IJH INTERNATIONAL JOURNAL OF HEALTH
Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

Sleep quality among productive-age adults with hypertension in Indonesian primary care: A descriptive cross-sectional study

Aggri Ega Setynto[1], Mohammad Miftachul Ulum[1], Andi Hayyun Abiddin[1]

[1]Department of Nursing, Poltekkes Kemenkes Malang, Indonesia

Corresponding Author:
Andi Hayyun Abiddin; andi_hayyun@poltekkes-malang.ac.id

Check for updates

Abstract:
Hypertension increasingly affects adults of productive age in Indonesia, and poor sleep may hinder blood pressure control, yet the sleep profile of this group in primary care is rarely described. This study aimed to describe sleep quality and its components among productive-age adults with hypertension. A descriptive cross-sectional study was conducted at the Sukorejo Community Health Center, Blitar City, Indonesia. Fifty patients aged 18–59 years with stage 1 or stage 2 hypertension were recruited by purposive sampling. Sleep quality was measured with the Pittsburgh Sleep Quality Index (PSQI; global score >5 indicating poor sleep) and analysed descriptively. Most respondents were women (78%), aged 51–59 years (58%), and had stage 1 hypertension (74%). More than half (56%) had poor sleep quality. Sleep duration (>7 hours, 84%), sleep efficiency (≥85%, 82%), and subjective sleep quality were largely favourable, whereas moderate-to-severe sleep disturbance (98%) and daytime dysfunction (88%) were almost universal; no respondent used sleep medication. Poor sleep quality is common in this population and is driven mainly by night-time disturbance and daytime dysfunction rather than short sleep. Routine sleep screening and non-pharmacological sleep care should be integrated into primary hypertension management.

Keywords:
hypertension; Pittsburgh Sleep Quality Index; primary health care; productive age; sleep quality

Article Info:
Submitted:
10-10-2025
Revised:
01-11-2025
Accepted:
03-11-2025
Published:
04-11-2025

https://doi.org/10.53713/ijh.v1i2.530

This work is licensed under the CC BY-SA License.

INTRODUCTION

Hypertension is the leading modifiable risk factor for cardiovascular disease, stroke, and kidney failure worldwide. The number of adults living with hypertension doubled between 1990 and 2019 to more than one billion, and almost half of them were unaware of their condition (NCD Risk Factor Collaboration [NCD-RisC], 2021). Most of this burden now falls on low- and middle-income countries, where rapid urbanization, high-salt diets, and physical inactivity are pushing the onset of hypertension into younger age groups (Mills et al., 2020). Hypertension is therefore no longer a disease of old age alone; it increasingly affects people of working age who bear the primary responsibilities for work and family life.

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

Indonesia reflects this global pattern. National survey data indicate that roughly one in three Indonesian adults has hypertension, with higher risk among women, older adults, and people with overweight, and with low levels of awareness and control (Peltzer & Pengpid, 2018). In Blitar City, East Java, the City Health Office recorded 47,016 hypertension cases in 2023, of which 16,064 were registered at the Sukorejo Community Health Center. A preliminary study at this center identified 1,829 people of productive age (18–59 years) living with hypertension. Uncontrolled blood pressure in this group results in long-term cardiovascular risk and threatens household income and workforce productivity.

Importantly, sleep quality cannot be adequately characterized by sleep duration alone. Individuals may obtain sufficient hours of sleep but still experience frequent nocturnal awakenings, prolonged sleep latency, reduced sleep efficiency, or impaired daytime functioning. These dimensions are particularly relevant in people with hypertension because sleep fragmentation and repeated nocturnal awakenings may contribute to sympathetic activation and interfere with the normal nocturnal decline in blood pressure (Bock et al., 2022; Makarem et al., 2021). Furthermore, poor subjective sleep quality has been associated with hypertension, indicating that the assessment of sleep should consider both individual sleep experiences and their cumulative effects (Lo et al., 2018). Therefore, examining the specific components of sleep quality may provide a more comprehensive understanding of sleep-related problems than relying exclusively on sleep duration or a single subjective assessment.

Sleep has recently been recognized as a core component of cardiovascular health. The American Heart Association added sleep health as the eighth metric of its Life's Essential 8 construct, alongside diet, physical activity, nicotine exposure, body mass, lipids, blood glucose, and blood pressure (Lloyd-Jones et al., 2022). Both short sleep and poor sleep quality are linked to unhealthy eating, weight gain, and adverse cardiometabolic outcomes (St-Onge et al., 2016). The pathways are well described: fragmented or insufficient sleep increases sympathetic nervous system activity, activates the hypothalamic–pituitary–adrenal axis, raises cortisol, impairs endothelial function, and blunts the normal nocturnal dip in blood pressure (Bock et al., 2022; Makarem et al., 2021). Consistent with these mechanisms, a meta-analysis found that poor subjective sleep quality was associated with higher odds of hypertension (Lo et al., 2018), and a cohort of young and middle-aged adults showed that poor sleep quality predicted new-onset hypertension (Yuan et al., 2021). Chronic insomnia has also been associated with a higher risk of cardiovascular events (Javaheri & Redline, 2017).

In primary health care settings, identifying sleep-related problems is important because hypertension management requires attention not only to blood pressure control but also to modifiable lifestyle and behavioral factors. Sleep disturbances may arise from several conditions, including nocturia, breathing difficulties, and potentially undiagnosed obstructive sleep apnea, which may coexist with hypertension (Smith et al., 2022; Del Pinto et al., 2021). Psychosocial stress and work-related demands may further contribute to sleep difficulties, particularly among individuals balancing occupational and family responsibilities (Kurniyawan et al., 2023; Maharani et al., 2025). Nurses in primary care can play an important role in identifying these problems through structured sleep assessment and providing appropriate education or referral. Incorporating

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

sleep assessment into routine hypertension management is also consistent with the recognition of sleep as an essential component of cardiovascular health (Lloyd-Jones et al., 2022).

The relationship between sleep and hypertension is bidirectional. Symptoms that accompany high blood pressure, such as headache, nocturia, and breathlessness, can interrupt sleep (Smith et al., 2022), while undiagnosed sleep disorders such as obstructive sleep apnea and insomnia frequently coexist with hypertension (Del Pinto et al., 2021). Women in midlife face additional sleep challenges related to the menopausal transition, including vasomotor symptoms and mood changes (Baker et al., 2018), and sex-specific hormonal mechanisms also shape blood pressure regulation (Reckelhoff, 2023). Psychosocial stress from work and family roles, which is common among informal workers and farmers in Indonesia, further disturbs rest and coping (Kurniyawan et al., 2023; Maharani et al., 2025). Studies among hypertensive outpatients in Ethiopia and Nigeria have reported a high burden of poor sleep and an association between poor sleep and inadequate blood pressure control (Ayanaw et al., 2022; Oseni et al., 2024), and an Indonesian study has linked poor sleep to higher blood pressure among older adults (Komara et al., 2023).

Despite this evidence, most studies have focused on older adults or hospital patients and have usually reported only the global sleep quality score. Little is known about how sleep quality looks among productive-age adults with hypertension who are managed in Indonesian primary care, or which specific aspects of sleep are most affected. A component-level profile is clinically useful because sleep problems driven by short sleep, by night-time disturbance, or by daytime dysfunction require different interventions. Primary health care nurses are well placed to screen for and address these problems, but they need local evidence to do so. Therefore, this study aimed to describe sleep quality and its seven components among productive-age adults with hypertension at the Sukorejo Community Health Center, Blitar City, Indonesia.

METHODS

This study used a descriptive cross-sectional design. The report follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline for cross-sectional studies (von Elm et al., 2007). The study was conducted in the working area of the Sukorejo Community Health Center (Puskesmas), Blitar City, East Java, Indonesia, a primary care facility that provides routine screening and follow-up for non-communicable diseases. The target population was 1,829 people of productive age with hypertension registered at the center. A total of 50 respondents were recruited using purposive sampling. The inclusion criteria were: (1) aged 18–59 years; (2) a diagnosis of hypertension of at least stage 1; and (3) willingness to participate. Patients who could not communicate adequately because of physical or psychological impairment were excluded. Hypertension stage was classified according to the International Society of Hypertension guideline as stage 1 (systolic 140–159 mmHg and/or diastolic 90–99 mmHg) or stage 2 (systolic ≥160 mmHg and/or diastolic ≥100 mmHg) (Unger et al., 2020).

A structured questionnaire recorded age, sex, education, occupation, and hypertension stage. Sleep quality over the previous month was measured with the Pittsburgh Sleep Quality Index (PSQI), which contains 19 self-rated items grouped into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

medication, and daytime dysfunction. Each component is scored from 0 (no difficulty) to 3 (severe difficulty), and the component scores are summed into a global score ranging from 0 to 21. A global score >5 indicates poor sleep quality, a cut-off that showed 89.6% sensitivity and 86.5% specificity in the original validation (Buysse et al., 1989). The PSQI is a robust screening tool across clinical and non-clinical samples (Mollayeva et al., 2016), and the Indonesian version has shown good content validity and internal consistency (Cronbach's $\alpha = 0.80$) (Fauzi et al., 2024).

Eligible patients were approached in the health center working area. After the study's purpose and procedures were explained, each respondent completed the demographic form and the PSQI in Indonesian. The researchers were present to clarify items when needed and checked each questionnaire for completeness before collection. Data were coded, scored according to the PSQI manual, and analyzed descriptively. Respondent characteristics, the distribution of each PSQI component, and the global sleep quality category (good ≤5; poor >5) are presented as frequencies and percentages. To show which components contributed most to poor sleep, the proportion of respondents with an unfavorable profile in each component was also summarized and ranked. Permission was obtained from the Sukorejo Community Health Center. All respondents received verbal and written information and gave written informed consent before participating. Participation was voluntary, and data were anonymized and kept confidential.

RESULTS

This study included 50 productive-age adults with hypertension. The results describe respondents' characteristics, the seven PSQI components, overall sleep quality, and unfavorable sleep profiles.

Table 1. Characteristics of respondents (n=50)

Characteristics	Frequency	Percentage (%)
Age		
31–40	6	12
41–50	15	30
51–59	29	58
Gender		
Male	11	22
Female	39	78
Education		
Elementary school	7	14
Junior high school	10	20
Senior high school	28	56
College	5	10
Occupation		
Housewife	30	60
Farmer	6	12
Civil servant	2	4
Self-employed	12	24
Hypertension stage		
Stage 1 (140–159/90–99 mmHg)	37	74
Stage 2 (≥160/≥100 mmHg)	13	26

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

Table 1 shows that the respondents were predominantly aged 51–59 years (58%) and female (78%). Regarding educational attainment, more than half had completed senior high school (56%), while 20% had completed junior high school, 14% had completed elementary school, and 10% had completed college; only 8% reported fairly bad health, and 12% and 14% reported severe health. Housewives represented the largest occupational group (60%), followed by self-employed respondents (24%), farmers (12%), and civil servants (4%). In terms of hypertension severity, most respondents had stage 1 hypertension (74%), whereas 26% had stage 2 hypertension. Overall, the sample was characterized by a predominance of middle-aged and older adults, women, and respondents with stage 1 hypertension.

Table 2. Distribution of PSQI components (n=50)

PSQI component	Frequency	Percentage (%)
Subjective sleep quality		
Very good	27	54
Fairly good	19	38
Fairly bad	4	8
Sleep latency		
≤15 minutes	18	36
16–30 minutes	17	34
31–60 minutes	15	30
Sleep duration		
>7 hours	42	84
6–7 hours	6	12
5–6 hours	2	4
Habitual sleep efficiency		
≥85%	41	82
75–84%	7	14
65–74%	2	4
Sleep disturbance		
Mild	1	2
Moderate	42	84
Severe	7	14
Use of sleep medication		
None	50	100
Daytime dysfunction		
Mild	6	12
Moderate	38	76
Severe	6	12

Table 2 presents the distribution of the seven PSQI components. Regarding subjective sleep quality, most respondents reported very good (54%) or fairly good (38%), while only 8% reported fairly bad. Sleep latency varied, with 36% falling asleep within 15 minutes, 34% requiring 16–30 minutes, and 30% requiring 31–60 minutes. Most respondents reported sleeping for more than 7 hours per night (84%) and having a habitual sleep efficiency of at least 85% (82%). However, sleep disturbances were common, with 84% reporting moderate and 14% severe. Similarly, daytime dysfunction was moderate in 76% of respondents and severe in 12%. None of the respondents reported using sleep medication. These findings indicate that although sleep duration, habitual

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

sleep efficiency, and subjective sleep quality were relatively favorable for most respondents, sleep disturbances and daytime dysfunction remained prominent concerns.

Table 3. Global sleep quality category (n=50)

Global PSQI category	Frequency	Percentage (%)
Poor (score >5)	28	56
Good (score ≤5)	22	44

Based on the global Pittsburgh Sleep Quality Index (PSQI) score, 28 respondents (56%) were classified as having poor sleep quality (score >5), while 22 (44%) had good sleep quality (score ≤5). Thus, more than half of the respondents experienced poor overall sleep quality. This finding indicates that favorable ratings in selected sleep components did not necessarily translate into good overall sleep quality across all seven PSQI components.

Table 4. Ranking of unfavorable PSQI component profiles (n=50)

PSQI component	Unfavourable criterion	Frequency	Percentage (%)
Sleep disturbance	Moderate or severe	49	98
Daytime dysfunction	Moderate or severe	44	88
Sleep latency	>30 minutes	15	30
Habitual sleep efficiency	<85%	9	18
Sleep duration	≤7 hours	8	16
Subjective sleep quality	Fairly bad or very bad	4	8
Use of sleep medication	Any use	0	0

Table 4 ranks the PSQI components according to the proportion of respondents with unfavorable profiles. Sleep disturbance was the most frequently reported concern, affecting 49 respondents (98%), followed by daytime dysfunction in 44 respondents (88%). Prolonged sleep latency of more than 30 minutes was identified in 15 respondents (30%). Less frequent unfavorable profiles included habitual sleep efficiency below 85% (18%), sleep duration of 7 hours or less (16%), and poor subjective sleep quality (8%). None of the respondents reported using sleep medication. The distribution highlights a concentration of unfavorable profiles in sleep disturbance and daytime functioning, whereas the other components were relatively less affected.

DISCUSSION

This study shows that more than half of productive-age adults with hypertension attending a primary health care center in Blitar City had poor sleep quality. The most striking finding, however, lies in the pattern behind this figure. Respondents generally slept long enough, spent most of their time in bed asleep, and rated their own sleep positively. Yet almost all of them reported night-time sleep disturbances, and most reported difficulty functioning during the day. In other words, the main problem in this group was not how much they slept but how well and how continuously they slept. The prevalence of poor sleep is consistent with reports from hypertensive outpatients in Ethiopia and Nigeria (Ayanaw et al., 2022; Oseni et al., 2024) and from older

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

Indonesian adults with hypertension (Komara et al., 2023), suggesting that poor sleep is a common companion of hypertension across settings and age groups.

Sleep disturbance was the dominant problem, affecting 98% of respondents at a moderate or severe level. The PSQI disturbance component captures waking in the middle of the night, getting up to use the bathroom, breathing difficulty, coughing or snoring, feeling too hot or too cold, bad dreams, and pain. Several of these are closely tied to hypertension. Nocturia is common in people with high blood pressure and in those taking diuretics, and it repeatedly breaks sleep (Smith et al., 2022). Snoring and breathing difficulty may signal obstructive sleep apnea, a condition that is strongly linked to resistant hypertension but often remains undiagnosed in primary care (Del Pinto et al., 2021). Each awakening triggers a brief burst of sympathetic activity and a rise in blood pressure; when repeated throughout the night, these bursts prevent the normal nocturnal dip and may sustain elevated blood pressure during the day (Makarem et al., 2021). Fragmented sleep can therefore be both a consequence and a driver of hypertension.

The characteristics of the respondents help explain this pattern. Most were women aged 51–59 years, an age range that overlaps with the menopausal transition. Hot flushes, night sweats, and mood changes during this period frequently interrupt sleep and are associated with insomnia symptoms (Baker et al., 2018). At the same time, the loss of estrogen alters vascular function and contributes to the rise in blood pressure seen in midlife women (Reckelhoff, 2023). The concentration of women in this sample may thus reflect a group in which hormonal changes affect both sleep and blood pressure. In addition, most respondents were housewives, self-employed workers, or farmers. These roles often involve long and irregular hours, caregiving duties, and financial uncertainty. Psychosocial stress has been documented among Indonesian farmers and agricultural communities, and limited coping resources can translate into worry at bedtime and lighter, more fragile sleep (Kurniyawan et al., 2023; Maharani et al., 2025).

An apparent paradox in our data is that 92% of respondents rated their sleep as very good or fairly good, while 56% were classified as poor sleepers. This gap between perception and the composite score is clinically important. People living with chronic conditions often normalize frequent awakenings or daytime tiredness and therefore do not report them unless they are asked directly. Similar gaps between self-perceived sleep and measured sleep problems have been reported in hypertensive populations (Ayanaw et al., 2022; Oseni et al., 2024). Because poor subjective sleep quality is itself associated with hypertension (Lo et al., 2018), relying on a single question, such as "How did you sleep?", is likely to miss many patients at risk. A structured tool, such as the PSQI, provides a more complete picture and can be completed in a few minutes during a routine visit.

Daytime dysfunction was the second most affected component and deserves attention. Daytime sleepiness, low energy, and poor concentration reduce work productivity and make it harder for patients to carry out self-management tasks such as preparing low-salt meals, exercising regularly, and remembering to take medication (Smallfield et al., 2021). For people of productive age, who must balance work and family responsibilities, these effects are especially relevant. Over the long term, poor sleep quality has been shown to predict the onset of hypertension in young and middle-aged adults (Yuan et al., 2021), and chronic insomnia is associated with a higher risk of cardiovascular events (Javaheri & Redline, 2017). Daytime dysfunction may therefore be an early

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

signal that a patient's cardiovascular risk is not well controlled, even when sleep duration appears adequate.

Almost one third of respondents needed more than 30 minutes to fall asleep. Prolonged sleep latency is a core feature of insomnia and usually reflects heightened physiological and cognitive arousal at bedtime, such as worry, rumination, or muscle tension. In contrast, sleep duration and sleep efficiency were favorable for most respondents. Adequate sleep duration is generally protective for blood pressure (Bock et al., 2022), but our findings suggest that this protection may be weakened when sleep is repeatedly interrupted. Assessment of sleep in patients with hypertension should therefore look beyond total sleep time and include sleep continuity, sleep onset, and daytime consequences.

An important implication of these findings is the need to prioritize sleep problems according to their specific characteristics rather than treating poor sleep quality as a uniform condition. The predominance of sleep disturbances and daytime dysfunction suggests that interventions that focus exclusively on extending sleep duration may not adequately address the primary difficulties experienced by these respondents. Instead, assessment should identify the specific factors contributing to sleep fragmentation, prolonged sleep latency, and impaired daytime functioning. For example, patients reporting nocturia may require a review of urinary symptoms and medication schedules, whereas those reporting snoring or breathing difficulties may need further assessment for possible sleep-disordered breathing. This component-based approach is consistent with the multidimensional nature of sleep assessment and the importance of addressing potentially modifiable factors associated with hypertension (Del Pinto et al., 2021; Makarem et al., 2021; Bock et al., 2022).

None of the respondents used sleep medication. This is favorable, because hypnotic drugs carry risks of dependence, falls, and interactions with antihypertensive agents. It also means that there is a clear opportunity for non-pharmacological care. Cognitive behavioral therapy for insomnia, relaxation training, stimulus control, and sleep hygiene education are effective first-line options (Park et al., 2024), and simple nursing interventions such as foot and back massage have improved both sleep quality and blood pressure in women with essential hypertension (Arslan et al., 2021). Because 74% of respondents had stage 1 hypertension, many were still at a stage where lifestyle measures are strongly recommended alongside medication (Unger et al., 2020). Adding sleep to these lifestyle measures is consistent with current cardiovascular health frameworks that treat sleep as a modifiable target (Lloyd-Jones et al., 2022; St-Onge et al., 2016).

These findings have direct implications for nursing practice in primary care. Nurses can integrate brief sleep screening with the PSQI into routine hypertension follow-up and community programs for chronic disease management. Patients with high disturbance or daytime dysfunction scores should be asked about nocturia, snoring, pain, hot flushes, and stress, and referred for further evaluation when sleep apnea is suspected. Education on sleep hygiene, stress management, and the timing of diuretic doses can be delivered in group sessions or home visits, and family members can be involved to support regular sleep routines.

Beyond initial screening and health education, the findings support the potential development of structured sleep-management strategies as part of routine hypertension care. Nurses could incorporate periodic assessment of sleep quality into follow-up visits to identify

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

persistent problems, monitor changes in specific PSQI components, and evaluate patients' responses to non-pharmacological interventions. Individualized approaches may include relaxation techniques, sleep hygiene counseling, stress management, and referral for further assessment when symptoms indicate a possible underlying sleep disorder. Such strategies should be integrated with established hypertension self-management activities rather than delivered as isolated interventions. Previous evidence supporting cognitive behavioral therapy for insomnia and complementary nursing interventions, including foot and back massage, provides a basis for exploring these approaches in primary care populations with hypertension (Park et al., 2024; Arslan et al., 2021). Future intervention studies could evaluate whether improvements in sleep quality are accompanied by better daytime functioning, adherence to hypertension self-management, and blood pressure control.

This study has several limitations. The sample was small, drawn from a single health center, and selected purposively, which limits the generalizability of the findings to all productive-age adults with hypertension. The descriptive design did not test associations between sleep quality and blood pressure levels or other factors, so no causal conclusions can be drawn. Sleep was measured by self-report only, without objective measures such as actigraphy or polysomnography, and comorbid conditions, including sleep apnea, depression, and diabetes, were not assessed. Women were over-represented, which may reflect the population attending the center but limits comparison between sexes. Future studies should use larger probability samples, include men and younger adults, combine subjective and objective sleep measures, and examine the relationship between specific sleep components and blood pressure control.

CONCLUSION

More than half of productive-age adults with hypertension at the Sukorejo Community Health Center had poor sleep quality. Their poor sleep was driven mainly by night-time sleep disturbance and daytime dysfunction, while sleep duration, sleep efficiency, and self-rated sleep quality were largely favorable, and no one used sleep medication. Routine sleep screening with the PSQI and non-pharmacological, nurse-led sleep interventions should therefore be included in primary hypertension care for this population.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the Sukorejo Community Health Center (Puskesmas Sukorejo), Blitar, for granting permission and providing assistance during data collection. We thank all respondents who voluntarily participated and provided valuable information for this study. Their cooperation made this research possible. The authors also acknowledge the contributions of colleagues and students from the Department of Nursing, who assisted with data entry and preliminary analysis.

CONFLICT OF INTEREST

The authors declare no conflict of interest in the conduct and publication of this research.

REFERENCES

Arslan, G., Ceyhan, Ö., & Mollaoğlu, M. (2021). The influence of foot and back massage on blood pressure and sleep quality in females with essential hypertension: A randomized controlled study. *Journal of Human Hypertension*, *35(7)*, 627–637. https://doi.org/10.1038/s41371-020-0371-z

Ayanaw, T., Temesgen, M., Azagew, A. W., & Ferede, Y. M. (2022). Sleep quality and associated factors among adult hypertensive patients attending a chronic follow up care clinic in northwest Amhara regional state referral hospitals, Northwest Ethiopia. *PLOS ONE*, *17(7)*, e0271072. https://doi.org/10.1371/journal.pone.0271072

Baker, F. C., Lampio, L., Saaresranta, T., & Polo-Kantola, P. (2018). Sleep and sleep disorders in the menopausal transition. *Sleep Medicine Clinics*, *13(3)*, 443–456. https://doi.org/10.1016/j.jsmc.2018.04.011

Bock, J. M., Vungarala, S., Covassin, N., & Somers, V. K. (2022). Sleep duration and hypertension: Epidemiological evidence and underlying mechanisms. *American Journal of Hypertension*, *35(1)*, 3–11. https://doi.org/10.1093/ajh/hpab146

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, *28(2)*, 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Del Pinto, R., Grassi, G., Ferri, C., Pengo, M. F., Lombardi, C., Pucci, G., Salvetti, M., & Parati, G. (2021). Diagnostic and therapeutic approach to sleep disorders, high blood pressure and cardiovascular diseases: A consensus document by the Italian Society of Hypertension (SIIA). *High Blood Pressure & Cardiovascular Prevention*, *28(2)*, 85–102. https://doi.org/10.1007/s40292-021-00436-y

Fauzi, A., Ahmedy, F., & Rosidah, R. (2024). Cross-culture adaptation and validation of Indonesian language version of Pittsburgh Sleep Quality Index. *International Journal of Public Health Science*, *13(4)*, 1672–1678. https://doi.org/10.11591/ijphs.v13i4.23439

Javaheri, S., & Redline, S. (2017). Insomnia and risk of cardiovascular disease. *Chest*, *152(2)*, 435–444. https://doi.org/10.1016/j.chest.2017.01.026

Komara, N. K., Kahanjak, D. N., Ahmad, F. F. R., Balyas, A. B., Widhiyanto, H. T. D., Hartoyo, R., Ivanka, D., Sitanggang, C. M. I., Sandhikarana, I. D. G., & Anwar, M. N. (2023). Hubungan kualitas tidur terhadap tekanan darah pada lansia hipertensi di Panti Werda Sinta Rangkang Palangka Raya. *Journal of Noncommunicable Diseases*, *3(2)*, 63–70. https://doi.org/10.52365/jond.v3i2.782

Kurniyawan, E. H., Cahyani, P. S. R., Khoiriyah, A. A., Purnomo, F. K. A., Afandi, A. T., Kurniawan, D. E., & Nur, K. R. M. (2023). Coping mechanisms used by farmers to encounter psychosocial problems: Literature review. *Health and Technology Journal (HTechJ)*, *1(4)*, 445–454. https://doi.org/10.53713/htechj.v1i4.84

Lloyd-Jones, D. M., Allen, N. B., Anderson, C. A. M., Black, T., Brewer, L. C., Foraker, R. E., Grandner, M. A., Lavretsky, H., Perak, A. M., Sharma, G., & Rosamond, W. (2022). Life's Essential 8: Updating and enhancing the American Heart Association's construct of cardiovascular health: A presidential advisory from the American Heart Association. *Circulation*, *146(5)*, e18–e43. https://doi.org/10.1161/CIR.0000000000001078

Lo, K., Woo, B., Wong, M., & Tam, W. (2018). Subjective sleep quality, blood pressure, and hypertension: A meta-analysis. *The Journal of Clinical Hypertension*, *20(3)*, 592–605. https://doi.org/10.1111/jch.13220

Maharani, D. N., Umami, N., Yuliyani, U., Kurniyawan, E. H., Nur, K. R. M., Kurniawan, D. E., & Afandi, A. T. (2025). Psychosocial problems among farmers in agricultural areas. *Health and Technology Journal (HTechJ)*, *3(1)*, 120–130. https://doi.org/10.53713/htechj.v3i1.318

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

Makarem, N., Alcántara, C., Williams, N., Bello, N. A., & Abdalla, M. (2021). Effect of sleep disturbances on blood pressure. *Hypertension*, *77(4)*, 1036–1046. https://doi.org/10.1161/HYPERTENSIONAHA.120.14479

Mills, K. T., Stefanescu, A., & He, J. (2020). The global epidemiology of hypertension. *Nature Reviews Nephrology*, *16(4)*, 223–237. https://doi.org/10.1038/s41581-019-0244-2

Mollayeva, T., Thurairajah, P., Burton, K., Mollayeva, S., Shapiro, C. M., & Colantonio, A. (2016). The Pittsburgh Sleep Quality Index as a screening tool for sleep dysfunction in clinical and non-clinical samples: A systematic review and meta-analysis. *Sleep Medicine Reviews*, *25*, 52–73. https://doi.org/10.1016/j.smrv.2015.01.009

NCD Risk Factor Collaboration (NCD-RisC). (2021). Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: A pooled analysis of 1201 population-representative studies with 104 million participants. *The Lancet*, *398(10304)*, 957–980. https://doi.org/10.1016/S0140-6736(21)01330-1

Oseni, T. I. A., Udonwa, N. E., Oku, A. O., Makinde, M. T., & Archibong, F. (2024). Association between sleep quality and blood pressure control among hypertensive patients at a rural tertiary hospital in Southern Nigeria: A cross-sectional study. *BMJ Open*, *14(3)*, e079774. https://doi.org/10.1136/bmjopen-2023-079774

Park, S., Lim, E. J., Lee, D., & Lee, Y.-J. (2024). Non-pharmacological treatments for insomnia: A focus on components of cognitive behavioral therapy for insomnia. *Kosin Medical Journal*, *39(4)*, 238–245. https://doi.org/10.7180/kmj.24.153

Peltzer, K., & Pengpid, S. (2018). The prevalence and social determinants of hypertension among adults in Indonesia: A cross-sectional population-based national survey. International Journal of *Hypertension*, *2018*, 5610725. https://doi.org/10.1155/2018/5610725

Reckelhoff, J. F. (2023). Mechanisms of sex and gender differences in hypertension. *Journal of Human Hypertension*, *37(8)*, 596–601. https://doi.org/10.1038/s41371-023-00810-4

Smallfield, S., Fang, L., & Kyler, D. (2021). Self-management interventions to improve activities of daily living and rest and sleep for adults with chronic conditions: A systematic review. *The American Journal of Occupational Therapy*, *75(4)*, 7504190010. https://doi.org/10.5014/ajot.2021.046946

Smith, M., Dawson, S., Andrews, R. C., Eriksson, S. H., Selsick, H., Skyrme-Jones, A., Udayaraj, U., Rees, J., Strong, E., Henderson, E. J., & Drake, M. J. (2022). Evaluation and treatment in urology for nocturia caused by nonurological mechanisms: Guidance from the PLANET study. *European Urology Focus*, *8(1)*, 89–97. https://doi.org/10.1016/j.euf.2022.01.007

St-Onge, M.-P., Grandner, M. A., Brown, D., Conroy, M. B., Jean-Louis, G., Coons, M., & Bhatt, D. L. (2016). Sleep duration and quality: Impact on lifestyle behaviors and cardiometabolic health: A scientific statement from the American Heart Association. *Circulation*, *134(18)*, e367–e386. https://doi.org/10.1161/CIR.0000000000000444

Unger, T., Borghi, C., Charchar, F., Khan, N. A., Poulter, N. R., Prabhakaran, D., Ramirez, A., Schlaich, M., Stergiou, G. S., Tomaszewski, M., Wainford, R. D., Williams, B., & Schutte, A. E. (2020). 2020 International Society of *Hypertension* global hypertension practice guidelines. Hypertension, 75(6), 1334–1357. https://doi.org/10.1161/HYPERTENSIONAHA.120.15026

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *The Lancet*, *370(9596)*, 1453–1457. https://doi.org/10.1016/S0140-6736(07)61602-X

Yuan, Y., Heizhati, M., Wang, L., Li, M., Lin, M., Gan, L., Cai, X., Yang, W., Yao, L., Wang, Z., Abudereyimu, R., & Li, N. (2021). Poor sleep quality is associated with new-onset hypertension in a

Volume 01 Number 02 (November 2025)
e-ISSN: 3164-8835; p-ISSN: 3164-8827

diverse young and middle-aged population. *Sleep Medicine*, *88*, 189–196. https://doi.org/10.1016/j.sleep.2021.10.021