Research Article

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Occupational Stress among Rural Manufacturing Workers: The Role of Work Fatigue and Job Demands

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Abstract

Background: The manufacturing sector plays a crucial role in driving economic growth; however, it often exposes workers to occupational stress that impacts their health and productivity. **Objective:** This study aimed to examine factors associated with occupational stress among manufacturing workers in rural Indonesia. **Methods:** A quantitative cross-sectional study was conducted among 55 employees in the dry production division of PT X using total sampling. Work stress was assessed using a questionnaire developed in accordance with Indonesian occupational safety and health requirements, while job demands were assessed using the Copenhagen Psychosocial Questionnaire III (COPSOQ III) - Demands at Work (short version). Work fatigue was assessed using the L77 Lakassidaya Reaction Timer. Data were analyzed using descriptive and bivariate analyses, followed by multiple linear regression. **Results:** Most participants were aged 35 years or older (76.4%), male (72.7%), high school graduates (72.7%), and had more than 10 years of work experience (65.5%). Bivariate analysis revealed that education, job demands, and work fatigue were significantly associated with occupational stress ($p < 0.05$). In the multivariable linear regression analysis, only work fatigue remained independently associated with occupational stress ($B = 0.056$, standardized $\beta = 0.364$, $p = 0.005$), whereas job demands were no longer statistically significant after adjustment ($p = 0.066$). **Conclusion:** Work fatigue was the only independent factor associated with occupational stress among manufacturing workers after adjustment for other variables. These findings suggest that workplace strategies aimed at reducing work fatigue may contribute to better occupational mental health. However, longitudinal studies are needed to clarify the temporal relationship between work fatigue and occupational stress.

Keywords: Cross-Sectional Study, Occupational Health, Psychosocial Risk, Rural Industry, Workplace Mental Health

What was Known

- Manufacturing work is associated with elevated occupational stress and reduced productivity.
- High job demands and work fatigue have been associated with occupational stress in manufacturing workers.
- Rural manufacturing workers may experience greater occupational stress because of limited workplace resources and support.

What's New and Next

- Work fatigue was independently associated with occupational stress among rural manufacturing workers after adjustment for other factors.
- Workplace interventions should prioritize fatigue reduction alongside stress management to promote workers' mental health.
- Future longitudinal and intervention studies are needed to confirm causal relationships and evaluate effective strategies to reduce work fatigue in rural manufacturing settings.

Introduction

The manufacturing sector plays a critical role in economic growth by generating employment, fostering innovation, and supporting industrial competitiveness, particularly in developing countries [1,2]. In Indonesia, the manufacturing sector contributed approximately 17.18% to the Gross Domestic Product (GDP) in the third quarter of 2024, up from 16.70% in the previous quarter [3]. However, the nature of work in this sector, such as high workloads, deadline pressures, and risky working environments, often poses various challenges for workers, ultimately leading to job stress [4].

There were 875,000 cases of work-related stress, depression, and anxiety, resulting in the loss of 17.1 million workdays in 2023 [5]. Data from the Gallup State of the Global Workplace 2024 shows that 16% of employees in Indonesia experience daily work stress [6]. Research in the Yogyakarta Province indicates varying levels of job stress among workers: 15.3% experience high stress, 72.7% moderate stress, and 12% low stress [7].

Job stress affects both the physical and mental health of employees, negatively impacting productivity [8]. Several factors influence job stress, such as age, gender, educational level, sleep duration, tenure, high job demands, and work fatigue [9–11]. Both individual and occupational factors contribute to job stress. Age and gender can affect stress levels due to physiological changes and social responsibilities. Additionally, higher educational attainment is often associated with more

effective coping mechanisms [12]. Factors like inadequate sleep and prolonged tenure in the same position can increase psychological strain, especially in unsupportive work environments. Among occupational factors, high job demands such as long working hours and challenging targets are consistently recognized as significant contributors to work-related stress [13].

PT X is a manufacturing company specializing in leather processing, focusing on producing garment materials from sheepskin and goatskin, as well as shoe uppers and other leather-based products. As part of the manufacturing industry, PT X transforms raw materials into high-value finished goods through multiple stages of intensive labor and technical processes. Within this production chain, the dry production division, which employs the most workers, often experiences considerable occupational stress. This stress stems from physically demanding tasks, elevated production pressure, and exposure to extreme working conditions. The resulting consequences include increased absenteeism, declining product quality, and a higher frequency of minor accidents due to diminished worker concentration. Furthermore, the company's rural location underscores the urgency of this issue. Rural manufacturing sites in Indonesia typically face distinct challenges, including limited access to occupational health services, inadequate implementation of safety regulations, and a workforce predominantly composed of individuals with lower educational backgrounds. These contextual factors heighten vulnerability to work-related stress, as employees may lack sufficient knowledge, skills, or coping mechanisms to effectively manage high job demands and fatigue.

From a theoretical perspective, this study draws on the Job Demands–Resources (JD–R) model. The Job Demand–Resources (JD-R) model is an effective theoretical framework for understanding the dynamics of occupational stress and fatigue, particularly in the manufacturing sector. According to this model, stress arises when job demands exceed the resources available to the worker, resulting in adverse outcomes such as fatigue, dissatisfaction, and decreased productivity [14]. In rural manufacturing environments, job demands tend to be more pronounced due to limited resources, heavier workloads, and challenging working conditions [15]. Workers in under-resourced rural areas are particularly vulnerable to burnout and fatigue when job demands are high and support systems are inadequate. A large cross-sectional study involving 13,867 industrial workers in China highlights a significant concern regarding occupational stress. The findings reveal that manufacturing workers experience the highest prevalence of occupational stress at 10.3%, compared with 3.3% in

the electricity, gas, and water supply sectors and 5.8% in transportation. This data indicates that the manufacturing industry is among those at greatest risk for occupational stress [16].

Previous studies have shown that job demands, workload, work fatigue, and social support are associated with work-related stress among Indonesian workers. There is a significant relationship between workload and work fatigue on work-related stress among production workers [17], and the same is true among brick factory workers [18]. On the other hand, in the rural food processing industry, the work environment is a significant factor that can reduce fatigue and work burnout, thereby lowering work-related stress [19]. Not only that, but social support has also been found to reduce workplace stress as part of adaptation and interaction with the environment, which is linked to the development of mental balance and psychological satisfaction [20], although the same was not found among female textile workers [21]. These findings indicate that job demands and work fatigue have been studied separately and in various work environments. Meanwhile, empirical evidence on manufacturing workers in rural Indonesia remains limited. Therefore, this study aims to examine the associations between educational level, job demands, work fatigue, and occupational stress among manufacturing workers in rural Indonesia. Based on the identified research gap, this study addresses the following research question: To what extent are job demands and work fatigue associated with occupational stress among manufacturing workers in rural Indonesia?

Materials and Methods

This study employed a quantitative analytical survey using a cross-sectional design to examine occupational factors associated with work stress among manufacturing workers. A cross-sectional approach was selected because it enables the assessment of work stress and its associated factors at a single point in time. The study was conducted between January and February 2024 at PT X, a leather manufacturing company located in Piyungan District, Bantul Regency, Special Region of Yogyakarta, Indonesia. PT X was selected because it represents a labor-intensive manufacturing industry in a rural setting, where workers are exposed to substantial physical and psychosocial job demands that may influence work stress. The study population comprised workers in the dry production division.

The dry production division was purposively selected because it represents a relatively homogeneous production system comprising the setter, hanging, milling, stacking, polishing, toggling, and sorting workstations. Although each workstation performs different production tasks, workers operate under comparable production targets, organizational systems, work schedules, supervisory

practices, and physical work environments. Restricting the study to this division minimized variability in production processes and occupational exposures, thereby improving the study's internal validity. Workers from the wet production division were excluded because they engage in substantially different production processes with distinct work characteristics, environmental conditions, chemical exposures, and occupational hazards. Including workers from both production divisions could have introduced considerable heterogeneity unrelated to the study objectives, potentially obscuring the associations between occupational factors and work stress.

A total sampling technique was employed to recruit all eligible workers from the dry production division. Eligible participants were active production workers who had been employed in the division for at least six months and agreed to participate in the study. Workers who were absent during the data collection period or were unable to complete the study procedures were excluded. Consequently, all 55 eligible workers were included in the study.

The dependent variable was work stress. The independent variables included age, gender, educational level, work tenure, sleep duration, job demands, and work fatigue. These variables were selected based on the study objective, which focused on occupational determinants of work stress. Accordingly, only occupational and individual work-related characteristics were included, whereas non-occupational factors, such as personality traits, family-related factors, financial problems, socioeconomic conditions, and pre-existing psychological disorders, were beyond the scope of this study.

Prior to data collection, all questionnaire-based instruments underwent validity and reliability testing. Item validity was evaluated using Pearson's product-moment correlation, whereas internal consistency reliability was assessed using Cronbach's alpha coefficient. The work stress questionnaire demonstrated a Cronbach's alpha coefficient of 0.866, while the job demands questionnaire demonstrated a Cronbach's alpha coefficient of 0.841, indicating satisfactory internal consistency for both instruments.

Work stress refers to the extent to which workers in the dry production department at PT X experience psychological pressure or tension in certain situations. Work stress was measured using a questionnaire developed based on the Regulation of the Minister of Manpower of the Republic of Indonesia Number 5 of 2018 [22], with modifications to suit the study context. Following content validation and empirical item analysis, 24 valid items were retained from the initial 30-item questionnaire. Responses were recorded using a five-point Likert scale ranging from 1 (strongly

disagree) to 4 (strongly agree). Negatively worded items were reverse-scored before analysis. Item scores were summed to obtain a total work stress score, with higher scores indicating greater work stress.

Job demands refer to the intensity of physical activity and job demands faced by workers in the dry production department at PT X. Job demands were assessed using the Demands at Work–Short Version of the Copenhagen Psychosocial Questionnaire III (COPSOQ III) [23], consisting of 11 items. Responses were recorded using the same five-point Likert scale, and item scores were summed to generate a total job demands score, with higher scores indicating greater perceived job demands.

Work fatigue was operationally defined as a condition in which a person experiences physical and mental decline due to excessive work demands on production workers at PT X. Work fatigue was measured objectively using the L77 Lakassidaya Reaction Timer (SLS-L77, Indonesia), which assesses psychomotor performance by measuring reaction time to visual or auditory stimuli in milliseconds. Longer reaction times indicate higher levels of work fatigue. The instrument was calibrated before data collection and has been widely used in occupational health and ergonomics research in Indonesia. Previous studies have reported high reliability ($r = 0.90$) [24,25]. Fatigue measurements were performed between 1:00 PM and 3:00 PM, which corresponds to the period when fatigue generally peaks after several hours of continuous work. Fatigue levels were classified according to the standard classification of the L77 Lakassidaya Reaction Timer.

Information on age, gender, educational level, work tenure, and sleep duration was collected using a structured demographic questionnaire. Meanwhile, to present the respondents' characteristics, work stress was categorized as stressed (score $\geq$58) or normal (score <58), and job demand was categorized as high (mean score >34.37) or low (mean score <34.27). However, in the Spearman correlation and linear regression analyses, each variable was analyzed using continuous numerical scores rather than categories. Then, work fatigue is categorized by reaction time: normal (150–240 milliseconds), mild (>240–<410 milliseconds), moderate (410–580 milliseconds), and severe (>580 milliseconds).

Data were analyzed using univariate, bivariate, and multivariable analyses. Descriptive statistics were used to summarize participants' characteristics and study variables. Categorical variables were presented as frequencies and percentages, whereas continuous variables were summarized using appropriate measures of central tendency and dispersion. The normality of

continuous variables was assessed using the Kolmogorov–Smirnov test. Because the total work stress score and most continuous variables were not normally distributed ($p < 0.05$), non-parametric tests were applied in the bivariate analysis. Associations between continuous variables (age, work tenure, sleep duration, job demands, work fatigue, and work stress) were examined using Spearman's rank correlation test. Differences in work stress scores between gender groups were analyzed using the Mann–Whitney U test, whereas differences across educational levels were examined using the Kruskal–Wallis test. Variables with a p-value < 0.25 in the bivariate analysis, together with variables considered theoretically relevant, were included in the multiple linear regression model. In the multivariable analysis, the total work stress score was treated as a continuous dependent variable. Continuous independent variables were entered directly into the model, whereas categorical variables (gender and educational level) were entered using dummy coding.

Results

The majority of workers at PT X were older adults (≥ 35 years), comprising 42 individuals (76.4%) of this age group. Most workers were male, accounting for 40 individuals (72.7%). Additionally, most workers had a high school education as their highest level of education, with 40 individuals (72.7%) holding this level. Regarding work tenure, 36 individuals (65.5%) had been employed for more than 10 years. Regarding sleep duration, the majority of workers (54.5%) had sufficient sleep (≥7 hours) (Table 1).

Table 1. Characteristic of Respondents

Variable	n	%
Age (Years)		
≥ 35 (older worker age group)	42	76.4
< 35 (young worker age group)	13	23.6
Gender		
Male	40	72.7
Female	15	27.3
Education		
Elementary School	3	5.5
Junior High School	7	12.7
High School	40	72.7
College	5	9.1
Work Tenure		
≤10 Years	19	34.5
>10 Years	36	65.5
Sleep Duration		
<7 hours	25	45.5
≥7 hours	30	54.5
Job Demands		
High	30	54.5
Low	25	45.5
Work Fatigue		
Moderate	1	1.8
Mild	23	41.8
Normal	31	56.4
Work Stress		
Stress	29	52.7
Normal	26	47.3

S.D.=standard deviation

As for job demands, 30 workers (54.5%) were categorized as having high demands. Regarding work fatigue, most workers were in the normal category (31 individuals, 56.4%), followed by the mild category (23 individuals, 41.8%). Regarding work stress, the majority of respondents (29, 52.7%) reported experiencing it.

Table 2. Factors related to work stress in PT X

Variable	Correlation coefficient (Spearman's rho)	p-value
Age	0.1	0.469
Work tenure	0.132	0.336
Sleep duration	-0.114	0.406
Job demands	-0.292	0.031*
Work fatigue	0.327	0.015*

Based on the bivariate analysis, only job demands and work fatigue were significantly associated with work stress. Job demands showed a significant negative correlation with work stress ($r = -0.292$, $p = 0.031$), whereas work fatigue was positively correlated with work stress ($r = 0.327$, $p = 0.015$). Age ($r = 0.100$, $p = 0.469$), work tenure ($r = 0.132$, $p = 0.336$), and sleep duration ($r = -0.114$, $p = 0.406$) were not significantly associated with work stress (Table 2).

Table 3. Bivariate Analysis of Categorical Variables Associated with Work Stress

Variable	Category	n	Mean Rank	Test Statistic	p-value
Gender	Male	40	26.96	245.5	0.302
	Female	15	30.77		
Educational level	Elementary school	3	41.33	3.995	0.262
	Junior high school	7	24.07		
	Senior high school	40	26.66		
	College/University	5	36.2		

Furthermore, no significant differences in work stress scores were observed according to gender ($p = 0.302$) or educational level ($p = 0.262$) (Table 3).

Table 4. Classical Assumption Tests for Multiple Linear Regression

Assumption	Test	Result	Interpretation
Normality of residuals	Kolmogorov–Smirnov	Statistic = 0.118; p = 0.055	Residuals were normally distributed (p > 0.05).
Multicollinearity	Tolerance; VIF	Job demands: Tolerance = 0.997, VIF = 1.003Work fatigue: Tolerance = 0.997, VIF = 1.003	No evidence of multicollinearity (Tolerance > 0.10; VIF < 10).
Heteroscedasticity	Spearman correlation	Job demands: p = 0.988Work fatigue: p = 0.819	No evidence of heteroscedasticity (p > 0.05).

Prior to multiple linear regression analysis, the classical assumptions were evaluated. The Kolmogorov–Smirnov test showed that the regression residuals were normally distributed (p = 0.055). Multicollinearity diagnostics indicated no multicollinearity, as all tolerance values exceeded 0.10 and variance inflation factor (VIF) values were close to 1. Furthermore, the Spearman correlation test between the absolute residuals and the independent variables showed no significant correlations (all p > 0.05), indicating the absence of heteroscedasticity. Therefore, the data satisfied the assumptions required for multiple linear regression analysis.

Table 5. Multivariate analysis (multiple linear regression test)

Independent Variable	B (Regression Coefficient)	Std. Error	Beta (β)	t	p-value
Job demands	-0.525	0.279	-0.234	-1.879	0.066
Work fatigue	0.056	0.019	0.364	2.924	0.005*

**Significant p-value<0.05*

Multiple linear regression analysis was performed to identify independent factors associated with work stress. After adjustment for the other independent variable, work fatigue remained significantly associated with work stress (β = 0.364, p = 0.005). Specifically, each one-unit increase in the work fatigue score was associated with a 0.056-unit increase in the work stress score. In contrast, job demands weren't significantly associated with work stress after adjustment for work

fatigue (β = —0.234, p = 0.066). These findings indicate that work fatigue was the only factor independently associated with occupational stress in the final regression model.

Table 6. Final model of multiple linear regression test

	R	R-Square	Adjusted R-Square	F	Sig. F (p-value)
Results	0.443	0.196	0.165	6.343	0.003*

The multiple linear regression model was statistically significant (F = 6.343, p = 0.003), indicating that job demands and work fatigue collectively contributed to explaining variations in work stress. The model demonstrated a moderate correlation between the predictors and work stress (R = 0.443) and explained 19.6% of the variance in work stress (R^2 = 0.196). After adjusting for the number of predictors in the model, the adjusted R^2 was 0.165, indicating that approximately 16.5% of the variability in work stress was explained by job demands and work fatigue, with the remaining variation attributable to other factors not included in the model.

Discussion

The present study identified work fatigue as the only independent factor associated with work stress among workers in the dry production division of a leather manufacturing company. Although both job demands and work fatigue were significantly associated with work stress in the bivariate analysis, only work fatigue remained statistically significant after adjustment in the multiple linear regression model. Furthermore, the final regression model explained 16.5% of the variance in work stress, indicating that occupational stress is a multifactorial outcome influenced by psychosocial, organizational, and individual factors beyond those examined in this study.

Work fatigue remained independently associated with occupational stress after multivariable adjustment, suggesting that workers experiencing greater fatigue also tended to report higher levels of occupational stress. This finding is consistent with prior studies among industrial workers showing that fatigue is associated with psychological distress, emotional exhaustion, impaired work ability, and reduced productivity [26]. According to the Job Demands–Resources (JD–R) model, prolonged exposure to demanding work without adequate recovery initiates the health impairment process, progressively depleting workers' physical and psychological resources and increasing susceptibility to occupational stress [14]. Manufacturing work typically involves repetitive tasks, sustained physical effort, production pressure, and continuous attention, all of which contribute to fatigue accumulation

[27–29]. Mental fatigue arises primarily from prolonged cognitive and psychological demands, whereas physical fatigue is mainly driven by repetitive muscular activity and biomechanical load [30].

Unlike work fatigue, job demands showed a significant association with work stress in the bivariate analysis but were no longer independently associated with work stress after adjustment. This finding differs from the conventional prediction of the JD–R model, which proposes that excessive job demands increase occupational stress when they exceed available resources [14]. The absence of an independent association between job demands and work stress may also be explained by the relatively homogeneous characteristics of the study population. All participants worked within the same production division under comparable production targets, supervisory systems, work schedules, and physical environments, potentially limiting the variability in perceived job demands. Another possible explanation is the healthy worker survivor effect, whereby workers who remain employed in physically demanding jobs are more likely to have adapted to occupational demands than those who leave employment [31]. Consequently, workers who continue working may perceive demanding work conditions as more manageable, attenuating the observed relationship between job demands and work stress. However, because this study employed a cross-sectional design, this interpretation remains speculative and should be confirmed through prospective longitudinal studies.

None of the demographic characteristics, including age, work tenure, sleep duration, gender, and educational level, were significantly associated with work stress. These findings suggest that work stress in the present study was more strongly related to occupational conditions than to individual demographic characteristics. This interpretation is supported by previous research showing that psychosocial work factors, such as job demands, effort, social support, reward, and organizational resources, explain occupational stress more consistently than demographic variables after adjustment for potential confounders [32]. Within the relatively homogeneous work environment of the present study, workers were exposed to similar production targets, supervisory systems, and physical working conditions, which may have reduced the influence of demographic differences on perceived work stress. In addition, the absence of an association between educational level and work stress may partly reflect the limited educational variability of the study population, as most participants had completed senior high school.

An important observation in the present study is that work fatigue remained statistically significant after multivariable adjustment, whereas job demands did not. This pattern suggests that fatigue may represent a more immediate occupational determinant of work stress than perceived job

demands alone. Although mediation analysis was not performed, it is plausible that prolonged job demands contribute to the accumulation of physical and mental fatigue, which subsequently increases workers' vulnerability to occupational stress. This interpretation is conceptually consistent with the health impairment process described in the JD–R model, whereby sustained job demands progressively exhaust workers' energetic resources before psychological strain becomes evident [32].

Although the final regression model was statistically significant, it explained only 16.5% of the variance in work stress. This relatively modest explanatory power is consistent with previous occupational stress research, as psychosocial outcomes are influenced by multiple organizational, interpersonal, and individual factors that extend beyond work fatigue and job demands. The present findings also contribute to the occupational health literature by suggesting that objectively measured work fatigue may provide additional value beyond perceived job demands in identifying workers at risk of occupational stress. Although further studies are needed to confirm this observation, integrating objective fatigue assessment with psychosocial risk evaluation may strengthen occupational health surveillance and support more targeted workplace interventions. Research on production workers in coconut flour manufacturing reports that, the increasingly heavy workload tends to lead to work fatigue [33]. Consistent with this study's findings, job demands and work fatigue are correlated with work-related stress. Thus, increased job demands not only trigger work fatigue but also increase the workload through physical and psychological strain on production workers.

From a practical perspective, these findings emphasize the importance of implementing comprehensive fatigue management within occupational health programs. A notable strength of the present study is the use of the L77 Lakassidaya Reaction Timer to objectively assess work fatigue, whereas many previous occupational stress studies have relied primarily on subjective self-report questionnaires. Objective fatigue assessment may complement subjective measures by identifying physiological changes that are not always recognized by workers themselves [34]. Effective fatigue management should therefore extend beyond educational interventions and include ergonomic improvements, workload optimization, appropriate work–rest scheduling, fatigue risk management systems, and routine monitoring of workers' physical and psychological conditions [35]. Such interventions may help reduce fatigue accumulation, improve worker well-being, and ultimately decrease occupational stress while enhancing productivity and workplace safety.

This study has several limitations. First, the cross-sectional design precludes causal inference; therefore, the observed relationships should be interpreted as associations rather than causal effects.

Second, the study was conducted in a single leather manufacturing company and included only workers from the dry production division, which may limit the generalizability of the findings. Third, the regression model explained only a modest proportion of work stress variability, suggesting that important psychosocial and organizational determinants were not included. In addition, the number of predictors in the regression model was acceptable, but the small sample size may have affected the stability and precision of the coefficients. Caution is advised in interpreting the results, and further confirmation in larger studies is needed. Also, future longitudinal studies involving multiple manufacturing industries, larger sample sizes, and more comprehensive psychosocial assessments are warranted to validate these findings and provide a broader evaluation of the Job Demands–Resources framework in manufacturing settings.

Conclusion

This study found that work fatigue was the only independent factor associated with work stress among workers in the dry production division of a leather manufacturing company. Although job demands were significantly associated with work stress in the bivariate analysis, this association was no longer significant after adjustment for work fatigue, suggesting that work fatigue remained independently associated with work stress after adjustment for job demands. In contrast, age, gender, educational level, work tenure, and sleep duration were not significantly associated with work stress, indicating that occupational conditions may exert a greater influence on work stress than demographic characteristics within this relatively homogeneous work environment.

These findings highlight the importance of incorporating fatigue management into occupational health programs. Workplace interventions should prioritize evaluating workloads, implementing ergonomic improvements, establishing appropriate work–rest schedules, conducting routine fatigue monitoring, and assessing psychosocial risks to reduce fatigue and promote workers' psychological well-being. Because the final regression model explained only a modest proportion of the variance in work stress, future studies should incorporate additional psychosocial and organizational factors, such as job control, leadership quality, organizational justice, safety climate, supervisor support, coworker support, and work family conflict, to achieve a more comprehensive understanding of occupational stress. Longitudinal studies involving larger and more diverse manufacturing populations are also needed to clarify temporal relationships and further evaluate the mechanisms linking job demands, work fatigue, and work stress.

Ethical Approval Statement

This study obtained ethical approval from the Ethics Committee of Ahmad Dahlan University (KEP UAD) under Approval Number 012311294 for research involving human subjects. Before participants agreed to take part in the study, they were provided with a comprehensive overview of the research objectives, procedures, and their involvement. This explanation included the study's purpose, the types of data to be collected, the duration of their participation, and any potential risks or discomforts. Moreover, participants were asked to read and sign a written consent form that detailed all aspects of the study. This form included a statement confirming that participation is voluntary, assurance of confidentiality and anonymity, and information about their right to withdraw from the study at any time without penalty. Furthermore, to ensure participants fully understood the information provided, they were encouraged to ask questions. This dialogue was essential for clarifying any doubts they had about their involvement in the study.

Author Contributions

H.T. and R.Y.P. conceived the study, designed the methodology, and interpreted the findings. R.Y.P. collected the data and assisted with data management. H.T. supervised the research, verified the analytical methods, drafted and critically revised the manuscript, and served as the corresponding author. I.W.T. critically reviewed the manuscript and contributed important intellectual content. All authors read and approved the final manuscript prior to submission.

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Conflicts of Interest

There is no conflict of interest in this research.

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