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The Effect of Workload and Working Hours on Work-Life Balance: The Mediating Role of Work Stress Among Nurses

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Abstract

This study aims to examine the effects of workload and working hours on work-life balance, with work stress as a mediating variable among nurses at Dr. Ario Wirawan Pulmonary Hospital, Salatiga, Indonesia. Maintaining work-life balance is particularly challenging in the healthcare sector, where nurses face demanding responsibilities, irregular schedules, and considerable physical and psychological pressures. Excessive workloads and prolonged working hours may increase work stress and interfere with personal and family responsibilities, making it important to understand how these factors relate to nurses' work-life balance. This study employed a quantitative approach using survey data collected from 215 nurses through purposive sampling. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS. The findings indicate that workload and working hours have positive and significant effects on work stress. Working hours significantly influence work-life balance, whereas workload has no significant direct effect. Work stress has no significant effect on work-life balance and does not mediate the relationships between workload and work-life balance or between working hours and work-life balance. These findings suggest that working hours are more directly associated with nurses' work-life balance than workload and work stress. This study contributes to the human resource management literature by providing empirical evidence on the limited mediating role of work stress in the relationship between job demands and work-life balance among healthcare professionals. The findings also emphasize the importance of effective work scheduling and workload management in supporting nurses' well-being.

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INTRODUCTION

Healthcare professionals, particularly nurses, play a fundamental role in maintaining the quality, continuity, and safety of healthcare services. As frontline healthcare providers, nurses interact directly with patients while performing various clinical responsibilities under demanding working conditions. Consequently, nurses are frequently exposed to high workloads, long working hours, emotional demands, and considerable professional responsibilities, all of which may adversely affect their physical and psychological well-being (Putri & Suharto, 2023). When these job demands are not adequately managed, they may disrupt the balance between professional responsibilities and personal life, commonly referred to as work–life balance.

Work–life balance has become one of the most important issues in healthcare management because it directly influences nurses' well-being, job satisfaction, and quality of patient care. Recent evidence indicates that work–life imbalance among healthcare professionals is associated with lower quality of life, increased

occupational stress, emotional exhaustion, and decreased job satisfaction (Antolí-Jover et al., 2024). Conversely, nurses who successfully maintain an appropriate balance between their professional and personal lives tend to experience higher work engagement, greater job satisfaction, and improved service quality. A quantitative study by Ismail et al. (2025) demonstrated a positive relationship between work–life balance and nurses' job satisfaction in teaching hospitals, suggesting that achieving work–life balance benefits not only individual nurses but also healthcare organizations by improving service performance.

The issue of work–life balance has also attracted increasing attention in Indonesia. Evidence from a regional public hospital in Banjarmasin revealed that nurses experiencing high workloads frequently encountered difficulties in balancing professional responsibilities with their personal lives, particularly due to extensive documentation requirements and increasing clinical demands (Adam et al., 2025). These findings indicate that excessive job demands remain a significant challenge for Indonesian nurses and may ultimately reduce both employee well-being and organizational performance.

Among various organizational factors, workload has consistently been identified as one of the strongest determinants of nurses' work–life balance. Workload extends beyond the number of assigned tasks and includes task complexity, time pressure, emotional demands, and cognitive effort required to accomplish professional responsibilities. According to the Job Demands–Resources (JD–R) Theory, excessive job demands consume employees' physical and psychological resources, thereby increasing work-related stress and reducing overall well-being (Demerouti et al., 2001; Bakker & Demerouti, 2017). Previous studies have demonstrated that excessive workload contributes to fatigue, occupational stress, and declining work performance, ultimately making it more difficult for nurses to achieve a satisfactory work–life balance (Macphee et al., 2017; Griffiths et al., 2020).

Another important job demand is working hours. Unlike many other professions, nurses commonly work rotating shifts, night shifts, overtime, and extended working schedules to ensure continuous patient care. Long working hours have been associated with fatigue, impaired concentration, reduced recovery opportunities, and increased risks to patient safety (Wu et al., 2013). Furthermore, Jarrar et al. (2023) reported that prolonged working hours negatively influence nurses' perceptions of patient safety and teamwork effectiveness. Consequently, extended working hours may interfere with nurses' ability to fulfill family responsibilities and maintain a healthy balance between work and personal life.

Work stress has frequently been proposed as the psychological mechanism linking job demands with work–life balance. Lazarus & Folkman (1984) explained that stress emerges when individuals perceive that job demands exceed their available coping resources. In nursing practice, excessive workload and prolonged working hours create continuous psychological pressure that may lead to emotional exhaustion, burnout, and diminished capacity to separate work from personal life. Therefore, work stress may function as a mediating variable through which workload and working hours influence work–life balance.

Despite the growing body of literature examining workload, working hours, work stress, and work–life balance, several research gaps remain. First, previous studies have reported inconsistent findings regarding the direct effects of workload and working hours on work–life balance, as well as the mediating role of work stress. Some studies found that work stress significantly mediates these relationships, whereas others reported insignificant mediation effects. Second, most existing studies have been conducted in corporate organizations or general hospitals, while empirical evidence from Indonesian specialized public hospitals remains limited. Nurses working in pulmonary hospitals encounter unique occupational challenges because they provide continuous care for patients with chronic respiratory diseases requiring intensive monitoring, infection prevention, and prolonged treatment. These distinctive work characteristics may generate different patterns of workload, working hours, occupational stress, and work–life balance compared with other healthcare settings.

Therefore, this study aims to examine the effects of workload and working hours on work–life balance, with work stress serving as a mediating variable among nurses at dr. Ario Wirawan Pulmonary Hospital, Salatiga, Indonesia. Grounded in the Job Demands–Resources (JD–R) Theory and Boundary Theory, this study is expected to contribute to the human resource management literature by extending empirical evidence on work–life balance among nurses in specialized hospitals. It also examines whether work stress serves as a mechanism linking workload and working hours to nurses' work–life balance. Furthermore, the findings are expected to have practical implications for hospital management in developing effective workload management, working hour arrangements, and employee well-being policies.

HYPOTHESIS DEVELOPMENT

Workload is one of the job demands that may influence employees' psychological conditions. According to the Job Demands–

Resources (JD–R) theory, high job demands, such as excessive workload, require sustained physical and psychological effort, which may deplete individual energy and consequently trigger psychological strain and work stress (Bakker & Demerouti, 2017). In hospital settings, nurses often face high job demands, including a large number of patients, complex medical procedures, and time pressure in providing healthcare services. When these demands exceed an individual's ability to cope, they may contribute to increased levels of work stress.

Previous empirical studies have also demonstrated a positive relationship between workload and work stress. Kokoroko & Sanda (2019) found that higher job demands significantly increased the level of stress experienced by nurses. Similarly, Yu et al. (2021) reported that excessive workload could trigger psychological strain and subsequently affect employees' well-being. Based on these theoretical and empirical arguments, this study argues that higher workload is likely to increase work stress among nurses. Thus, the proposed hypothesis is as follows:

H1: Workload has a positive effect on work stress.

Working hours are an important factor that may influence employees' psychological conditions. Long or irregular working hours can contribute to physical and mental fatigue, which may subsequently increase work stress. According to the Job Demands–Resources (JD–R) theory, extended working hours can be considered a form of job demand that may increase psychological strain when adequate recovery time is unavailable (Bakker & Demerouti, 2017). In healthcare settings, nurses frequently work under shift systems involving extended working hours and overtime, which may increase their risk of experiencing work stress.

Previous empirical studies have demonstrated a positive relationship between working hours and work stress. Gray et al. (2019) found that long working hours and irregular work schedules were positively associated with employees' levels of work stress. Similarly, Cho et al. (2015) reported that longer working hours could increase fatigue and psychological strain among healthcare workers. Based on these theoretical and empirical arguments, this study argues that longer working hours are likely to increase work stress among nurses. Thus, the proposed hypothesis is as follows:

H2: Working hours have a positive effect on work stress.

Work-life balance refers to an individual's ability to effectively manage and maintain harmony between work and personal life roles. High workload may interfere with an individual's ability to allocate sufficient time and energy to personal and family activities. From the perspective of the Job Demands–Resources (JD–R) theory, excessive job demands can deplete individual resources and reduce the capacity to fulfill roles outside the workplace (Bakker & Demerouti, 2017). As workload increases, individuals may devote more time and energy to work, leaving fewer resources available for personal and family needs.

Previous research has demonstrated a negative relationship between workload and work-life balance. Haar et al. (2014) found that higher workload was associated with lower work-life balance, indicating that excessive work demands can make it more difficult for individuals to maintain balance between their work and personal lives. Based on these theoretical and empirical arguments, this study argues that higher workload is likely to reduce nurses' work-life balance. Thus, the proposed hypothesis is as follows:

H3: Workload has a negative effect on work-life balance.

Working hours are an important factor influencing an individual's ability to maintain work-life balance. Long working hours may reduce the time available for family activities, recreation, and personal needs, thereby making it more difficult for individuals to fulfill their responsibilities across work and personal domains. From the perspective of the Job Demands–Resources (JD–R) theory, extended working hours represent a form of job demand that consumes individuals' time and energy and may limit their ability to allocate sufficient resources to non-work activities (Bakker & Demerouti, 2017).

Previous research has demonstrated a negative relationship between working hours and work-life balance. Hsu et al. (2019) found that longer working hours were negatively associated with work-life balance, indicating that individuals who work for longer periods tend to experience greater difficulty in managing their work and personal lives. Similarly, Pawlicka et al. (2020) emphasized that extended working hours can contribute to work-family conflict, which may ultimately reduce individuals' work-life balance. Based on these theoretical and empirical arguments, this study argues that longer working hours are likely to reduce nurses' work-life balance. Thus, the proposed hypothesis is as follows:

H4: Working hours have a negative effect on work-life balance.

Work stress refers to a psychological condition that arises when individuals perceive that work demands exceed their ability to cope with them. High levels of work stress may affect individuals' psychological well-being and their ability to effectively manage multiple roles in both work and personal life. In the context of healthcare, nurses are particularly exposed to demanding working conditions, including high levels of responsibility, emotional demands, irregular schedules, and prolonged working hours, which may increase their vulnerability to work stress.

Previous research has demonstrated a negative relationship between work stress and work-life balance. Prabhu et al. (2026) found that work stress negatively affects work-life balance, indicating that individuals experiencing higher levels of work stress tend to have greater difficulty managing their time and energy between work and personal life. Similarly, Natanael et al. (2023) highlighted that healthcare workers, including nurses, may experience work stress arising from demanding responsibilities, unpredictable work schedules, and emotional pressures, which can contribute to difficulties in maintaining balance between professional and personal life.

Based on these theoretical and empirical arguments, this study argues that higher levels of work stress are likely to reduce nurses' work-life balance. Thus, the proposed hypothesis is as follows:

H5: Work stress has a negative effect on work-life balance.

High workload may increase work stress, which can subsequently affect individuals' ability to maintain work-life balance. From the perspective of the Job Demands–Resources (JD–R) theory, excessive job demands require sustained physical and psychological effort, which may increase psychological strain and reduce individual well-being (Bakker & Demerouti, 2017). In the context of nursing, high workload may consume greater amounts of time and energy, leaving fewer resources for personal and family activities. Previous studies have shown that work stress may serve as a mechanism linking workload to work-life outcomes. Allen et al. (2000) found that work-related stress can contribute to conflict between work and family domains, while Kumar et al. (2021) found that work stress mediates the relationship between workload and work-life balance. Therefore, this study proposes that higher workload may reduce work-life balance indirectly through increased work stress.

H6: Work stress mediates the negative effect of workload on work-life balance.

Long working hours may increase psychological strain and reduce the time and energy available for personal and family activities, thereby making it more difficult for individuals to maintain work-life balance. Hsu et al. (2019) found that longer working hours were negatively associated with work-life balance, while Virtanen et al. (2020) reported that working beyond normal hours could reduce well-being and increase work-family conflict. From the perspective of the Job Demands–Resources (JD–R) theory, prolonged working hours represent a form of job demand that may increase psychological strain and work stress when adequate recovery opportunities are unavailable (Bakker & Demerouti, 2017). In this context, work stress may serve as a mechanism through which longer working hours negatively affect work-life balance. Kumar et al. (2021) also found that work stress can link job demands to work-life balance by interfering with individuals' ability to manage their work and personal roles. Therefore, this study proposes that longer working hours may reduce work-life balance indirectly through increased work stress.

H7: Work stress mediates the negative effect of working hours on work-life balance.

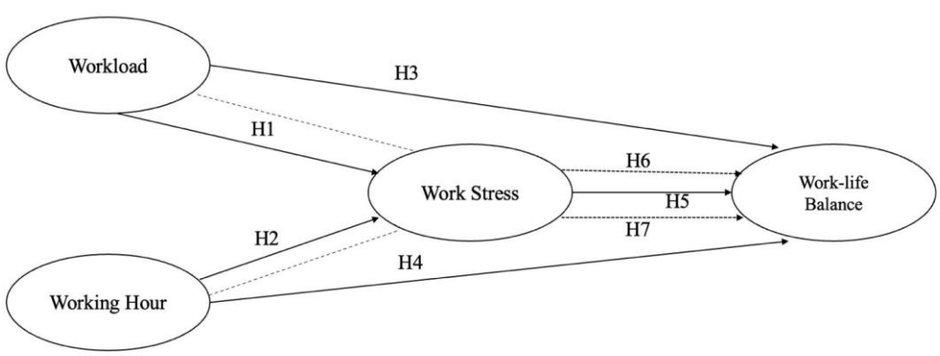


Figure 1. Research Model

METHOD

This study employed a quantitative research approach using an associative survey design to examine the relationships among workload, working hours, work stress, and work-life balance among nurses at dr. Ario Wirawan Pulmonary Hospital, Salatiga. The population consisted of nurses working at the hospital, while 215 respondents were selected using purposive sampling based on the criterion that respondents had worked at least one year at the hospital. The sample size was determined based on the multivariate analysis guideline of five to ten times the number of measurement indicators, with 42 indicators resulting in a minimum sample range of 210–420 respondents. Primary data were collected directly from respondents through a structured questionnaire distributed online using Google Forms. Each questionnaire item was measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

The study examined four constructs: workload, working hours, work stress, and work-life balance. Workload was measured using five dimensions adopted from Hart (2006), namely physical demand, mental demand, time pressure, effort, and performance. Working hours were measured using four dimensions adapted from Natanael et al. (2023), namely the impact of working time on personal life, health effects, working duration, and reduction of social and family time. Work stress was measured using six indicators adapted from Obrenovic et al. (2020), covering excessive workload, lack of clear work instructions, an unconducive work environment, a stressful work atmosphere, lack of coworker support, and concerns about future job security. Work-life balance was measured using indicators adapted from Johari et al. (2018), covering work interference with personal life, personal life interference with work, enhancement of personal life through work, and enhancement of work through personal life. The measurement items were subsequently contextualized to the nursing setting at dr. Ario Wirawan Pulmonary Hospital, Salatiga.

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS version 4.1.1.6. Data analysis involved the evaluation of the measurement model (outer model) through convergent validity, discriminant validity, and internal consistency reliability, followed by the evaluation of the structural model (inner model) using inner VIF, coefficient of determination (R^2), effect size (f^2), and predictive assessment. Hypotheses were tested using the bootstrapping procedure based on path coefficients, t-statistics, and p-values to assess both direct and indirect effects, including the mediating role of work stress. A hypothesis was considered statistically significant when the t-statistic exceeded 1.96 and the p-value was below 0.05.

RESULT AND DISCUSSION

Respondent Characteristic

The following information summarizes the profiles of 215 respondents. Of the 215 respondents, 150 were female, accounting for 69.77% of the total respondent population, while 65 respondents were male (30.23%). Regarding length of work, 59 respondents (27.44%) had worked for more than 20 years, the largest group. This was followed by respondents with 10–15 years of work experience (45 respondents, 20.93%) and those with 5–10 years of work experience (42 respondents, 19.53%). Based on work unit, the majority of respondents worked in the inpatient unit/ward, with 126 respondents (58.60%) of the total respondent population. Meanwhile, 26 respondents (12.09%) worked in the outpatient unit/polyclinic, 23 respondents (10.70%) worked in the intensive care unit (ICU), and 21 respondents (9.77%) worked in the operating room (OR). The remaining respondents were distributed across the emergency department (ED), with 18 respondents (8.37%), and administration/management, with 1 respondent (0.47%).

Measurement Items

The measurement items used in this study are presented in Table 1.

Table 1. Measurement Items

Construct	Code	Measurement Item
Workload	WL.1	My job often requires intense mental activity, such as deep thinking and making difficult decisions.
	WL.2	I have to remember a lot of information and details in my job, which sometimes affects my stress level.
	WL.3	My job requires strenuous physical activity, such as lifting or moving heavy objects.
	WL.4	I often feel physically exhausted after completing my work tasks because of tight time pressure.

	WL.5	I often feel rushed to complete my work tasks because of tight time pressure.
	WL.6	Sometimes, I have to work quickly to complete a task within the specified time limit.
	WL.7	I feel that I need to work hard, both mentally and physically, to achieve the performance targets expected in my job.
	WL.8	The effort I put into my work sometimes makes me feel tired and stressed.
Working Hour	WH.2	Working less than 7 hours per day on the morning and afternoon shifts gives me enough time to maintain a balance between work and personal life.
	WH.3	I work 7 hours per day on the morning and afternoon shifts.
	WH.4	Working 7 hours per day on the morning and afternoon shifts gives me enough time to maintain a balance between work and personal life.
	WH.6	Working more than 7 hours on the morning and afternoon shifts has reduced the time I have for my family and social life.
	WH.7	These working hours affect my quality of life outside of work.
	WH.9	I work less than 10 hours per day on the night shift.
	WH.10	Working less than 10 hours per day on the night shift gives me enough time to maintain a balance between work and personal life.
	WH.11	I work 10 hours per day on the night shift.
	WH.12	Working 10 hours per day on the night shift gives me enough time to maintain a balance between work and personal life.
	WH.13	I work more than 10 hours per day on the night shift
	WH.14	Working more than 10 hours on the night shift has reduced the time I have for my family and social life.
Work Stress	WS.1	I often feel stressed because I have many work tasks to complete within a short period of time.
	WS.2	Tight deadlines at work make me feel stressed and rushed to complete my tasks.
	WS.3	I feel frustrated when my work tasks are not clearly explained, and I have to figure out what needs to be done.
	WS.4	A lack of sufficient information or guidance about my tasks makes me feel confused and uncertain about how to complete them.
	WS.5	I often experience conflicts or disagreements with my coworkers that contribute to my feelings of stress.
	WS.6	The work environment where I work is often not conducive and creates tension among employees.
	WS.7	I feel that I do not receive enough support from my coworkers or supervisors in completing my work, which increases my stress level.
	WS.8	When I encounter difficulties at work, I often feel that there is no one I can rely on for help.
	WS.9	The threat of job termination or major organizational changes often makes me feel insecure and stressed.
	WS.10	I feel anxious about the future of my job because of uncertainty regarding organizational policies.
Work-life Balance	WLB.1	I feel that a heavy workload often requires me to sacrifice time with my family and for personal activities I enjoy.
	WLB.2	Excessive working hours make it difficult for me to maintain a balance between work and personal life.
	WLB.3	My personal problems often make it difficult for me to concentrate and focus on my work.
	WLB.4	I feel that stress from my personal life can interfere with my ability to perform well at work.
	WLB.5	My job has provided me with opportunities to improve my quality of life and fulfill my personal aspirations outside of work.

	WLB.6	I feel that a good work-life balance has helped me achieve a higher overall level of happiness.
	WLB.7	Positive experiences in my personal life, such as success in hobbies or good social relationships, often motivate me to work more effectively and productively.
	WLB.8	A good balance between work and personal life has had a positive impact on my performance at work.

Measurement Model Assessment

The measurement model was evaluated using Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess the validity and reliability of the measurement instruments. Convergent validity was assessed using outer loadings and Average Variance Extracted (AVE), while internal consistency reliability was evaluated using Cronbach's Alpha and Composite Reliability. The results of the measurement model assessment are presented in Table 2.

Table 2. Measurement Model Assessment

Construct	Code	Outer Loading	AVE	Composite Reliability	Cronbach's Alpha
Workload	WL.1	0.696	0.618	0.927	0.910
	WL.2	0.829			
	WL.3	0.816			
	WL.4	0.862			
	WL.5	0.854			
	WL.6	0.647			
	WL.7	0.689			
	WL.8	0.861			
Working Hour	WH.2	0.676	0.527	0.924	0.909
	WH.3	0.724			
	WH.4	0.825			
	WH.6	0.682			
	WH.7	0.667			
	WH.9	0.719			
	WH.10	0.784			
	WH.11	0.743			
	WH.12	0.741			
	WH.13	0.673			
	WH.14	0.731			
Work Stress	WS.1	0.791	0.739	0.966	0.961
	WS.2	0.772			
	WS.3	0.764			
	WS.4	0.768			
	WS.5	0.802			
	WS.6	0.778			
	WS.7	0.708			
	WS.8	0.651			
	WS.9	0.849			
	WS.10	0.851			
Work-life Balance	WLB.1	0.876	0.571	0.914	0.894
	WLB.2	0.830			

WLB.3	0.891
WLB.4	0.862
WLB.5	0.884
WLB.6	0.908
WLB.7	0.837
WLB.8	0.805

The results show that the outer loading values of the retained indicators ranged from 0.647 to 0.908. Most indicators exceeded the recommended threshold of 0.708, supporting the convergent validity of the measurement indicators. Several indicators had outer loading values between 0.40 and 0.70; however, these indicators were retained because the AVE and reliability values of their respective constructs remained above the recommended thresholds and the indicators were theoretically relevant to the constructs being measured. This consideration is consistent with the recommendation that indicators with outer loadings between 0.40 and 0.70 may be retained when their removal does not substantially improve the measurement model (Hair et al., 2021).

The AVE values ranged from 0.527 to 0.739, exceeding the minimum threshold of 0.50 for all constructs. These results indicate that each construct explains more than half of the variance of its indicators, thereby supporting convergent validity. In addition, Composite Reliability values ranged from 0.914 to 0.966, while Cronbach's Alpha values ranged from 0.894 to 0.961. All values exceeded 0.70, indicating satisfactory internal consistency reliability for all constructs. These findings confirm that the measurement model demonstrates adequate convergent validity and reliability and can therefore proceed to the assessment of discriminant validity.

Discriminant Validity Assessment

Discriminant validity was subsequently assessed using the Heterotrait–Monotrait ratio (HTMT). According to Hair et al. (2021), HTMT is a more sensitive approach for detecting discriminant validity issues than traditional methods such as the Fornell–Larcker criterion. A construct is considered to demonstrate adequate discriminant validity when the HTMT value is below 0.90. The results of the HTMT assessment are presented in Table 3.

The results show that all HTMT values between the constructs were below the recommended threshold of 0.90, ranging from 0.721 to 0.892. The highest HTMT value was observed between Working Hours and Work-Life Balance (0.892), while the lowest value was found between Work Stress and Work-Life Balance (0.721). Although the relationship between Working Hours and Work-Life Balance showed a relatively high HTMT value, it remained below the recommended threshold. These findings indicate that the constructs demonstrate adequate discriminant validity and are sufficiently distinct from one another.

Table 3. Discriminant Validity Assessment using Heterotrait–Monotrait Ratio (HTMT)

Construct	Workload	Working Hour	Work Stress	Work-life Balance
Workload	-			
Working Hour	0.776	-		
Work Stress	0.813	0.762	-	
Work-life Balance	0.766	0.892	0.721	-

The final PLS-SEM model after the measurement model assessment is presented in Figure 1. The figure illustrates the retained measurement indicators and their corresponding outer loading values for each construct, showing the final composition of the measurement model after the assessment process. It also presents the structural relationships among workload, working hours, work stress, and work-life balance, including the direct relationships between the exogenous and endogenous constructs. In addition, the model illustrates the role of work stress as a mediating construct linking workload and working hours to work-life balance.

Overall, Figure 1 provides a visual representation of the final research model used for subsequent structural model evaluation (collinearity, explanatory power, effect size, and predictive capability) and hypothesis testing.

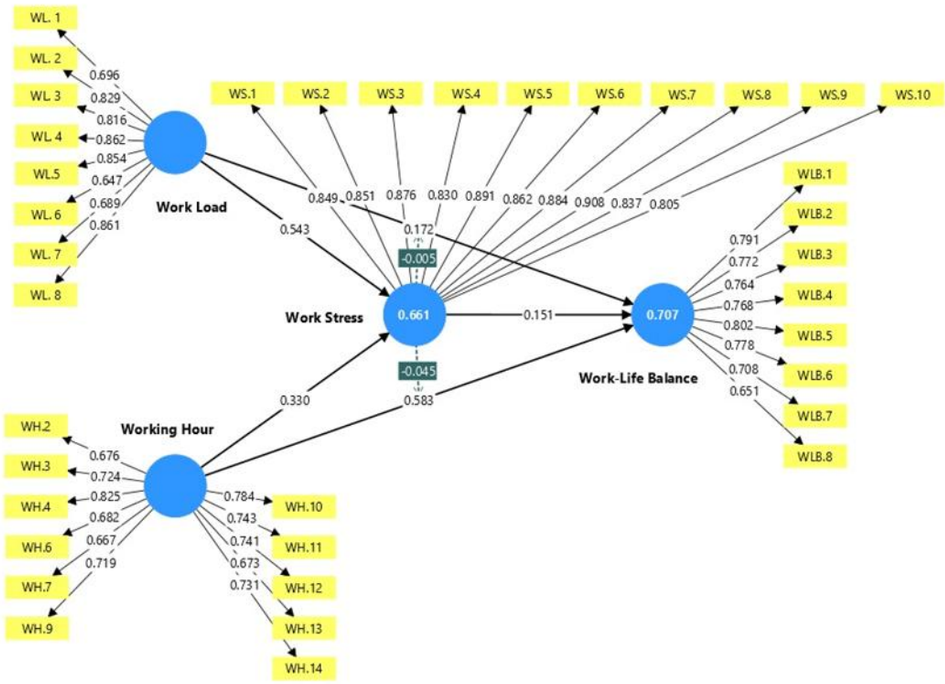


Figure 2. PLS-SEM Model

Structural Model Assessment

The structural model was first assessed for collinearity using the inner Variance Inflation Factor (VIF). According to Hair et al. (2021), a structural model is considered free from collinearity problems when the VIF value is below 5.00. The results of the inner VIF assessment are presented in Table 4.

Table 4. Inner VIF

Structural Relationship	Inner VIF
Workload → Work Stress	2.059
Working Hour → Work Stress	2.059
Workload → Work-life Balance	3.194
Working Hour → Work-life Balance	2.675
Work Stress → Work-life Balance	3.151

As shown in Table 4, the inner VIF values ranged from 2.059 to 3.194, with all values below the maximum threshold of 5.00. The highest VIF value was observed for the relationship between workload and work-life balance (3.194), while the lowest values were observed for workload and working hours predicting work stress (2.059). These results indicate that the structural model does not experience collinearity problems among the constructs, allowing the estimation of relationships between constructs to proceed to the subsequent stages of structural model evaluation.

The coefficient of determination (R^2) was assessed to evaluate the explanatory power of the structural model. According to Hair et al. (2021), R^2 values of 0.75, 0.50, and 0.25 represent substantial, moderate, and weak levels of explanatory power, respectively. The results of the coefficient of determination are presented in Table 5.

Table 5. Coefficient of Determination (R^2)

Construct	R^2	R^2 Adjusted
Work Stress	0.661	0.658
Work-life Balance	0.707	0.700

As shown in Table 5, the R^2 value for Work Stress is 0.661, with an adjusted R^2 of 0.658. This indicates that 66.1% of the variance in work stress can be explained by workload and working hours, while the remaining 33.9% is explained by other factors outside the model. Meanwhile, Work-Life Balance has an R^2 value of 0.707 and an adjusted R^2 of 0.700. This indicates that 70.7% of the variance in work-life balance can be explained by workload, working hours, and work stress, while the remaining 29.3% is explained by other factors outside the model. Overall, the results indicate that the structural model has substantial explanatory power for both endogenous constructs.

Effect size (f^2) was assessed to determine the magnitude of the contribution of each exogenous construct to the endogenous constructs. According to Hair et al. (2021), f^2 values of 0.02–<0.15 indicate a small effect, 0.15–

<0.35 indicate a medium effect, and values ≥0.35 indicate a large effect. The results of the effect size assessment are presented in Table 6.

Table 6. Effect Size (f^2)

Structural Relationship	f^2	Category
Workload → Work Stress	0.422	Large
Working Hour → Work Stress	0.156	Medium
Workload → Work-life Balance	0.032	Small
Working Hour → Work-life Balance	0.433	Large
Work Stress → Work-life Balance	0.025	Small

As shown in Table 6, the effect size values varied across the structural relationships. Workload had a large effect on work stress, with an f^2 value of 0.422. Working hours had a medium effect on work stress, with an f^2 value of 0.156. For work-life balance, workload had a small effect, with an f^2 value of 0.032, while working hours showed a large effect with an f^2 value of 0.433. Meanwhile, work stress had a small effect on work-life balance, with an f^2 value of 0.025. These results indicate that workload and working hours make different levels of contribution to the endogenous constructs in the structural model, with working hours showing the largest effect size on work-life balance.

The predictive capability of the PLS-SEM model was assessed using PLS-Predict to evaluate its out-of-sample predictive performance for the endogenous constructs. According to Hair et al. (2021), a model demonstrates predictive capability when the Q^2predict value is greater than zero. The results of the PLS-Predict assessment are presented in Table 7.

Table 7. Predictive Assessment Using PLS-Predict

Construct	Q^2 predict	RMSE	MAE
Work Stress	0.647	0.598	0.435
Work-life Balance	0.684	0.569	0.401

As shown in Table 7, the Q^2predict values for Work Stress and Work-Life Balance were 0.647 and 0.684, respectively. Both values were greater than zero, indicating that the model has predictive capability for both endogenous constructs. In addition, the RMSE values were 0.598 for Work Stress and 0.569 for Work-Life Balance, while the MAE values were 0.435 and 0.401, respectively. The relatively low RMSE and MAE values indicate that the prediction errors were within an acceptable range. Overall, the PLS-Predict results indicate that the proposed model demonstrates good predictive capability for Work Stress and Work-Life Balance.

Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure in PLS-SEM to examine the significance and direction of the direct relationships between the constructs. The assessment was based on the path coefficient, t-statistic, and p-value, with a significance level of 5%. A relationship was considered statistically significant when the p-value was below 0.05 and the t-statistic exceeded 1.96. The results of the direct effect analysis for hypotheses H1–H5 are presented in Table 8.

Table 8. Direct Effect Assessment

Structural Relationship	Hypothesis	*β*	t-statistics	p-value	Remark
Workload → Work Stress	H1	0.543	8.070	<0.001	Supported
Working Hour → Work Stress	H2	0.330	4.457	<0.001	Supported
Workload → Work-life Balance	H3	-0.172	1.946	0.052	Not Supported
Working Hour → Work-life Balance	H4	-0.583	5.866	<0.001	Supported
Work Stress → Work-life Balance	H5	-0.151	1.276	0.202	Not Supported

H1 proposed that workload has a positive effect on work stress. The results in Table 8 show a positive path coefficient of 0.543, with a t-statistic of 8.070 and a p-value of <0.001. Since the t-statistic exceeds 1.96 and the p-value is below 0.05, the relationship between workload and work stress is statistically significant. Therefore, H1 is supported.

The positive coefficient indicates that higher levels of workload are associated with

higher levels of work stress among nurses. This finding is consistent with the Job Demands–Resources (JD–R) theory, which explains that high job demands can consume employees' physical and psychological resources and consequently increase work-related strain. In the context of nursing, high workload may arise from the large number of patients, demanding clinical tasks, and time pressure in providing patient care. Therefore, when nurses perceive their workload as increasingly demanding, they are more likely to experience higher levels of work stress. This finding is also consistent with previous research by Kokoroko & Sanda (2019) and Yu et al. (2021), which found that higher workload is associated with increased work stress.

H2 proposed that working hours have a positive effect on work stress. The results in Table 8 show a positive path coefficient of 0.330, with a t-statistic of 4.457 and a p-value of <0.001. Since the t-statistic exceeds 1.96 and the p-value is below 0.05, the relationship between working hours and work stress is statistically significant. Therefore, H2 is supported.

The positive path coefficient indicates that longer or more demanding working hours are associated with higher levels of work stress among nurses. This finding is consistent with the Job Demands–Resources (JD–R) theory, which considers excessive working hours as a form of job demand that can increase psychological strain when employees do not have sufficient opportunities for recovery. In the nursing context, shift work, extended working hours, and limited recovery time may increase physical and psychological demands, thereby contributing to higher work stress. This finding is consistent with Gray et al. (2019), who found that longer and irregular working hours were positively associated with work stress, and Cho et al. (2015), who reported that longer working durations could increase fatigue and psychological strain among healthcare workers.

H3 proposed that workload has a positive effect on work-life balance. The results in Table 8 show a negative path coefficient of −0.172, with a t-statistic of 1.946 and a p-value of 0.052. Although the direction of the relationship is negative, the t-statistic is below 1.96 and the p-value exceeds 0.05. Therefore, the relationship between workload and work-life balance is not statistically significant, and H3 is not supported.

The negative path coefficient indicates that higher workload tends to be associated with lower work-life balance among nurses, although this relationship does not reach statistical significance. This finding suggests that workload alone may not be sufficient to significantly determine nurses' work-life balance in the context of this study. Other factors may contribute to how nurses manage the demands of their work and personal lives. The finding is therefore not fully consistent with Haar et al. (2014), who found that higher workload was negatively associated with work-life balance.

H4 proposed that working hours have a negative effect on work-life balance. The results in Table 8 show a negative path coefficient of −0.583, with a t-statistic of 5.866 and a p-value of <0.001. Since the t-statistic exceeds 1.96 and the p-value is below 0.05, the relationship between working hours and work-life balance is statistically significant. Therefore, H4 is supported.

The negative path coefficient indicates that longer or more demanding working hours are associated with lower levels of work-life balance among nurses. This finding suggests that when nurses spend more time at work, the time and energy available for family, social activities, and personal needs may become more limited. In the context of nursing, shift schedules and extended working hours may further restrict opportunities for recovery and participation in activities outside work. This finding is consistent with Hsu et al. (2019), who found that longer working hours were negatively associated with work-life balance. It is also in line with Pawlicka et al. (2020), who emphasized that longer working hours can contribute to work-family conflict and subsequently reduce individuals' work-life balance.

H5 proposed that work stress has a negative effect on work-life balance. The results in Table 8 show a negative path coefficient of −0.151, with a t-statistic of 1.276 and a p-value of 0.202. Although the direction of the relationship is negative, the t-statistic is below 1.96, and the p-value exceeds 0.05. Therefore, the relationship between work stress and work-life balance is not statistically significant, and H5 is not supported.

The negative path coefficient indicates that higher levels of work stress tend to be associated with lower work-life balance among nurses, although the relationship is not statistically significant. This finding suggests that work stress alone may not be sufficient to significantly explain variations in nurses' work-life balance in this study. Factors such as working conditions, family support, individual coping mechanisms, and the ability to manage work and personal roles may also influence work-life balance. This finding is not consistent with Prabhu et al. (2026), who found a negative relationship between work stress and work-life balance, but it is consistent with the non-significant empirical relationship found in the present study.

Indirect effects were assessed to examine whether work stress mediates the relationships between workload and work-life balance and between working hours and work-life balance.

The mediation analysis was conducted using the bootstrapping procedure in PLS-SEM, with the indirect path coefficient, t-statistic, and p-value used to determine the significance of the mediating effects. An indirect effect was considered statistically significant when the t-statistic exceeded 1.96 and the p-value was below 0.05. The results of the indirect effect analysis are presented in Table 9.

Table 9. Indirect Effect Assessment

Structural Relationship	Hypothesis	β	t-statistics	p-value	Remark
Workload → Work Stress → Work-life Balance	H6	-0.082	1.230	0.219	Not Supported
Working Hour → Work Stress Work-life Balance	H7	-0.050	1.208	0.227	Not Supported

H6 proposed that work stress mediates the negative effect of workload on work-life balance. The results in Table 9 show an indirect path coefficient of -0.082, with a t-statistic of 1.230 and a p-value of 0.219. Since the t-statistic is below 1.96 and the p-value exceeds 0.05, the indirect effect is not statistically significant. Therefore, H6 is not supported.

The negative indirect coefficient indicates that workload tends to have a negative indirect relationship with work-life balance through work stress. However, the non-significant result indicates that work stress does not significantly mediate the relationship between workload and work-life balance in this study. Thus, although higher workload is associated with higher work stress, the resulting work stress does not significantly translate into changes in work-life balance through the proposed mediating pathway. This finding suggests that other factors may play a more important role in explaining how workload affects nurses' work-life balance.

H7 proposed that work stress mediates the negative effect of working hours on work-life balance. The results in Table 9 show an indirect path coefficient of -0.050, with a t-statistic of 1.208 and a p-value of 0.227. Since the t-statistic is below 1.96 and the p-value exceeds 0.05, the indirect effect is not statistically significant. Therefore, H7 is not supported.

The negative indirect coefficient indicates that working hours tend to have a negative indirect relationship with work-life balance through work stress. However, the non-significant result indicates that work stress does not significantly mediate the relationship between working hours and work-life balance in this study. This finding suggests that although longer working hours are associated with higher work stress, the increase in work stress does not significantly explain the indirect relationship between working hours and work-life balance. Therefore, the effect of working hours on work-life balance appears to be more strongly reflected through the direct relationship rather than through the proposed mediating pathway of work stress.

CONCLUSION AND RECOMMENDATION

This study aimed to examine the effects of workload and working hours on work-life balance, with work stress as a mediating variable among nurses at Dr. Ario Wirawan Pulmonary Hospital, Salatiga, Indonesia. The findings indicate that workload and working hours have positive and significant effects on work stress. However, workload does not significantly affect work-life balance, whereas working hours have a significant direct effect. Work stress has no significant effect on work-life balance and does not mediate the relationships between workload and work-life balance or between working hours and work-life balance. These findings suggest that working hours play a more important role in explaining nurses' work-life balance than workload or work stress. The study provides empirical evidence that increased work stress does not necessarily explain how job demands relate to work-life balance in the healthcare sector. From a practical perspective, hospital management should prioritize effective work scheduling and regular workload evaluation to support nurses' well-being and maintain a balance between professional and personal responsibilities.

Based on the findings, hospital management should improve working-hour arrangements by reviewing shift schedules, overtime policies, and rest periods to support nurses' work-life balance. Regular workload evaluations are also necessary to ensure equitable task distribution and reduce excessive work pressure. Future research should consider additional factors, such as organizational support, leadership, job satisfaction, burnout, and psychological well-being, to provide a more comprehensive understanding of work-life balance. Further studies involving larger samples, different hospital settings, and other healthcare

professionals are recommended to improve the generalizability of the findings.

AUTHOR CONTRIBUTIONS

Mutia Salsabila Widiyanti: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization, and Project administration.

Rini Kuswati: Supervision, Validation, Resources, Writing – review and editing, and Research coordination.

Farid Wajdi: Investigation, Data analysis, Validation, Resources, and Writing – review and editing.

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CONFLICT OF INTEREST

The authors declare that there are no competing interests that could have influenced the conduct of the study, the interpretation of its findings, or the publication of this article.

DECLARATION OF ARTIFICIAL INTELLIGENCE USE

The authors confirm that generative artificial intelligence was not used to generate the manuscript's content, develop its arguments, or establish its conceptual framework.

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