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Association between physical activity and sleep quality among older adults

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Abstract

Sleep quality is a crucial indicator of health and well-being among older adults, often disrupted by age-related physiological changes and lifestyle factors such as physical activity. As individuals age, reduced physical activity may contribute to sleep disturbances, negatively affecting cognitive function, emotional stability, and overall quality of life. This study examined the association between physical activity and sleep quality in older adults. A cross-sectional study was conducted among elderly individuals attending a community health post, with data collected through questionnaires assessing physical activity and sleep quality. The findings revealed that many participants exhibited low physical activity levels and experienced poor sleep quality. Further analysis indicated a meaningful relationship between higher physical activity levels and better sleep outcomes. These results underscore the importance of physical activity as a potential non-pharmacological strategy to support healthy aging and improve sleep patterns in the elderly population. Encouraging older adults to engage in regular physical activity may improve sleep hygiene and overall health. Future research should explore this relationship using longitudinal or interventional designs to establish causal pathways and inform public health strategies for elderly care.

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1. Introduction

Older adults represent the final stage of the human life cycle, typically marked by gradual deterioration in physical, cognitive, and psychological functioning (Devanti & Utami, 2022). Globally, population aging is accelerating. The World Health Organization (2021) estimates that 2050 individuals aged 60 years and older will reach 2.1 billion, up from 1.4 billion in 2020. In Indonesia, this demographic shift is evident in the rising proportion of older adults, from approximately 8.5% in 2015 to 12% in 2024, and is projected to reach 20.31% by 2045, or over 65 million people (Badan Pusat Statistik [BPS], 2024; BPS, 2021). This trend poses challenges for public health systems, particularly concerning age-related conditions like sleep disturbances.

Sleep quality is critical for maintaining health and quality of life among older adults. However, aging is often associated with problems such as difficulty initiating and maintaining sleep, frequent nocturnal awakenings, and early morning awakenings (Mulyani, 2023; Arifin et al., 2021). Insomnia is the most prevalent sleep disorder in the elderly and contributes to a cascade of adverse health outcomes, including hypertension, depression, impaired cognition, and diminished overall well-being (Bahtiar et al., 2024). In a large-scale U.S. study, 67% of older adults reported poor sleep quality, and 7.3% experienced severe sleep disruptions (Stella et al., 2018). In Portugal, institutionalized elderly were shown to have

significantly worse sleep patterns than community-dwelling counterparts, mainly due to limited exposure to physical activity and sunlight, social isolation, and depressive symptoms (Martins da Silva et al., 2020). Similar findings have been reported in Indonesia, where a study revealed that 67.2% of elderly individuals in a rural setting had poor sleep quality (Sinulingga et al., 2022).

Among the modifiable factors that may improve sleep quality, physical activity stands out as particularly effective. Physical activity, defined as any skeletal muscle movement that results in energy expenditure, plays a crucial role in regulating circadian rhythms, increasing melatonin secretion, reducing sleep latency, and decreasing sleep fragmentation (Kruk et al., 2021; Fitria & Aisyah, 2020). A growing body of research supports this relationship. For instance, older adults who consistently engage in housecleaning, gardening, walking, and even informal labor exhibit significantly better sleep outcomes (Palit et al., 2021; Ashari et al., 2021). Ashari (2021) reported that physically active elderly were three to five times more likely to experience restorative sleep. Similarly, Iriyani et al. (2023) found that physical activity correlates with improved sleep duration and quality in aging populations.

Physical inactivity among older adults can be attributed to physical decline associated with aging, leading to reduced engagement in daily movement. This reduction in activity affects sleep quality and impairs functional capacity and overall health (Jumaiyah, Rachmawati, & Choiruna, 2020). Studies by Natikoh et al. (2023) and Ashari et al. (2021) confirm that physical activity levels are positively associated with sleep quality in institutional and community settings for older adults. The mechanisms underlying this relationship include increased energy expenditure, endorphin release, reduced anxiety, and enhanced relaxation—factors that help older adults fall asleep faster and stay asleep longer.

Despite these insights, most prior studies have focused on hospital or institutional settings, leaving a gap in understanding the relationship between physical activity and sleep quality within community-based health services such as Posyandu Lansia (integrated health posts for older adults). Therefore, this study aims to examine the association between physical activity and sleep quality among older adults attending community health posts in the working area of Pondok Gede Public Health Center, Bekasi City. The findings are expected to inform non-pharmacological interventions that promote healthy aging and improve sleep quality among elderly individuals in urban community contexts.

2. Method

2.1 Research Design and Participants

This study employed a descriptive-analytical design with a cross-sectional approach, appropriate for examining the relationship between physical activity and sleep quality at a single point in time. The target population consisted of older adults aged 60 years and above residing in the working area of the Pondok Gede Public Health Center, Bekasi, Indonesia. A total of 97 participants were recruited using purposive sampling based on inclusion criteria: the ability to perform daily activities independently, willingness to participate, and being cognitively and physically able to respond to the questionnaire. This study's sample size determination was based on pragmatic considerations in line with the purposive sampling technique, as often adopted in cross-sectional studies involving specific populations. Subhaktiyasa (2024b) states that purposive sampling suits focused health research where access and eligibility are predefined and statistical power is balanced with resource limitations.

2.2 Instruments and Data Collection

Data were collected between March and May 2024 at elderly health posts (posyandu lansia) in the Pondok Gede area. Data collection was conducted by the primary researchers with assistance from trained posyandu cadres. Participants completed the questionnaires during their regular health visits. Physical activity was measured using the Physical Activity Scale for the Elderly (PASE), which consists of 11 items rated on a 4-point Likert scale (0–3). Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), which contains 18 items grouped into seven components and uses a 4-point Likert scale (0–3). Before the main study, a pilot test involving 30 elderly individuals was conducted to examine the psychometric properties of the instruments. The PASE questionnaire demonstrated item-total correlations greater than 0.409 and a Cronbach's alpha of 0.833. The PSQI showed item-total correlations above 0.554 and a Cronbach's alpha of 0.924. These reliability coefficients confirm that both instruments had acceptable internal consistency, aligning with recommendations for evaluating research tools in quantitative studies (Subhaktiyasa, 2024a).

2.3 Data Analysis

Data were analyzed using univariate and bivariate statistical approaches. Univariate analysis was employed to describe the distribution of respondents' demographic characteristics, levels of physical activity, and sleep quality. This descriptive analysis is essential in establishing a foundational understanding of the study population before hypothesis testing (Subhaktiyasa et al., 2025). The Chi-square test was used for bivariate analysis to assess the association between physical activity and sleep quality. The assumptions of the Chi-square test, including the independence of observations and the expected cell count criteria, were assessed and met. All statistical analyses were conducted using SPSS software version 25, with the level of statistical significance set at $p < 0.05$.

2.4 Ethical Considerations

This study was conducted under ethical principles outlined in the Declaration of Helsinki, especially regarding the involvement of elderly participants. Informed consent was obtained voluntarily after fully explaining the study's objectives, procedures, and potential risks. Researchers also ensured that participants were physically and mentally fit to complete the questionnaires and provided additional assistance to minimize fatigue. Participant confidentiality and anonymity were strictly maintained throughout the research process, and no identifying information was included in the publication. Ethical approval for this study was obtained from the Health Research Ethics Committee of Poltekkes Kemenkes Jakarta III (Approval No. LB.02.02/F.XIX.21/4252/2024).

3. Results and Discussion

3.1 Results

This study involved 97 older adults residing in the working area of Pondok Gede Public Health Center. The findings are presented under the research objectives, beginning with the demographic characteristics of the participants, followed by the distribution of physical activity and sleep quality, and finally, the statistical analysis results examining the association between the two variables.

Table 1. Demographic Characteristics of Respondents

Characteristics	Category	Frequency	Percentage (%)
Age	60–74 years	87	86.6
	≥75 years	13	13.4
Gender	Male	41	42.3
	Female	56	57.7
Education	≤ Junior High	50	51.5
	≥ Senior High	47	48.5
Employment Status	Unemployed	65	67
	Employed	31	33

Table 2. Distribution of Physical Activity and Sleep Quality

Variable	Category	Frequency	Percentage (%)
Physical Activity	Good	49	50.5
	Poor	48	49.5
Sleep Quality	Good	79	81.4
	Poor	18	18.6

Table 1 presents the demographic characteristics of the respondents. Most were in the younger-old age category (60–74 years), accounting for 86.6% of the sample. More than half were female (57.7%) and had low educational attainment (51.5%). In terms of employment status, 67% were no longer employed. Table 2 shows that half of the older adults (50.5%) reported engaging in good physical activity, while the other half reported lower levels. Regarding sleep quality, the majority (81.4%) were classified as having good sleep, with only 18.6% categorized as having poor sleep quality.

Table 3. Association Between Physical Activity and Sleep Quality

Physical Activity	Sleep Quality						p-value	odds ratio (95% CI)
	Good		Poor		Total			
	N	%	N	%	N	%		
Good	46	93,9	3	6,1	49	100	0,003	6,970 (1,866-6,032)
Poor	33	68,8	15	31,3	48	100		

Table 3 demonstrates that 93.9% of respondents with good physical activity also reported good sleep quality, while only 68.8% of those with inadequate physical activity reported good sleep. The Chi-square test revealed a statistically significant association between physical activity and sleep quality ($p = 0.003$). The odds ratio (OR = 6.970) indicates that older adults with good physical activity are approximately seven times more likely to have good sleep quality than those with lower physical activity.

3.2 Discussion

This study found a statistically significant association between physical activity and sleep quality among older adults, supporting the hypothesis that physically active elderly individuals are more likely to achieve better sleep outcomes. These findings align with existing literature indicating that physical activity is crucial in maintaining physical and psychological health in aging populations (Ashari et al., 2022; Fitria & Aisyah, 2020). Demographically, the majority of respondents in this study were aged 60–74 years, female, with a low level of education, and unemployed. These patterns are consistent with national demographic data indicating that the younger-old subgroup (60–69 years) represents the most significant proportion of the elderly population in Indonesia (BPS, 2024). Prior studies support these observations, noting that older women with lower education levels are more likely to face barriers to maintaining health-related behaviors, including physical activity and sleep hygiene (Natikoh et al., 2023; Sholikhah et al., 2022). Furthermore, being unemployed at an older age is often a result of age-related degeneration, which leads to reduced physical capacity and economic productivity (Ashari et al., 2022; TNP2K, 2020).

Physiologically, regular physical activity supports the regulation of sleep by enhancing melatonin production, reducing cortisol levels, and improving mood through endorphin release, thus promoting circadian rhythm alignment and sleep quality (Kruk et al., 2021; Fitria & Aisyah, 2020). This mechanism is also supported by evidence that physically active older adults experience higher levels of physiological fatigue, facilitating better sleep initiation and continuity (Ashari et al., 2022; Sholikhah et al., 2022). In addition to structured exercise, light daily activities such as household chores, gardening, or walking have contributed to better sleep quality. These forms of physical activity encourage energy expenditure and reduce anxiety, supporting the neuroendocrine mechanisms that lead to sleep readiness (Stefan et al., 2018). Ezati et al. (2020) reported that moderate-intensity physical activity is particularly effective in improving sleep quality across age groups, especially among elderly individuals who may not tolerate vigorous exercise.

Empirical findings further strengthen the relationship between physical activity and sleep quality. For instance, Apriyeni et al. (2023) observed that older males with low physical activity had poorer sleep quality. Likewise, Dhari and Silvitasari (2022) emphasized the adverse outcomes of poor sleep hygiene among older adults, including cognitive decline and reduced immunity. Interventions such as group-based exercise programs, including elderly fitness classes or tai chi, have been proven effective in enhancing various domains of sleep, as measured by the Pittsburgh Sleep Quality Index (PSQI). Anggarwati and Kuntarti (2016) found that women who regularly participated in elderly exercise programs scored lower on PSQI indicators related to sleep efficiency and disturbances. Similarly, Mahar, Yusri, and Fitria (2022) demonstrated improved sleep quality following consistent participation in community-based fitness routines. Integrating routine physical activity into the daily lives of older adults whether through structured or informal movement can significantly improve their sleep quality. These findings support the development of community health programs through Puskesmas and Posyandu Lansia to promote physical activity as a non-pharmacological approach to sleep enhancement and overall well-being in aging populations.

4. Conclusion

This study concludes a significant association between physical activity and sleep quality among older adults. Those who engage in regular physical activity are substantially more likely to experience better sleep quality, reinforcing the role of physical activity as a vital non-pharmacological strategy for promoting healthy aging. These findings theoretically contribute by supporting existing behavioral health models and practically by highlighting the importance of integrating physical activity into elderly care programs. Encouraging older adults to participate in appropriate physical activities such as group exercises, walking, or household tasks can enhance sleep quality and overall well-being. However, the study is limited by its cross-sectional design and reliance on self-reported data, which may introduce bias and restrict causal inference. Future longitudinal or experimental studies are recommended to explore the long-term impact of structured physical activity interventions on sleep outcomes among older populations. These insights can inform community health strategies and support policy development to foster active, healthy, and independent aging.

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Conflict of Interest

The authors declare no conflict of interest.

References

Apriyeni, A., Yuliani, N., & Ramadhani, A. (2023). Aktivitas fisik dan kualitas tidur pada lansia laki-laki. *Indonesian Journal of Health Development*, *5*(2), September.

Arifin, H., Putri, N. A., & Rahayu, D. (2021). Prevalensi insomnia pada perempuan lanjut usia: Studi berbasis komunitas. *Jurnal Implementa Husada*, *3*(1), 6–11. https://doi.org/10.30596/jih.v3i1.11632

Ashari, M. H., Hardianto, Y., & Amalia, R. N. (2022). Hubungan antara aktivitas fisik dengan kualitas tidur pada lansia. *Jurnal Fisioterapi dan Rehabilitasi*, *6*(1), 35–41.

Badan Pusat Statistik. (2021). *Statistik penduduk usia lanjut 2021* (S. S. M. Andhie, S. Budi, M. Maylasari, Eds.). Jakarta.

Badan Pusat Statistik. (2024). *Statistik penduduk usia lanjut 2024* (Vol. 21). Jakarta. https://www.bps.go.id

Bahtiar, A., Maulidiyah, L., & Azis, M. (2024). Hubungan kualitas tidur dengan tingkat insomnia pada lansia: Studi cross-sectional. *Alauddin Scientific Journal of Nursing*, *5*(1), 15–24. https://journal.uin-alauddin.ac.id/index.php/asjn/article/view/45506

Devanti, N. R., & Utami, K. P. (2022). The effect of giving Hatha Yoga exercise on increasing sleep quality in the elderly in Karangkates Village. *Jurnal Keperawatan dan Fisioterapi (JKF)*, *5*(1), 61–66. https://doi.org/10.35451/jkf.v5i1.1226

Dhari, P. W., & Silvitasari, I. (2022). Hubungan antara sleep hygiene dengan tingkat insomnia pada lansia di Kecamatan Jebres Kelurahan Gandekan RW 05 Surakarta. *Nusantara Hasana Journal*, *2*(5), 71–77.

Ezati, M., Keshavarz, M., Barandouzi, Z. A., & Montazeri, A. (2020). The effect of regular aerobic exercise on sleep quality and fatigue among female student dormitory residents. *BMC Sports Science, Medicine and Rehabilitation*, *12*, 44. https://doi.org/10.1186/s13102-020-00190-z

Fitria, A., & Aisyah, S. (2020). Hubungan aktivitas fisik dengan kualitas tidur pada lanjut usia di Desa Babah Dua. *Jurnal Gentle Birth*, *3*(1), 1–11.

Iriyani, N., Safitri, Y., & Fadillah, L. (2023). Hubungan aktivitas fisik dengan pola tidur pada usia lanjut. *Fakumi Medical Journal*, *3*(1). https://fmj.fk.umi.ac.id/index.php/fm

Kruk, J., Aboul-Enein, B. H., & Duchnik, E. (2021). Exercise-induced oxidative stress and melatonin supplementation: Current evidence. *Journal of Physiological Sciences*, *71*(27). https://doi.org/10.1186/s12576-021-00812-2

Mahar, F., Yusri, & Fitria, N. (2022). Pengaruh senam terhadap kualitas tidur pada lansia di Puskesmas Bebesan. *Jurnal As Syifa*, *7*(2). https://doi.org/10.54460/jifa.v7i2.40

Martins da Silva, R., Rosa, C. A., & Castro, P. M. (2020). Comparing sleep quality in institutionalized and non-institutionalized elderly individuals. *Aging & Mental Health*, *24*(9), 1452–1458. https://doi.org/10.1080/13607863.2019.1619168

Mulyani, S. (2023). Ansietas dan kualitas tidur lanjut usia. *Jurnal Keperawatan Raflesia*, *5*(2), 97–108.

Natikoh, N., Wirakhmi, I. N., & Haniyah, S. (2023). Hubungan aktivitas fisik dengan kualitas tidur pada lansia. *Jurnal Keperawatan dan Kesehatan*, *14*(2), 79–86.

Palit, I. D., Nugroho, R., & Hasan, M. (2021). Hubungan antara aktivitas fisik dengan kualitas hidup pada lansia di Desa Salurang Kecamatan Tabukan Selatan Tengah Kabupaten Kepulauan Sangihe. *Jurnal KESMAS*, *10*(6), 93–100.

Sinulingga, W. A. L., Barus, T. M. B., & Manullang, Y. (2022). Gambaran kualitas tidur lansia di Puskesmas Desa Pasir Tengah Kecamatan Tanah Pinem Kabupaten Dairi tahun 2021. *Healthcaring: Jurnal Ilmiah Kesehatan*, *1*(2), 17–28. https://doi.org/10.47709/healthcaring.v1i2.1353

Sholikhah, D. U., Sasmito, N. B., Vidhiastutik, Y., & Wadid, M. T. W. (2022). Hubungan aktifitas fisik dengan kualitas tidur pada lansia di Posyandu Lansia Dusun Cangkring Desa Kedunglosari Kecamatan Tembalang Kabupaten Jombang. *Prima Wiyata Health*, *3*(2).

Stefan, L., Sporis, G., Kristicevic, T., & Knjaz, D. (2018). Associations between sleep quality and its domains and insufficient physical activity in a large sample of Croatian young adults: A cross-sectional study. *BMJ Open*, *8*, e021902. https://doi.org/10.1136/bmjopen-2018-021902

Stella, B. P., Sekplin, A. S. S., & Langi, F. L. F. G. (2018). Hubungan antara kualitas tidur dengan skor Mini Mental State Examination pada lanjut usia di Desa Tambun Kecamatan Likupang Barat. *Jurnal Kesmas*, *7*(4).

Subhaktiyasa, P. G. (2024a). Evaluasi validitas dan reliabilitas instrumen penelitian kuantitatif: Sebuah studi pustaka. *Journal of Education Research*, *5*(4), 5599–5609. https://doi.org/10.37985/jer.v5i4.1747

Subhaktiyasa, P. G. (2024b). Menentukan populasi dan sampel: Pendekatan metodologi penelitian kuantitatif dan kualitatif. *Jurnal Ilmiah Profesi Pendidikan*, *9*(4), 2721–2731. https://doi.org/10.29303/jipp.v9i4.2657

Subhaktiyasa, P. G., Candrawati, S. A. K., Sumaryani, N. P., Sunita, N. W., & Syakur, A. (2025). Penerapan statistik deskriptif: Perspektif kuantitatif dan kualitatif. *Emasains: Jurnal Edukasi Matematika dan Sains*, *14*(1), 96–104. https://doi.org/10.59672/emasains.v14i1.4450

Sukmawati, N. M. H., & Putra, I. G. S. W. (2019). Reliabilitas kuesioner Pittsburgh Sleep Quality Index (PSQI) versi bahasa Indonesia dalam mengukur kualitas tidur lansia. *Wicaksana: Jurnal Lingkungan dan Pembangunan*, *3*(2), 30–38.

Tim Nasional Percepatan Penanggulangan Kemiskinan (TNP2K). (2020). *Laporan penelitian: Situasi lansia di Indonesia dan akses terhadap program perlindungan sosial – Analisis data sekunder*. Jakarta: TNP2K.

Wang, F., & Boros, S. (2021). The effect of physical activity on sleep quality: A systematic review. *European Journal of Physiotherapy*, *23*, 11–18. https://doi.org/10.1080/21679169.2019.1623314

World Health Organization. (2021). *World health statistics 2021*. http://p2ptm.kemkes.go.id/infograpic-p2ptm/obesitas/kebutuhan-tidur-sesuai-usia