

The Relationship Between Smartphone Usage Duration and Distance During Sleep and Sleep Quality Among Employees of RSJKO X

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Sleep quality is a key indicator of an employee's physical and mental health, and the growing use of smartphones has raised concern about its effect on rest. This study aimed to determine the relationship between the duration of smartphone use and smartphone distance during sleep with sleep quality among employees of X Mental Health and Drug Addiction Hospital (RSJKO), in 2026. A quantitative method with a cross-sectional design was used, involving 81 respondents selected through purposive sampling. Data were collected using questionnaires, including the Pittsburgh Sleep Quality Index (PSQI), and analyzed using univariate and bivariate Chi-Square tests at a 95% confidence level ($\alpha = 0.05$). Results showed that 51.9% of respondents had a risky daily smartphone use duration ($>2-4$ hours/day), while 70.4% kept a safe smartphone distance (≥ 1 metre) during sleep, and 77.8% had good sleep quality. Bivariate analysis found a significant relationship between duration of smartphone use and sleep quality ($p = 0.013$), whereas smartphone distance during sleep showed no significant relationship with sleep quality ($p = 0.845$). The study concludes that duration of smartphone use, rather than its distance from the body during sleep, is associated with sleep quality among RSJKO employees. Employees are advised to limit smartphone use, particularly at night, to help maintain good sleep quality.

Keywords: Sleep quality, duration of smartphone use, distance from smartphone, hospital staff.

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1. Introduction

Smartphones have become an integral part of daily life and work, including for workers in the healthcare sector. According to Data Reportal 2024, the number of smartphone and internet users globally has reached 5.35 billion people, equivalent to 69.4% of the global population. In Indonesia, the Association of Indonesian Internet Service Providers (Asosiasi Penyelenggara Jasa Internet Indonesia / APJII) [1] recorded that national internet penetration has surpassed 200 million users. In the Riau Islands Province, smartphone ownership ranges between 85% and 88% [2], driven by high mobility and public service digitization across the archipelago.

In hospital settings, smartphone use significantly facilitates task completion, communication between staff, and digital-based reporting [3]. However, excessive use has the potential to have negative impacts, one of which is on sleep quality [4]. Two aspects of smartphone use that have received much attention in relation to sleep are the duration of daily use and the distance the smartphone is placed in relation to the body while sleeping. Long-term use can lead to central nervous system overstimulation, making it more difficult for individuals to enter sleep [5], [6]. While the habit of keeping smartphones close to one another while sleeping is thought to be associated with impaired pre-sleep relaxation due to notifications and screen light exposure [7]

RSJKO X is the only specialized Class B mental health facility, operating a 24-hour shift system to ensure continuity of service. The nature of their work, which requires high alertness and a reliance on smartphones for work communication, puts RSJKO employees at risk for sleep quality disorders. A preliminary study was conducted in February 2026 involving 15 employees selected through convenience sampling solely to identify the research problem and establish the study rationale. The preliminary findings revealed that 11 respondents used smartphones for more than 4–6 hours per day, 9 habitually used their smartphones immediately before bed, and 8 placed their smartphones near their heads while sleeping. Furthermore, 10 respondents reported sleep complaints, such as difficulty falling asleep and frequent nighttime awakenings. These preliminary data were utilized exclusively for initial problem identification and were not included in the main research analysis.

Although various studies have examined the relationship between smartphone use and sleep quality, most have predominantly focused on adolescents and university students, whose device usage patterns and circadian stressors differ significantly from working adults. While a few studies have explored general adult or healthcare worker populations, research specifically addressing personnel in specialized mental health and drug addiction hospitals remains exceptionally scarce. Employees in psychiatric and addiction facilities face unique occupational conditions, including high psychological demands, continuous alertness required for patient safety, and rotating 24-hour shift schedules. These factors necessitate distinct smartphone usage habits for urgent workplace communication, which may uniquely intersect with sleep hygiene. By focusing on employees at RSJKO X, this study contributes novel empirical evidence regarding how both active usage duration and physical placement proximity during sleep relate to sleep quality within a high-stress, shift-dependent specialized healthcare setting

2. Literature Review And Problem Statement

Smartphone use in healthcare settings has been shown to support task coordination and efficiency [3] but prolonged use can potentially trigger cognitive overstimulation [5] and suppress melatonin secretion due to blue light exposure, ultimately reducing sleep quality [8], [9]. While some hypotheses suggest that the distance from which devices are placed during sleep influences relaxation levels [10], a literature review reveals inconsistencies; active interaction behavior and usage duration have been shown to be more important determinants of sleep quality than simply the physical location of the device [7]. Furthermore, most previous studies have focused on adolescents or college students [6], [11], leaving a research gap regarding the impact of smartphone use behavior on healthcare workers in psychiatric and drug addiction hospitals, who have typical workloads and 24-hour shift systems.

Based on the research gap, the main problem in this study focuses on how smartphone usage behavior affects the sleep quality of employees of X RSJKO X. Therefore, this study was formulated to answer the question: "Is there a relationship between the duration of smartphone use and the distance of the smartphone while sleeping on the sleep quality of employees of RSJKO X?". To address this research question, H_0 and alternative H_a hypotheses were formulated for each independent variable. For the first variable, the null hypothesis (H_{01}) states that there is no significant relationship between the duration of smartphone use and sleep quality, whereas the alternative hypothesis (H_{a1}) posits a significant relationship between the duration of smartphone use and sleep quality. For the second variable, the null hypothesis (H_{02}) states that there is no significant relationship between the distance of the smartphone while sleeping and sleep quality, while the alternative hypothesis (H_{a2}) posits a significant relationship between the distance of the smartphone while sleeping and sleep quality.

3. Method

This research uses a quantitative method with an observational analytic design and a cross-sectional approach, where both the independent variables (duration of smartphone use and distance of the smartphone while sleeping) and the dependent variable (sleep quality) were measured simultaneously. The study was conducted from March to May 2026 at RSJKO X. The target population comprised all permanent employees at RSJKO X who actively used smartphones, totaling 423 people. To determine the sample size, Slovin's formula was applied with a 10% margin of error ($\alpha = 0,10$), yielding a required sample size of 81 respondents. The choice of Slovin's formula is justified given that the target population is finite, well-defined ($N = 423$), and relatively small. The selection of a 10% margin of error is justified as an acceptable standard for exploratory observational social and health-behavior studies, balancing statistical precision with feasibility constraints, resource availability, and operational shift-work schedules among hospital staff.

Sampling was conducted using a non-probability purposive sampling technique based on specific predetermined criteria. The inclusion criteria comprised: (1) permanent employees of RSJKO X, (2) active daily smartphone users, and (3) willing participants who signed the informed consent form. The exclusion criteria included: (1) employees currently taking prescribed sleep medication, (2) employees diagnosed with medical or sleep disorders unrelated to smartphone use, and (3) employees on extended leave or inactive during the data collection period. Acknowledging a methodological constraint, the reliance on purposive sampling limits the representative balance of the sample and restricts the generalizability of the findings to the broader healthcare population, which is explicitly recognized as a study limitation. Data collection procedures involved distributing structured self-administered questionnaires directly to eligible employees who met the inclusion criteria during their working shifts. Prior to data collection, ethical considerations were strictly observed. All prospective participants were informed about the study's purpose, the voluntary nature of their participation, and the complete confidentiality and anonymity of their responses before providing written informed consent.

The independent variables in this study are the duration of smartphone use and the distance between the smartphone and the individual during sleep, while the dependent variable is sleep quality. The duration of smartphone use was measured using a structured questionnaire recording average daily usage. Although preliminary survey responses indicated usage ranging up to 6 hours per day, the actual research data collected from the final sample revealed a maximum daily usage of 4 hours. Consequently, usage duration was operationally operationalized into two mutually exclusive categories based on the actual sample distribution: safe (≤ 2 hours/day) and risky (> 2 -4 hours/day)[12]. The distance between the smartphone and the individual while sleeping was assessed through a self-reported habit questionnaire, categorized as safe (≥ 1 meter) and risky (< 1 meter) [10], [12]. Sleep quality was evaluated using an Indonesian-validated version of the Pittsburgh Sleep Quality Index (PSQI), which has demonstrated high internal validity and reliability for local populations. Global PSQI scores were classified using the standard cut-off point, where a score of ≤ 5 indicates good sleep quality and a score of > 5 indicates poor sleep quality.

4. Results And Discussion

Result

Table 1. Overview of Daily Smartphone Usage Duration of RSJKO X Employees in 2026

Duration of Smartphone Use	Frequency	%
Safe (≤ 2 hours/day)	39	48,1
At Risk (> 2 -4 hours/day)	42	51,9
Total	81	100

Table 2. Overview of Smartphone Distance While Sleeping for RSJKO X Employees in 2026

Distance of Smartphone While Sleeping	Frequency	%
Safe (≥ 1 meter)	57	70,4
At Risk (< 1 meter)	24	29,6
Total	81	100

Table 3. Overview of Sleep Quality of Employees at RSJKO X in 2026

Sleep Quality	Frequency	%
Good (Score ≤ 5)	63	77,8
Bad (Score > 5)	18	22,2
Total	81	100

Univariate Analysis

Of the 81 respondents, 42 (51.9%) had smartphone usage duration in the risky category ($>2-4$ hours/day), while 39 (48.1%) were in the safe category (≤ 2 hours/day). The majority of respondents, 57 (70.4%), kept their smartphones at a safe distance (≥ 1 meter) while sleeping, while 24 (29.6%) kept their smartphones at an at risk distance (< 1 meter). In terms of sleep quality, 63 respondents (77.8%) had good sleep quality, and 18 respondents (22.2%) had poor sleep quality (Tables 1–3).

Table 4. The Relationship Between Smartphone Usage Duration and Sleep Quality of Employees at RSJKO X in 2026

Duration of Smartphone Use	Poor Sleep n (%)	Good Sleep n (%)	Total	p-value	OR	95%CI
Safe	4 (10,3%)	35 (89,7%)	39	0,013	4,375	1,295-14,778
At Risk	14 (33,3%)	28 (66,7%)	42			
Total	18 (22,2%)	63 (77,8%)	81			

Table 5. The Relationship Between Smartphone Distance While Sleeping and Sleep Quality of Employees at RSJKO X in 2026

Distance of Smartphone While Sleeping	Poor Sleep n (%)	Good Sleep n (%)	Total	p-value	OR	95%CI
Safe	13 (22,8%)	44 (77,2%)	57	0,845	0,85	0,28 – 2,85
At Risk	5 (20,8%)	19 (79,2%)	24			
Total	18 (22,2%)	63 (77,8%)	81			

Bivariate Analysis

Chi-square test results showed that among the 42 respondents with a risky smartphone usage duration ($>2-4$ hours/day), 14 (33,3%) reported poor sleep quality, whereas among the 39 respondents with a safe duration (≤ 2 hours/day), only 4 (10,3%) reported poor sleep quality. Statistical analysis revealed a significant association between smartphone usage duration and sleep quality among employees at RSJKO X ($p = 0,013$) (Table 4). Furthermore, respondents with a risky smartphone usage duration had 4,375 times higher odds of experiencing poor sleep quality compared to those with a safe usage duration (OR = 4,375; 95%CI [1,295-14,778]).

Conversely, the chi-square test results for smartphone distance while sleeping showed a p-value of 0.845 ($p > 0.05$). The proportion of poor sleep quality in the unsafe distance group (20.8%) was even slightly lower than in the safe distance group (22.8%), indicating no significant relationship between smartphone distance while sleeping and sleep quality among respondents (Table 5). Further analysis yielded an OR of

0,89 (OR = 0,89; 95%CI [0,28 – 2,85]), confirming that placing smartphones at an unsafe distance during sleep was not associated with an increased likelihood of poor sleep quality in this study population.

Discussion

Prolonged smartphone use is biologically linked to central nervous system overstimulation, which may hinder individuals from entering the sleep phase [13]. Additionally, exposure to smartphone screen light is known to inhibit the production of melatonin, the hormone regulating the sleep-wake cycle, thereby extending sleep onset latency [8], [9]. These findings align with research by Demirci, Akgönül, and Akpınar (2015), which demonstrated that smartphone use severity is associated with sleep quality, as well as Hale and Guan (2015), who concluded that screen time correlates with sleep disturbances across various age groups [6], [11]. Among employees of Engku Haji Daud Mental Health and Drug Addiction Hospital (RSJKO), a potential context that may relate to prolonged usage is the reliance on smartphones for work-related communication during 24-hour shifts, particularly close to rest periods. However, as work communication demands were not directly measured in this study, this remains a plausible contextual factor that warrants further investigation rather than a definitive causal determinant.

The lack of a statistically significant association between smartphone distance while sleeping and sleep quality aligns with the perspective that the physical presence of an electronic device near the bed does not necessarily relate to sleep quality unless accompanied by active use before sleep [7]. This suggests that smartphone usage behaviors, specifically the duration and timing of active interaction may play a more relevant role in relation to sleep quality than the physical placement of the device during sleep [14], [15]. Respondents who habitually keep their smartphones near their beds may not experience sleep disturbances if they refrain from active device interaction prior to or during rest.

However, this non-significant finding should also be interpreted in light of potential measurement limitations. Smartphone distance was assessed solely through self-reported habits, which may introduce recall bias and fail to capture nuanced nighttime exposures, such as screen light emissions from unmuted notifications, vibrations, or brief nocturnal interactions. Future studies utilizing objective measurement tools or tracking passive nighttime disruptions are recommended to further clarify this relationship.

Study Limitation

Several methodological limitations should be considered when interpreting the findings of this study. First, the cross-sectional design inherently restricts the ability to establish temporal precedence or causal relationships between smartphone usage habits and sleep quality, limiting the conclusions to statistical associations. Second, all measurements including smartphone duration, placement distance, and sleep quality (PSQI) relied on self-reported questionnaires, which are susceptible to recall bias and social desirability bias, and may not fully reflect objective nighttime behavior or passive exposures (e.g., unmuted notifications or screen light emissions). Third, the use of non-probability purposive sampling within a single hospital facility, combined with a relatively small sample size ($n = 81$), constrains the statistical power and limits the generalizability of the results to broader healthcare populations. Finally, potential confounding variables such as occupational workload, night-shift schedules, caffeine consumption, and underlying stress levels were not directly controlled or measured in this study, which may have influenced respondents' sleep architecture and usage patterns. Future studies utilizing longitudinal designs, objective tracking tools (e.g., mobile actigraphy or usage-logging applications), probability sampling, and comprehensive control over work-related stressors are recommended to further validate and extend these findings.

5. Conclusion

Based on the results of the study conducted among 81 employees of RSJKO X, in 2026, the majority of respondents reported smartphone usage duration in the risky category (51,9%), placed their smartphones at a safe distance while sleeping (70,4%), and exhibited good sleep quality (77,8%). Statistical analysis revealed a significant association between the duration of smartphone use and sleep quality ($p = 0,013$; $OR = 4,375$; $95\%CI [1,295 - 14,778]$). Conversely, the distance of the smartphone during sleep showed no statistically significant relationship with sleep quality ($p = 0,845$; $OR = 0,89$; $95\%CI [0,28 - 2,85]$).

Employees at RSJKO X recommend implementing healthier smartphone use while maintaining 24-hour work communication needs. This includes prioritizing notifications, utilizing the "do not disturb" feature during breaks, and limiting non-work-related smartphone use before bedtime. The hospital is advised to increase health promotion related to smartphone time management and good sleep habits through employee wellness programs and counseling. Researchers further recommend examining other factors that could potentially influence sleep quality, such as workload, shift systems, and smartphone usage habits before bedtime, with a larger sample size.

6. References

- [1] Asosiasi Penyelenggara Jasa Internet Indonesia, "Asosiasi Penyelenggara Jasa Internet Indonesia." Accessed: Jul. 27, 2026. [Online]. Available: <https://survei.apjii.or.id/survei>
- [2] Badan Pusat Statistik Provinsi Kep. Riau, "Indeks Pembangunan Manusia Provinsi Kepulauan Riau 2024." Accessed: Jul. 27, 2026. [Online]. Available: <https://kepri.bps.go.id/id/publication/2025/05/19/26daf46cd29b083119022d1e/indeks-pembangunan-manusia-provinsi-kepulauan-riau-2024.html>
- [3] A. I. Stoumpos, F. Kitsios, and M. A. Talias, "Digital Transformation in Healthcare: Technology Acceptance and Its Applications," *Int. J. Environ. Res. Public Health*, vol. 20, no. 4, p. 3407, Feb. 2023, doi: 10.3390/IJERPH20043407.
- [4] H. Intensitas Penggunaan Smartphone Dengan Kualitas Dan Kuantitas Tidur Pada Remaja Elvie Febriani Dunga, A. Dulanim, J. Kedokteran Universitas Negeri Gorontalo, and J. Keperawatan Fakultas Olahraga dan Kesehatan universitas Negeri Gorontalo, "Hubungan Intensitas Penggunaan Smartphone Dengan Kualitas Dan Kuantitas Tidur Pada Remaja," *Jambura Nursing Journal*, vol. 3, no. 2, pp. 78–88, Jul. 2021, doi: 10.37311/JNJ.V3I2.11912.
- [5] J. D. Elhai, R. D. Dvorak, J. C. Levine, and B. J. Hall, "Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology," *J. Affect. Disord.*, vol. 207, pp. 251–259, Jan. 2017, doi: 10.1016/J.JAD.2016.08.030.
- [6] L. Hale and S. Guan, "Screen time and sleep among school-aged children and adolescents: A systematic literature review," *Sleep Med. Rev.*, vol. 21, pp. 50–58, Jun. 2015, doi: 10.1016/j.smrv.2014.07.007.
- [7] P. Paridah, F. Ferniati, J. Jafriati, N. J., and R. D. Liaran, "FAKTOR DURASI, JARAK DAN INTENSITAS CAHAYA SMARTPHONE DENGAN KUALITAS TIDUR PADA REMAJA: LITERATURE REVIEW," *Jurnal Kesehatan dan Keselamatan Kerja Universitas Halu Oleo*, vol. 6, no. 4, Feb. 2026, doi: 10.37887/JK3UHO.V6I4.204.
- [8] A. M. Chang, D. Aeschbach, J. F. Duffy, and C. A. Czeisler, "Evening use of light-emitting eReaders negatively affects sleep, circadian timing, and next-morning alertness," *Proc. Natl. Acad. Sci. U. S. A.*, vol. 112, no. 4, pp. 1232–1237, Jan. 2015, doi: 10.1073/PNAS.1418490112.

- [9] W. B. R. MS, P. B, and F. MG, "Light level and duration of exposure determine the impact of self-luminous tablets on melatonin suppression," *Appl. Ergon.*, vol. 44, no. 2, 2013, doi: 10.1016/J.APERGO.2012.07.008.
- [10] H. Syafitri, Didi Kurniawan, and A. Agrina, "HUBUNGAN DURASI PENGGUNAAN SMARTPHONE DENGAN KUALITAS TIDUR MAHASISWA TINGKAT AKHIR FAKULTAS KEPERAWATAN UNRI DIMASA PANDEMI COVID-19," *Riau Nursing Journal*, vol. 1, no. 1, pp. 115–128, Oct. 2022, doi: 10.31258/RNJ.1.1.115-128.
- [11] K. Demirci, M. Akgönül, and A. Akpınar, "Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students," *J. Behav. Addict.*, vol. 4, no. 2, pp. 85–92, 2015, doi: 10.1556/2006.4.2015.010.
- [12] L. Exelmans and J. Van den Bulck, "Bedtime mobile phone use and sleep in adults," *Soc. Sci. Med.*, vol. 148, pp. 93–101, Jan. 2016, doi: 10.1016/j.socscimed.2015.11.037.
- [13] C. Putri Devira, Y. Supartini, E. Sumarti Tambunan, T. Sulastri, and P. Kemenkes Jakarta, "Hubungan Durasi Penggunaan Gadget Sebelum Tidur Dengan Kejadian Insomnia Pada Remaja," *Jurnal Keperawatan Terapan*, vol. 11, no. 1, pp. 80–86, Jul. 2025, doi: 10.31290/JKT.V11I1.5613.
- [14] D. Arshad *et al.*, "The adverse impact of excessive smartphone screen-time on sleep quality among young adults: A prospective cohort," *Sleep Science*, vol. 14, no. 4, p. 337, Nov. 2021, doi: 10.5935/1984-0063.20200114.
- [15] M. Q. H. Leow, J. Chiang, T. J. X. Chua, S. Wang, and N. C. Tan, "The relationship between smartphone addiction and sleep among medical students: A systematic review and meta-analysis," *PLoS One*, vol. 18, no. 9 September, Sep. 2023, doi: 10.1371/JOURNAL.PONE.0290724.