



The Effect of WhatsApp-Based Nutrition Education on Sleep Quality and Stress Levels Among Employees of PT Pegadaian (Persero) Regional Office IX

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Abstract

Employee productivity is influenced by several factors, including sleep quality and stress levels. Poor sleep quality and high occupational stress may negatively affect physical health, mental well-being, and work performance. Digital nutrition education has emerged as a flexible intervention strategy for employees. This study aimed to analyze the effect of the WhatsApp-based Healthy Life Education Class nutrition education program on sleep quality and stress levels among employees of PT Pegadaian Regional Office IX. A pre-experimental study with a one-group pretest–posttest design without a control group was conducted involving 37 employees selected using a total sampling technique. The intervention was delivered over six weeks through a WhatsApp Group using synchronous weekly online lectures and asynchronous educational videos, posters, and behavioral maintenance activities. Data were collected using the Pittsburgh Sleep Quality Index (PSQI) and the Perceived Stress Scale (PSS-10) questionnaires and analyzed using the paired sample t-test with a significance level of 5%. The results showed that the mean sleep quality score improved significantly from 8.68 ± 2.056 to 7.70 ± 1.681 ($p < 0.001$). Meanwhile, the mean stress score decreased from 14.62 ± 4.238 to 13.54 ± 5.310 , although the difference was not statistically significant ($p = 0.219$). In conclusion, the WhatsApp-based Healthy Life Education Class nutrition education program significantly improved employees' sleep quality but did not produce a statistically significant reduction in stress levels.

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1. INTRODUCTION

Employee health is an essential component in maintaining organizational productivity and performance. Healthy employees are more likely to demonstrate better work performance, higher concentration, and greater efficiency in completing their tasks. In Indonesia, labor productivity was recorded at 74.4%, lower than the ASEAN average of 78.2%, indicating that Indonesian labor productivity remains relatively low compared with other countries in the region (Dhora & Abbas, 2025). However, modern office work is often characterized by high workloads, prolonged sedentary behavior, and psychological pressure, which may negatively affect employees' physical and mental health. Among the most common health problems experienced by office workers are poor sleep quality and occupational stress, both of which have been associated with decreased productivity, impaired cognitive function, and reduced quality of life (Syahri *et al.*, 2024).

Sleep quality is defined as an individual's satisfaction with the sleep experience, including sleep duration, sleep continuity, and feeling refreshed upon waking. Poor sleep quality has become a growing public health concern worldwide. In Indonesia, sleep disturbances also represent a substantial health concern. A previous study reported that approximately 10% of the Indonesian population, or around 28

million people out of 238 million, experienced insomnia (Pramesti *et al.*, 2024). Poor sleep quality has been associated with excessive fatigue, impaired immune function, metabolic disorders, and reduced work performance. In addition, inadequate sleep has been shown to affect appetite-regulating hormones, including leptin and ghrelin (Antara *et al.*, 2022). Therefore, improving sleep quality is not only important for maintaining general health but also for supporting optimal nutritional status and workplace productivity.

Occupational stress is another major issue affecting employee well-being. High job demands, workload, organizational responsibilities, and limited recovery time may contribute to chronic stress among office employees. According to the World Health Organization (WHO) (2014), approximately 8% of occupational diseases were attributed to work-related stress. In Indonesia, the 2023 Indonesian Health Survey (SKI) reported mental health problems among 0.7% of civil servants and 1.2% of private-sector employees. Persistent stress stimulates cortisol secretion, which may influence eating behavior, energy metabolism, and psychological health. Employees experiencing prolonged stress are more likely to consume energy-dense foods, experience reduced work performance, and develop long-term health problems. Consequently, interventions addressing both sleep quality and stress management are necessary to improve employees' overall health and occupational performance.

Nutrition education is a practical strategy to improve nutritional knowledge and promote healthy eating and lifestyle behaviors. Nutrition education focused primarily on balanced nutrition, healthy food choices, meal patterns, hydration, and mindful eating as the main components. Physical activity, stress management, and sleep hygiene were included as complementary components because they are related to energy balance, eating behaviors, sleep quality, and psychological well-being. Thus, nutrition education remained the main focus of the intervention, while the other lifestyle components supported behavioral changes and the study outcomes related to sleep quality and stress levels.

Previous studies have demonstrated that WhatsApp-based health education effectively improves nutrition knowledge and health behaviors among various populations, including adolescents and pregnant women. However, evidence regarding the effectiveness of an 8-week WhatsApp-based multidomain nutrition education intervention among employees in the financial sector remains limited, particularly regarding its simultaneous effects on sleep quality and stress levels, as measured by the Pittsburgh Sleep Quality Index (PSQI) and the Perceived Stress Scale-10 (PSS-10). Most existing interventions have focused primarily on improving nutritional knowledge or dietary practices rather than broader health outcomes such as sleep and psychological well-being. This lack of evidence highlights the need for further research exploring whether digital nutrition education can improve both physical and mental health indicators among working adults (Emylisa *et al.*, 2023).

To address this gap, the present study implemented the Healthy Life Education Class, a six-week WhatsApp-based nutrition education program designed specifically for employees of PT. Pegadaian Regional Office IX. The program combined synchronous educational sessions with asynchronous learning activities covering healthy lifestyles, balanced nutrition, hydration, physical activity, stress management, mindful eating, and behavior change strategies. By integrating nutrition education with practical lifestyle recommendations, the intervention was expected to improve employees' sleep quality while reducing occupational stress.

Therefore, this study aimed to analyze the effect of the WhatsApp-based Healthy Life Education Class nutrition education program on sleep quality and stress levels among employees of PT. Pegadaian Regional Office IX. The findings are expected to provide evidence regarding the potential use of digital nutrition education as an accessible workplace health promotion strategy to support employee well-being and productivity.

2. METHOD

This study employed a quantitative pre-experimental one-group pretest–posttest design without a control group to evaluate the effect of the WhatsApp-based Healthy Life Education Class on sleep quality and stress levels among employees of PT. Pegadaian Regional Office IX. This design was selected to compare outcomes before and after the six-week intervention. A total of 42 employees were initially assessed for eligibility. Of these, 37 met the inclusion and exclusion criteria and were recruited using total sampling. The remaining five employees were excluded because they did not meet the eligibility criteria. Inclusion criteria were active participation in the WhatsApp Group, willingness to participate, and completion of both pretest and posttest questionnaires. Participants who did not complete the intervention or either questionnaire were excluded. Informed consent was obtained from all participants. The absence of a control group limits the ability to attribute observed changes solely to the intervention, as other factors may have contributed to the outcomes.

The WhatsApp-based nutrition education intervention was conducted for six weeks through a WhatsApp Group and consisted of six synchronous education sessions. Each session was held every

Saturday from 13:30 to 14:30 WIB, with a duration of 60 minutes. The educational topics were delivered progressively and included healthy lifestyles, physical activity, hydration, stress management, eating patterns, mindful eating, and behavioral change strategies.

The education was delivered through short messages, graphical materials, and educational videos shared in the WhatsApp Group, followed by discussions and question-and-answer sessions. On weekdays, asynchronous *maintenance* activities were conducted through educational videos, posters, healthy lifestyle reminders, and sharing of participants' eating behaviors and physical activities. These activities were intended to reinforce participants' understanding and maintain their engagement throughout the six-week intervention. Participant engagement was monitored based on their participation in the education sessions and *maintenance* activities in the WhatsApp Group. After completion of the intervention, participants completed the *posttest* using the PSQI and PSS-10 questionnaires.

3. RESULTS AND DISCUSSION

This study was conducted online via WhatsApp, one of the most widely used communication applications in Indonesia (Diandra & Paidi 2022). The platform enabled flexible delivery of nutrition education without disrupting respondents' working hours, making it suitable for this intervention (Putri, 2021)

The study was carried out among employees of PT Pegadaian Regional Office IX, an Indonesian state-owned financial services company providing pawn-based financing and other financial services. The regional office covers North Jakarta, West Jakarta, South Jakarta, and Banten Province, where employees work in urban environments characterized by high workloads and mobility. These conditions may affect health behaviors, including sleep quality, highlighting the need for accessible and flexible online nutrition education. In addition, the study area has adequate healthcare facilities, and PT Pegadaian collaborates with healthcare providers to support employee health services.

Table 1. Characteristics of Respondents (n = 37)

No	Characteristics of Respondents	n	%
1	Age		
	• 25 – 40 years	26	70.27
	• 41 – 54 years	11	29.73
	Total	37	100
2	Gender		
	• Male	25	67.6
	• Female	12	32.4
	Total	37	100
3	Highest Level of Education		
	• Senior School/Equivalent	High 3	8.1
	• Diploma (D3)	5	13.5
	• Bachelor's Degree (S1)	26	70.3
	• Postgraduate Degree	3	8.1
	Total	37	100

Based on the data presented in the table, a total of 37 respondents participated in this study. The majority of respondents were aged 25–40 years, accounting for 26 individuals (70.27%), while 11 respondents (29.73%) were aged 41–54 years. Individuals aged 18–40 years are generally classified as young adults, whereas those aged 41–60 years are categorized as middle-aged adults. The predominance of respondents in the young adult group indicates that individuals at this stage are typically in their most productive years, with relatively good physical condition and active engagement in occupational and social activities (Diandra & Paidi 2022). Furthermore, young adults are recognized as frequent users of digital communication technologies, including the WhatsApp application (Wuriyanti & Febriana, 2022).

Regarding gender distribution, most respondents were male, with 25 participants (67.6%), while female respondents accounted for 12 participants (32.4%). The higher proportion of male respondents is consistent with national labor force statistics, which indicate that male participation in the workforce remains higher than that of females. Consequently, male employees tend to constitute a larger proportion of the workforce in many occupational settings (Cinderella *et al.*, n.d.).

Educational attainment was also examined as one of the respondents' characteristics. Most participants held a bachelor's degree (26 respondents; 70.3%), followed by a diploma (D3) qualification (5 respondents; 13.5%), while postgraduate and senior high school qualifications were each reported by 3

respondents (8.1%). The predominance of respondents with higher education, particularly bachelor's degree holders, reflects the educational qualifications commonly required in the financial services sector, such as Pegadaian, where employees are expected to possess competencies in administration, analytical thinking, customer service, and operational management. As a result, individuals with bachelor's degrees were more prominently represented in this study.

Table 2. Distribution of Sleep Quality Before and After the Intervention

Variable	Pretest		Posttest	
	n	%	n	%
Good sleep category	2	5.4	3	8.1
Poor sleep category	35	94.6	34	91.9

As shown in Table 2, before receiving the nutrition education intervention through the *Healthy Life Education Class* program, most respondents had poor sleep quality (35 respondents; 94.6%), while only 2 respondents (5.4%) had good sleep quality. Following the intervention, the number of respondents with good sleep quality increased slightly to 3 (8.1%), whereas those with poor sleep quality decreased to 34 (91.9%). These findings indicate only a modest improvement in sleep quality after the WhatsApp-based educational intervention.

The limited improvement is consistent with previous studies employing different intervention methods, which also reported a high prevalence of poor sleep quality among the productive-age population. Poor sleep quality has been associated with multiple factors, including lifestyle, workload, stress levels, and excessive use of digital media. Although a slight improvement in sleep quality was observed after the intervention, sleep disturbances remain common among working-age adults, indicating that continuous health promotion efforts, including nutrition education and healthy lifestyle practices, are still needed to improve sleep quality gradually (Regresi & Ordinal, 2024).

Sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI), which classifies respondents into good and poor sleep quality categories based on the total score. The findings showed that the majority of respondents continued to experience poor sleep quality, suggesting that sleep disturbance remains an important health concern. Poor sleep quality may increase stress hormone levels, such as cortisol, which can disrupt metabolic processes, including blood glucose regulation and energy utilization during rest (Suryani *et al.*, 2023).

Table 3. Distribution of Perceived Stress Levels Before and After the Intervention

Variable	Pretest		Posttest	
	n	%	n	%
Low	16	43.2	20	54.1
Moderate	20	54.1	17	45.9
High	1	2.7	0	0

As shown in Table 3, before the intervention, most respondents experienced moderate work stress (20 respondents; 54.1%), followed by low stress (16 respondents; 43.2%) and high stress (1 respondent; 2.7%). After the nutrition education intervention, the proportion of respondents experiencing low stress increased to 20 respondents (54.1%), while moderate stress decreased to 17 respondents (45.9%). No respondents remained in the high stress category after the intervention.

These findings indicate a shift in the distribution of work stress following the intervention; however, the paired t-test showed no statistically significant difference in stress levels before and after the intervention ($p = 0.219$).

Work-related stress is commonly associated with high job demands and responsibilities. Its severity is influenced by various factors, including workload, job roles, interpersonal relationships among employees, and organizational structure (Solon *et al.*, 2021). Although work stress levels decreased after the intervention, a considerable proportion of respondents remained in the moderate stress category, which may be explained by individual differences in coping abilities and personal characteristics related to stress management (Maghfirah, 2023).

Work stress was assessed using the Perceived Stress Scale (PSS), a validated psychological instrument that measures individuals' perceptions of stress over the previous month, including feelings of being overwhelmed, difficulty controlling situations, and the ability to cope with life and work pressures. The post-intervention findings suggest an improvement in respondents' awareness and management of

work-related stress (Lailatul Muna & Kurniawati, 2023).

Table 4. Differences in Sleep Quality Before and After the Intervention

Sleep Quality	Category	Intervention (n = 37)	r	p-value	Δ
Before (Pretest)	Mean ± SD	8,68 ± 2,056	0.695	0.000*	0.98
After (Posttest)	Mean ± SD	7,70 ± 1,681			

The normality test indicated that the pretest data ($p = 0.024$) and posttest data ($p = 0.053$) were normally distributed, as supported by histograms approximating a bell-shaped curve and skewness values within the acceptable range of -2 to $+2$ (Isnaini *et al.*, 2025).

The mean sleep quality score decreased from 8.68 ± 2.056 before the intervention to 7.70 ± 1.681 after the intervention. The mean difference ($\Delta = 0.98$) indicates an improvement in sleep quality, as lower Pittsburgh Sleep Quality Index (PSQI) scores reflect better sleep quality. The paired samples correlation analysis demonstrated a significant association between pretest and posttest scores ($r = 0.695$, $p < 0.05$), while the paired t-test revealed a statistically significant difference between the two measurements ($p < 0.05$) [65]. These findings suggest that nutrition education delivered through the WhatsApp-based *Healthy Life Education Class* significantly improved the sleep quality of employees at PT Pegadaian Regional Office IX. However, because this study employed a one-group pretest–posttest design without a control group, the influence of external factors on the observed improvement cannot be completely ruled out.

The effectiveness of the WhatsApp-based *Healthy Life Education Class* may be attributed to its interactive educational approach. The program combined synchronous WhatsApp lectures, during which participants received educational materials and interacted with facilitators in real time through chat, with asynchronous learning activities using educational videos and posters (Suryani *et al.*, 2023). Participants were also encouraged to ask questions and share their experiences related to sleep quality, fostering discussion, increasing knowledge, and promoting positive behavioral changes. The combination of interactive learning methods, educational media, and participant engagement likely contributed to the observed improvement in sleep quality (Nurfitrani & Kurniasari, 2023).

Table 5. Differences in Work Stress Levels Before and After the Intervention

Stress Quality	Category	Intervensi (n = 37)	r	p-value	Δ
Before (Pretest)	Mean ± SD	14,62 ± 4,238	0.410	0.219	1.08
After (Posttest)	Mean ± SD	13,54 ± 5,310			

The normality test showed that both the pretest and posttest data were normally distributed ($p > 0.05$). Therefore, the data were analyzed using a paired t-test, as the measurements were obtained from the same respondents before and after the intervention.

The mean work stress score, measured using the PSS-10 questionnaire, was 14.62 ± 4.238 before the nutrition education intervention and decreased to 13.54 ± 5.310 after the intervention. The mean difference ($\Delta = 1.08$) indicates a reduction in respondents' work stress scores following the intervention. However, the paired t-test revealed no statistically significant difference in work stress scores before and after the intervention ($p = 0.219$; $p > 0.05$), indicating that the null hypothesis could not be rejected (Solon *et al.* 2021). These findings suggest that the WhatsApp-based *Healthy Life Education Class* nutrition education program did not produce a significant effect on reducing respondents' work stress levels.

The lack of a significant effect may be explained by the multifactorial and situational nature of work-related stress (Maghfirah 2023), the indirect delivery of the educational intervention, and individual differences in coping strategies and responses to stress management. Previous studies have suggested that reducing work stress generally requires more intensive and interactive approaches, such as practical training sessions, individual counseling, or interventions involving direct social support (Solon *et al.*, 2021).

4. CONCLUSION

Based on the findings of this study, it can be concluded that the study involved 37 employees of PT Pegadaian Regional Office IX. Most respondents were aged 25–40 years, male, and held a bachelor's degree. Before the intervention, the majority of respondents had poor sleep quality (94.6%), which decreased to 91.9% after the WhatsApp-based *Healthy Life Education Class* intervention, while the proportion with good sleep quality increased from 5.4% to 8.1%. Regarding work stress, moderate stress was the most common category before the intervention (54.1%), while after the intervention, mild stress became the predominant category (54.1%).

Statistical analysis showed a significant difference in sleep quality scores before and after the intervention ($p < 0.05$), indicating an improvement in sleep quality. In contrast, although work stress scores decreased after the intervention, the difference was not statistically significant ($p > 0.05$). Thus, the WhatsApp-based Healthy Life Education Class was associated with improved sleep quality, but no statistically significant change in work stress was observed among the participating employees.

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