barthel Index and Pittsburgh Sleep Quality Index (PSQI) ($p = 0.001$). Similarly, Novitarum et al. (2025) found a significant relationship between ADL and sleep quality among 50 residents of the Binjai Social Service Nursing Home ($p = 0.001$). Khamila (2023) also reported that better ADL performance was associated with better sleep quality among 88 older adults in Karang Asem, Surakarta ($p = 0.008$). The consistency of these findings across different geographical and community settings strengthens the evidence that functional independence is an important determinant of sleep quality in older adults.

These findings are also supported by Maslow's hierarchy of needs, which identifies sleep as one of the most fundamental physiological needs. The fulfillment of this basic need is influenced by an individual's ability to perform daily activities independently. Maintaining functional independence enables older adults to remain physically active, regulate circadian rhythms, improve metabolic function, and enhance blood circulation, thereby promoting restorative sleep (Novitarum et al., 2025). Consequently, interventions aimed at preserving or improving ADL independence may represent an effective non-pharmacological strategy for enhancing sleep quality and promoting healthy aging. Several limitations should be acknowledged. First, the study was conducted in a single rural community with a relatively small sample size, which may limit the generalizability of the findings. Second, potential confounding factors, including chronic diseases, anxiety, depression, medication use, and environmental conditions affecting sleep, were not analyzed separately. Future studies employing larger multicenter samples and multivariable analytical approaches are recommended to clarify the independent contribution of ADL to sleep quality among older adults.

Conclusion

Most older adults in Lajo Lor Village, Singgahan District, exhibited mild dependence in activities of daily living and moderate sleep quality. A statistically significant and very strong positive relationship was identified between activities of daily living and sleep quality ($p < 0.001$; $r = 0.871$), indicating that greater independence in performing daily activities is associated with better sleep quality. Maintaining ADL independence through regular daily physical activity may promote natural physical fatigue and facilitate restorative sleep. Therefore, community health professionals and older adult health volunteers should integrate functional exercise programs and sleep hygiene education into routine community-based elderly health services to improve both functional independence and sleep quality among older adults.

Conflicts of Interest

No conflict of interest to declare.

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Author's Contribution

ANMS was responsible for the study conception and design, data collection, data analysis, and interpretation of the findings. LH provided supervision, critically reviewed the manuscript, and approved the final version of the manuscript.

Data Availability Statement

The dataset generated during and analyzed during the current study is available from the corresponding author upon reasonable request.

Declaration of Use of AI in Academic Writing

The author used ChatGPT/Gemini in the writing process to improve readability and remove grammatical errors. However, he took full responsibility for the content.

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