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The Relationship Between Mental Workload and Work Stress in Nurses at the Inpatient Installation

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Abstract

Background: *Nurses in inpatient settings face huge responsibilities, both physical and mental, such as looking after patients, providing emotional support, and handling high work demands. Excessive mental workload can trigger job stress, reduce productivity, and lower the quality of health services. This study explored the relationship between mental workload and job stress in nurses in inpatient settings.*

Method: *This study was an analytical quantitative research with a cross-sectional design. It was conducted from January to June 2023. The research instruments were the NASA-TLX questionnaire for mental workload and the job stress scale. The population consisted of 133 nurses, with a sample of 75 people selected by consecutive sampling. The independent variable was mental workload, while the dependent variable was job stress. Data analysis used the Chi-Square test with $p<0.05$ as significant.*

Result: *Sixty-four percent of nurses experienced a moderate mental workload, and 36% experienced a heavy workload. A total of 53.3% of nurses reported experiencing work stress. The analysis showed a significant relationship between mental workload and work stress ($p=0.034$), where work stress was more common among nurses with a moderate to severe mental workload.*

Conclusion: *There was a significant relationship between mental workload and work stress in nurses. To reduce mental workload and work stress, it is recommended that work management be improved, such as by redistributing tasks and providing psychological support. Stress management training and effective communication should also improve nurses' well-being.*

Keywords*: Mental workload, Nurse, Stress*

INTRODUCTION

The work environment can be a significant stressor, where various circumstances arise and are perceived as burdens. These burdens refer to excessive demands, pressures, and responsibilities that nurses face, ultimately contributing to work-related stress. Hospitals are particularly susceptible to issues of occupational stress. As health service providers, they operate continuously throughout the day, managing patient care without interruption.[1] Nurses, for instance, must maintain, supervise, and monitor patients' health development, and it is not uncommon to experience stress.[2]

The *American National Association for Occupational Safety ranks nurses' work stress first*. Similarly, referring to a survey in France, stress occurred in nurses at 74%, and in Sweden, more than 80% of nurses indicated stress.[3] Referring to Indonesian National Nurses Association research, 50.9% of Indonesian nurses who provide direct patient care can be indicated by work stress, frequent dizziness, easy fatigue, and lack of rest due to high workload.[4]

Hospital nurses are required to undertake both physical and mental labour. This includes assisting with patient mobility, performing hygiene care, maintaining medical equipment, preparing beds, and transporting patients via gurneys. Additionally, they face psychological demands, such as managing shift work, coping with challenging duties, providing emotional and spiritual support to

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patients and their families—especially those requiring surgery or in critical condition—applying specialised skills in patient care, taking responsibility for patient recovery, and engaging in effective communication with patients.[5] Excessive mental workload can be a cause of stress. It can trigger several adverse effects, such as forgetfulness in activities, boredom, reduced accuracy in doing work,and difficulty concentrating.[6] A recent study, as reviewed by Pamungkas et al., indicates that nurses responsible for inpatient care installations endure considerable stress due to their mental workload.[7] Data from the Indonesian Ministry of Health in 2021 states that 531,214 nurses are throughout Indonesia.[8] and 38,819 of them are in Jakarta. There are 8,714 nurses in East Jakarta, the highest concentration area after Central Jakarta. In a study at Pasar Rebo Hospital, East Jakarta, 45% of nurses at Pasar Rebo Hospital experienced work stress.[9] Similar research conducted at Budi Asih Hospital, East Jakarta stated that 65% of inpatient nurses experienced stress due to workload.[10]

Based on the description and data presented, this research explored the relationship between mental workload and job stress among nurses in the inpatient installation of a hospital in East Jakarta. This study is motivated by the high incidence of work stress among nurses in Indonesia, particularly in East Jakarta. Based on the description and data presented, this research explored the relationship between mental workload and job stress among nurses in the inpatient installation of a hospital in East Jakarta. This study is motivated by the high incidence of work stress among nurses in Indonesia, particularly in East Jakarta. This particular workplace was chosen because inpatient installations are known for their high patient turnover, demanding workloads, and diverse patient needs, which can contribute to increased mental workload and stress among nurses.

METHOD

Participants and Study Design

This study used quantitative analytical methods with a cross-sectional design. The study was conducted at the Inpatient Installation (IRNA) of Tk. II Moh. Ridwan Meuraksa, Jakarta, between January and June 2023. The study population consisted of 133 nurses working in the Inpatient Installation of Tk. II Moh. Ridwan Meuraksa Jakarta. The sample size was calculated using the proportion difference test formula, resulting in a minimum of 34 samples. To ensure robustness, the sample size was doubled to 68 and increased by 10% to account for potential dropouts, setting the minimum sample size to 75. The sampling technique used was consecutive sampling, where all subjects who met the inclusion criteria were studied until the number of subjects was met. The inclusion criteria were Inpatient Installation Nurses (IRNA) who agreed to be respondents by signing the Informed Consent and were aged 20—58. Exclusion criteria were nurses who were on leave or sick during data collection

Measurements and Procedure

The study used a questionnaire to collect data on mental workload and job stress. The NASA-TLX instrument was used for mental workload measurements, which were categorized into light workload (less than 50), medium workload (50—80), and heavy workload (>80). Job stress measurements were categorized into two groups: not stressed and stressed (score >80). A modified questionnaire adapted from the Job Stress Scale was utilised to measure job stress. Job stress measurements were categorized into two groups: not stressed and stressed (score >80). Both instruments were tested for validity and reliability.

Rusindiyanto et al. found that NASA-TLX is valid for measuring six mental workload dimensions relevant to work contexts. The Corrected Item-Total Correlation ranged from 0.41 to 0.68. The reliability testing yielded a Cronbach's Alpha of 0.82, indicating high reliability. Fachruddin et al. (2019) utilized a modified Job Stress Scale questionnaire, achieving a correlation of 0.35 to 0.72, confirming validity. Its reliability was strong, with a Cronbach's Alpha of 0.88. Using similar measurements, Hernata et al. reported a Cronbach's Alpha of 0.79 for work stress and 0.81 for mental workload.[5]

Statistical Analysis and Ethical Clearance

Statistical analysis was performed using statistical software. Bivariate analysis utilized the Chi-Square test to examine the relationship between mental workload (independent variable) and job stress

(dependent variable). The Fisher Exact Test was employed if more than 20% of the cells had an expected count of fewer than five. A p-value of <0.05 was considered statistically significant.

Ethical considerations were prioritized throughout the research process, ensuring informed consent, confidentiality, and compliance with institutional guidelines outlined by the Health Research Ethics Commission. This study has obtained ethical permission from the Health Research Ethics Commission (KEPK) Faculty of Medicine, Universitas Pembangunan Negeri Veteran Jakarta, with the ethical clearance number 269/VI/2023/KEPK

RESULT

Table 1 shows that 68 of 75 respondents (90.7%) were female, while 7 (9.3%) were male. The data on mental workload shows that respondents experienced a light mental workload. No more than 64% of respondents experienced a moderate mental workload, while the rest experienced a heavy one. The findings indicate that almost half of the participants reported no job-related stress, while the remaining 53.3% experienced job-related stress.

Table 1. Distribution Characteristics of Respondents

Variable	n	%
Gender		
Male	7	9.3
Female	68	90.7
Workload Mental		
Light	0	0
Moderate	48	64
Havy	27	36
Work Stress		
Stress	40	53.3
Not Stressed	35	46.7

Based on Table 2, there were zero cells. Thus, no alternative test was needed. The data analysis results have a p-value of chi-square statistical testing of 0.034, which means there was a significant relationship between mental workload and work stress, with an odds ratio (OR) of 2.83 (95% CI: 1.06—7.51). This means that nurses with heavy mental workloads are 2.83 times more likely to experience job stress than nurses with moderate mental workloads.

Table 2. Mental Workload to Job Stress

Mental Workload	Work Stress						OR (95% CI)	P-value
	Stress		Not Stressed		Total			
	n	%	n	%	n	%		
Light	0	0	0	0	0	0	2.83 (1.06 – 7.51)	0.034
Moderate	30	62.5	18	37.5	48	100		
Heavy	10	37	17	63	27	100		

DISCUSSION

The survey indicated that most respondents were female, reflecting a strong representation of women in the sample. This aligns with worldwide statistics indicating that the nursing profession is primarily female. The World Health Organization (WHO) reports that around 90% of nurses globally are female. The prevalence of women in nursing may be ascribed to societal and cultural factors that see caregiving as a vocation more appropriate for women. Nonetheless, this may also provide obstacles, including a dual load of professional and family obligations, which might increase the risk of occupational stress.

The highest proportion of nurses experienced a moderate mental workload, aligning with this study's predominant trend. The findings align with the study conducted by Dewi Kusumaningsih et al., which indicated that 62.5% of nurses at the Inpatient Health Center in Pesawaran Regency had a moderate mental burden. Elevated cognitive burden in nurses may correlate with intricate job requirements, including clinical decision-making, time management, and engagement with patients

and their families.[12] The Mental Burden Theory proposed by Hart & Staveland posits that mental burden is affected by variables like task difficulty, time constraints, and the degree of focus necessitated. In nursing, elevated mental burdens may lead to mental tiredness, thereby impacting their performance and overall well-being. This indicates that a moderate mental burden is a prevalent phenomenon encountered by nurses across diverse healthcare institutions. The majority of nurses in this study exhibited a moderate mental burden, consistent with the findings of Fahamsyah's research, which indicated that most respondents also encountered a moderate mental strain. This suggests that a moderate mental burden is a prevalent trend among nurses in hospitals and other healthcare settings. This research suggests that moderate mental effort is a significant factor that should be managed to avoid work-related stress. Proactive strategies for workload management, including reassignment and psychological support, may enhance nurses' well-being and mitigate the adverse effects of mental burden.[13]

The highest proportion of mental workload among nurses in this study was categorized as moderate. The results align with previous research, suggesting that moderate mental workload is a common issue nurses face across various healthcare facilities. Given the findings, it can be concluded that mental workload, whether mild or heavy, significantly contributes to work stress among nurses. This highlights the importance of addressing mental workload to prevent occupational stress. Hospitals should consider strategies to manage and reduce mental workload, such as task redistribution and psychological support, to enhance nurses' well-being and performance.[14] The NASA-TLX questionnaire consists of two filling stages: weighting and reviewing.

A total of 53.3% of nurses said that they encountered work-related stress. This conclusion aligns with Julaila's study, which indicated that 53.7% of South Tangerang City General Hospital nurses reported occupational stress. The stress experienced by nurses may be affected by several variables, such as excessive workload, insufficient social support, and elevated emotional demands.[15] Karasek's Job Stress Theory posits that work-related stress arises when job demands surpass an individual's coping capacity, particularly in the absence of social support and job management. In nursing, occupational stress may adversely affect the quality of healthcare services, leading to a heightened risk of medical mistakes and diminished patient satisfaction. Research by Tou et al. also shows the results of the majority of nurses who are respondents experiencing job stress as many as 39 (51.3%) and non-stressed respondents totalling 37 (48.7%).[4]

Based on the results of this study, the majority of nurses were affected by work stress. Nurses' work stress can occur because it is driven by various influencing factors, including burden, environment, career development, and multiple responsibility issues.[16] Poor management of work-related disorders can lead to decreased productivity, increased sick days taken, higher medical compensation expenditures, and poorer performance at work.[17]

Mental workload is the ratio of tasks requiring mental load and an individual's peak capability for mental load in a motivated state[18]. Several factors influence mental workload, such as the correlation between task demands and performance; safety to remain attentive to the task for extended periods; the concept of work, special conditions, and limited duration of completion; as well as internal factors including personal drive, competence, and excuse for failure.[19] Nurses' mental activity is used to assess mental workload, which is nurses' competence related to cognitive competencies such as thinking, retaining information, critical thinking, and nursing decision-making. Mental activity also includes a mix of physical activities to fulfil the patient's basic needs and mental activities to design care, such as assessment, diagnosis, intervention, and treatment. If nurses' mental activities are performed excessively and continuously, this may lead to excessive mental workload for them.[20]

According to the *National Institute for Occupational Safety and Health NIOSH*, nursing is classified as a very high risk of *occupational* stress due to nurses' mental workload.[21] According to the National Institute for Occupational Safety and Health NIOSH, nursing is classified as a very high risk of occupational stress due to nurses' mental workload.[21] The findings of this study suggest a relationship between mental workload and work stress. Respondents with moderate to heavy mental workloads tended to experience work-related stress, while those with mild mental workloads showed no association. This indicates that higher mental workloads may increase nurses' work stress.

The analysis indicates a significant relationship between mental workload and work stress among nurses. This underscores the critical need to address the mental workload contributing to work stress. Effective management strategies are essential to mitigate this issue and enhance the well-being

and productivity of nurses. This study is consistent with the findings of Hernata et al., which demonstrated a significant relationship between mental workload and work stress among nurses at PKU Muhammadiyah Gubug Hospital.[21] Fahamsyah also found a significant relationship between mental workload and work stress among staff at the CSSD Installation of RSU Haji Surabaya.[13]

The odds ratio calculation indicated that nurses with a high mental workload were 2.83 times as likely to experience work-related stress as those nurses with a moderate mental workload. This may be due to adaptation, where nurses with heavier workloads have developed better coping strategies. In contrast, nurses with moderate workloads may experience more stress because they have not fully developed these coping methods. Workload, especially when it exceeds available resources, can increase stress, leading to pressure and burnout. Improving workload management and providing support could help reduce stress in nurses. This research theoretically corroborates the Mental Workload Theory and the Job Stress Theory, which assert that excessive workloads might induce stress if not mitigated by sufficient support and resources. This research underscores the need for efficient workload management, including task dispersion, psychological support, and stress management training. Cooper and Cartwright's Stress Management Theory underscores the significance of organizational interventions in mitigating work-related stress, including enhancing social support and providing coping skills training.

This study has several limitations that should be considered when interpreting the findings. Firstly, the cross-sectional design restricts the ability to determine causal relationships between mental workload and work stress. While the study identifies significant correlations, it cannot establish whether high mental workload increases work stress or vice versa. Secondly, the research was conducted in a single hospital in East Jakarta, limiting the generalizability of the results to other regions or healthcare facilities with different work environments and nurse populations. Additionally, the reliance on self-reported data introduces the possibility of response biases, such as social desirability and recall inaccuracies, which may affect the validity of the data collected. The sample size, although statistically adequate, may not fully represent the diverse experiences and challenges faced by nurses in other settings. Future research should consider employing longitudinal designs to explore causal relationships, expanding the scope to include a broader range of healthcare facilities, and integrating objective measures of mental workload and stress to enhance the robustness and applicability of the findings.

CONCLUSION

The study demonstrates a significant relationship between mental workload and work stress among nurses in the inpatient installation. Most nurses reported experiencing moderate mental workload, aligning with similar findings. This suggests that moderate mental workload is prevalent and often serves as an early indicator of stress in nursing professionals. Addressing mental workload is crucial in preventing occupational stress and maintaining the quality of healthcare services. The findings imply that hospital management should prioritize strategies to manage and reduce mental workload. These strategies may include redistributing tasks, offering psychological support, and providing stress management training. By improving workload distribution and supporting nurses' mental health, healthcare institutions can enhance job satisfaction, reduce stress, and improve overall performance. Moreover, the results highlight the need for a sustainable approach to nurse well-being. Regular workload and stress level assessments should be incorporated into hospital management practices. Interventions, such as developing a supportive work culture and ensuring adequate staffing, are essential to fostering a healthier work environment. These efforts benefit the nurses and contribute to better patient outcomes and the efficiency of healthcare systems.

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