

Impact of Physical Workload and Mental Workload on Nurse Performance: A Path Analysis

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Abstract

Background. Nurse performance is an important factor in hospitals. Studies on nurse performance are required to improve the quality of hospital services. **Objective.** This study aims to determine the effect of physical and mental workloads on nurse performance, with burnout as an intervening factor. **Method:** This associative quantitative research uses primary data obtained through a survey of nurses at the inpatient unit of Bhakti Asih General Hospital, Tangerang. The survey was conducted by distributing questionnaires to 84 nurses using a modification of the National Aeronautics and Space Administration - Task Load Index, Maslach Burnout Inventory - Human Services Survey, and Individual Work Performance Questionnaire. The variables were analyzed using the path analysis method. **Results:** The results show no significant effect of physical and mental workloads on nurse performance, with burnout as an intervening factor. There was a negative significant effect of physical workload on nurse performance ($\beta = -0.309$, sig. = 0.004), as well as mental workload on nurse performance ($\beta = -0.340$, sig. = 0.009). There was a positive significant effect of physical workload on burnout ($\beta = 0.267$, sig. = 0.002), as well as mental workload on burnout ($\beta = 0.607$, sig. = 0.000). There was no significant effect of burnout on nurse performance ($\beta = -0.159$, sig. = 0.224). **Conclusion:** In conclusion that physical and mental workload impact on nurses' performance.

Keywords: physical workload, mental workload, nurses' performance

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INTRODUCTION

Nurse performance is an essential component in the hospital. The quality of service is closely related to the performance of nurses, where the better the performance of nurses will improve the quality of the service. Therefore hospitals need to manage care to produce quality services (1).

Performance is the behavior or actions of employees related to the organization's goals. There are several dimensions of performance; task performance, contextual performance, and counterproductive work behavior (2).

The workload is one of many factors that can affect performance (3). The workload is an important thing that can affect the performance of nurses (4). In previous research on 394 pharmacists every month starting from 2012 to 2018 at the two most important health care centers in Taiwan, Shao et al. concluded that reducing workload can improve the performance of pharmacists (5).

If not appropriately managed by the management, the workload can lead to burnout. Previous research conducted on healthcare workers in Africa found that a high workload can cause burnout in health workers. The highest burnout rate among these health workers occurred in nurses (6). The previous research in Switzerland conducted on 1441 health workers stated that physical workload and mental workload were proven to be strong risk factors for burnout (7). The workload on nurses, physically or mentally, is an essential component of nursing services in hospitals. Workload has an important role that can affect the performance of nurses. Every activity that nurses receive while doing their job is a workload for them. The workload can be in the form of physical workload or mental workload (8,9).

The physical workload is any physical activity and effort required by an employee to carry out his job duties (10). The high physical workload can reduce performance and can cause burnout in nurses. In previous research conducted on ICU nurses in Iran, it was found that physical workload affects the level of performance of nurses (11). Another study stated that a high physical workload had a positive and significant effect on burnout in nurses (12).

Mental workload limits employee attention during optimally performing tasks related to mental capacity, motivation, and job demands (8). In previous research conducted on nurses in several hospitals in Iran, it was stated that a high mental workload could reduce the performance of nurses (13). Another study conducted on nurses at the Inpatient Installation of a Private Hospital in Surabaya stated that mental workload had a positive and significant effect on burnout in nurses (14).

Burnout is a state of increased emotional exhaustion, the development of cynical or avoidant behavior toward work, and harmful job evaluations, which can occur in employees (15). In research conducted on 3150 nurses in America, it was stated that burnout had a negative and significant effect on nurse performance (16), as well as in the research conducted on workers in China, where it is stated that there is a negative and significant influence between burnout on employee performance (17).

Previous research on the factors that affect the performance of nurses at RSU Bhakti Asih Tangerang found that there were still nurses with poor performance categories with a percentage of 27%. This was still not under the service quality target of RSU Bhakti Asih, which determined nurses with poor performance categories below 20% (18).

Based on a preliminary study conducted by researchers by interviewing several nurses at the Inpatient Installation of Bhakti Asih Hospital Tangerang, nurses have a high workload. This is due to the high number of daily patients both in outpatient and inpatient care which makes nurses tired in carrying out their duties. This shows that there is a high physical workload and mental workload and the occurrence of burnout in nurses at the Inpatient Installation of Bhakti Asih General Hospital, Tangerang.

We are interested in discussing more the performance of nurses with physical workload and mental workload as independent variables, which in previous studies used workload and burnout. We are also interested in seeing the effect of burnout as an intervening variable between physical workload and mental workload on nurse performance. In contrast, in previous studies, burnout acted as an independent variable.

OBJECTIVE

This study aims to determine the effect of physical and mental workloads on nurse performance, with burnout as an intervening factor.

METHOD

Design

A cross-sectional study was applied to investigate the effect of physical workload and mental workload on nurse performance.

Sample, Sample Size, & Sampling Technique

The sample in this study were nurses at the Inpatient Installation at Bhakti Asih Hospital Tangerang, which had been selected by purposive sampling technique. Sampling was carried out by selecting samples that met the inclusion criteria: 1) Nurses who worked in the Inpatient Installation of Bhakti Asih Hospital Tangerang in December 2021, 2) Nurses who had worked in the Inpatient Installation of Bhakti Asih General Hospital for at least the last six months. The exclusion criteria: 1) Nurses at the Inpatient Installation of Bhakti Asih Hospital Tangerang who are currently on leave, 2) Nurses at the Inpatient Installation of Bhakti Asih Hospital Tangerang with a working period of fewer than six months. Based on these criteria, the sample in this study was 84 nurses.

Ethical consideration

This research has obtained approval and has passed the ethical review issued by *Dewan Penegakan Kode Etik Universitas Esa Unggul Komisi Etik Penelitian* with letter number: 09 22 01 009/DPKE-KEP/FINAL-EA/UEU/I/2022, which was published on January 4, 2022

The instrument for data collection

Demographic factors: three questions were used to obtain gender, age, and education level.

Physical workload questionnaire: physical workload was measured using a physical workload questionnaire that took the 2 dimensions in the National Aeronautics and Space Administration - Task Load Index (NASA-TLX) questionnaire. The questionnaire contains 5 questions divided into 2 dimensions, physical activity, and physical

effort. In this study, the researcher used a physical workload questionnaire with a four-level Likert scale (in order from left to right "never/strongly disagree," "rarely/disagree," "often/agree," "all the time/strongly agree").

Mental workload questionnaire: Mental workload was measured using a modified National Aeronautics and Space Administration - Task Load Index (NASA-TLX) questionnaire, which took 5 of the total 6 dimensions in it. The questionnaire contains 5 questions which are divided into 5 dimensions, namely Mental Demand (MD), Temporal Demand (TD), Performance (P), Frustration (F), and Effort (E). In this study, the researcher modified the NASA-TLX questionnaire into a four-level Likert scale (in order from left to right "strongly disagree," "disagree," "agree," "strongly agree").

Burnout Questionnaire: burnout was measured using a modified Maslach Burnout Inventory - Human Services Survey (MBI-HSS) questionnaire, which took the three dimensions. The questionnaire contains 21 questions divided into 3 dimensions, namely exhaustion, depersonalization, and reduced personal accomplishment. In this study, the researcher modified the MBI-HSS questionnaire into a four-level Likert scale (in order from left to right "never," "rarely," "often," "every day").

Performance questionnaire: performance was measured using a modified Individual Work Performance Questionnaire (IWPQ) which took 1 of the total 3 dimensions. The questionnaire contains 6 questions in one dimension, namely task performance. In this study, the IWPQ questionnaire used a four-level Likert scale (sequentially from left to right, "strongly disagree," "disagree," "agree," and "strongly agree").

Validity and reliability testing

Pre-research was conducted to test the validity and reliability of the research instrument. The pre-research was achieved by distributing samples to 30 nurses at the Inpatient Installation of Bhakti Asih General Hospital, Tangerang.

The validity test was conducted using the Kaiser Meyer Olkin (KMO) method. The instrument is said to be valid if the KMO value is > 0.5 . Based on the validity test, two questions were declared invalid and were removed from the research instrument because the KMO value was < 0.5 . The two questions are BO3_5 and K4.

The reliability test was carried out using the Cronbach Alpha method. An instrument is said to be reliable if the Cronbach alpha value shows a value > 0.6 . Based on the reliability test, all instruments were declared reliable because the Cronbach alpha value showed a p-value > 0.6 .

Data Analysis

The data analysis technique used in this study uses the path analysis method. Path analysis is used to see the effect of partially or simultaneously between the independent variable and the dependent variable and to determine the direct and indirect impact of the independent variable on the dependent variable through the intervening variable.

RESULTS

Characteristic of respondents

Based on research data, most respondents in this study were female with a percentage of 90.48%, and the rest were male with a percentage of 9.52%. The results found that some respondents are 25-29 years old (34.52%). Some of them are 30-34 years and 35-40 years, each with a percentage of 17.86%. Based on the respondent's latest education, most respondents have the latest education at the D-3 level with a percentage of 82.14%, and the least is at the S1 level with a percentage of 3.57%.

Table 1. Characteristic of respondents

Data demographic	n	%
Gender		
Male	8	9.52
Female	76	90.48
Age		
20-24 years old	25	29.76
25-29 years old	29	34.52
30-34 years old	15	17.86
35-40 years old	15	17.86

Educational background		
Diploma	69	82.14
Bachelor	3	3.57
NERS Profession	12	14.29

Three box Method Analysis

Univariate analysis was performed using the three-box method. Based on this analysis, it was found that the physical workload was in a low category, the mental workload was in the medium category, burnout was in a low category, and the nurse's performance was in the high category.

Effect of physical workload and mental workload on nurse performance through burnout

The findings showed the simultaneous influence of physical workload (X1), mental workload (X2), and burnout (Z) variables with a significance value of 0.000 (< 0.05). In table 4.21, it can be seen that the calculated F value is 27.827, where this value is greater than the F table value of 2.53. Based on the significant value and estimated F value, it can be concluded that physical workload (X1), mental workload (X2), and burnout (Z) simultaneously have a significant effect on nurse performance. Details explanation could be seen in the table 2 and table 3.

Table 2. Model of F testing

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.827	3	1.942	27.827	.000 ^b
	Residual	5.584	80	.070		
	Total	11.411	83			
a. Dependent Variable: Nurses' performance (Y)						
b. Predictors: (Constant), Burnout (Z), Physical workload (X1), Mental workload (X2)						

Table 3. Model Summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.715 ^a	.511	.492	.26420

a. Predictors: (Constant), Burnout (Z), Physical workload (X1), Mental workload (X2)

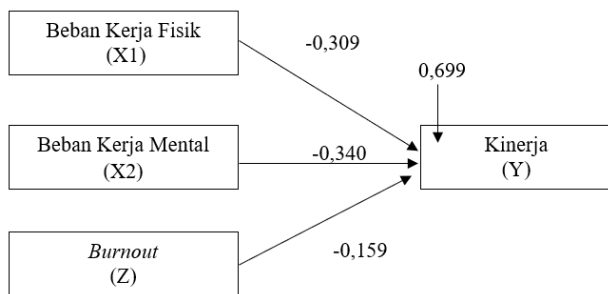


Figure 1. Model correlation between the variables

It is known that the direct effect given by the X1 variable to Y is equal to (-0.309), while the indirect effect given by the X1 variable to Y through Z is the result of multiplying the value of ZX1 with the value of ZY, namely; $0.267 \times (-0.159) = (-0.043)$. Then the total effect given by X1 to Y is the direct effect plus the indirect effect, namely; $(-0.309) + (-0.043) = (-0.352)$.

It is known that the direct effect given by the X2 variable to Y is equal to (-0.340), while the indirect effect given by the X2 variable to Y through Z is the result of multiplying the value of ZX2 with the value of ZY, namely; $0.607 \times (-0.159) = (-0.097)$. Then the total effect given by X2 to Y is the direct effect plus the indirect effect, namely; $(-0.340) + (-0.097) = (-0.437)$.

Based on the data above, to see the effect of X1 and X2 on Y through Z, the following equation is used:

(Indirect effect) < (Direct effect)

$(PTL X1Y) + (PTL X2Y) < PL X1Y + PL X2Y$

$(-0.043) + (-0.097) < (-0.309) + (-0.340)$

$(-0.14) < (-0.649)$

From the above equation, it can be seen that the value of the indirect effect is smaller than the value of the direct impact. The indirect and direct effect values are absolute, where positive or negative values are ignored. Thus, Hypothesis 1 is rejected where physical workload and mental workload have no significant effect on nurse performance through burnout.

DISCUSSION

Based on the path analysis, see Table 8, the indirect effect value is (-0.14), and the direct effect value is (-0.649). PTL and PL values are absolute where positive or negative values are ignored. From these results, it is known that the value of the indirect effect is smaller than the value of the direct effect. It can be concluded that physical and mental workloads have no significant impact on nurse performance through burnout.

Based on the T-test obtained in the path analysis stage 2, see Table 7, it can be seen that the beta coefficient (β) of physical workload on nurse performance is (-0.309), which means that physical workload has a negative effect on nurse performance of (-0.309). The t_{count} value is (-2,941), and the t_{table} value is 1,667, so the t_{count} value is more significant than the t_{table} value. Therefore, the physical workload has a negative and significant effect on nurse performance. This result aligns with the theory and previous research, which states that physical workload has a significant negative impact on performance (5,11).

Based on the T-test obtained in the path analysis stage 2, see Table 7, it can be seen that the value of the beta coefficient (β) of mental workload on nurse performance is (-0.340), which means mental workload has a negative effect on nurse performance of (-0.340). The t_{count} value is (-2.684), and the t_{table} value is 1.667, so the t_{count} value is more significant than the t_{table} value. Another finding showed that the significant value of mental workload on nurse performance is 0.009, where this value is smaller than 0.05. Thus, the mental workload has a negative and significant effect on nurse performance. These results are in line with the theory and previous research, which states that mental workload has a significant negative impact on performance (11,13).

The T-test obtained in the path analysis showed beta coefficient (β) of burnout on nurse performance is (-0.159), which means burnout has a negative effect on nurse

performance of (-0.159). The value of the t-count is (-1.226), and the value of the t-table is 1.667. Therefore, the t-count is smaller than the t-table. The significance value of burnout on nurse performance is 0.224, where this value is bigger than 0.05. Based on the value of $t_{\text{he t-count}}$, which is smaller than $t_{\text{he t-table}}$, with a p-value of more than 0.05. It can be explained that burnout has no significant effect on nurse performance. This result is not in line with the theory and previous research, which states that burnout has a significant negative impact on performance (16,17,19).

The results of the T-test obtained beta coefficient (β) of physical workload on burnout is 0.267, which means that physical workload has a positive effect on burnout of 0.267. The t-count value is 3,146, and the t-table value is 1,667, so the t-count is bigger than the t-table value. Based on table 6, it can be seen that the significance value of physical workload on burnout is 0.002, where this value is smaller than 0.05. Thus, the physical workload has a positive and significant effect on burnout. These results are in line with the theory as well as previous research, which states that physical workload has a significant positive impact on burnout (6,12,19,20)

Another T-test result showed beta coefficient (β) of mental workload on burnout is 0.607, which means that mental workload has a positive effect on burnout of 0.607. The value of tcount is 7.159, and the score of the t-table is 1.667, so the value of tcount is more significant than the t-table value. Thus, the mental workload on burnout is 0.000, where this value is smaller than 0.05. Therefore, the mental workload has a positive and significant effect on burnout. These results are in line with the theory and previous research, which states that mental workload has a significant positive impact on burnout (6,14,19).

Conclusion

The results of the research that have been stated above indicate that the physical workload and mental workload partially have a negative and significant effect on the

performance of nurses. Therefore, hospital management needs to evaluate nurses' physical, mental, and performance periodically.

Burnout does not significantly affect the performance of nurses. From the study results, it can also be seen that the physical workload and mental workload partially have a positive and significant effect on burnout. The overall effect that has been mentioned is a direct effect between variables, while the indirect effect through burnout as an intervening variable has no significant impact.

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References

- (1) Gunawan NPIN, Hariyati RTS, Gayatri D. Motivation as a Factor Affecting Nurse Performance in Regional General Hospitals: A Factors Analysis. *Enfermería Clínica* [Internet]. 2019 Sep;29(S2):515–20.
- (2) Koopmans L. Measuring Individual Work Performance. Leiden: Body@Work; 2014.
- (3) Robbins SP, Judge TA. *Organizational Behavior*. 15th ed. New Jersey: Pearson; 2013.
- (4) Yamin R, Wahyu A, Ishak H, Salmah U, Patittingi F. Effect of BMI, Workload, Work fatigue, and Complaints of Musculoskeletal Disorders on Nurse Performance in Sawerigading Hospital Palopo. *Enfermería Clínica* [Internet]. 2020 Jun;30(4):403–6.
- (5) Shao S-C, Chan Y-Y, Lin S-J, Li C-Y, Kao Yang Y-H, Chen Y-H, et al. Workload of pharmacists and the performance of pharmacy services. *Rovers J*, editor. *PLoS One* [Internet]. 2020 April 21;15(4):1–12.
- (6) Dubale BW, Friedman LE, Chemali Z, Denninger JW, Mehta DH, Alem A, et al. Systematic Review of Burnout Among

- Healthcare Providers in Sub-Saharan Africa. *BMC Public Health* [Internet]. 2019 Dec 11;19(1):1247.
- (7) Hämmig O. Explaining burnout and the intention to leave the profession among health professionals – a cross-sectional study in a hospital setting in Switzerland. *BMC Health Serv Res* [Internet]. 2018 Dec 19;18(1):785.
- (8) Hancock PA, Meshkati N. *Human Mental Workload*. Amsterdam: North-Holland; 1988.
- (9) Tarwaka, Bakri S, Sudiajeng L. *Ergonomi Untuk Keselamatan, Kesehatan Kerja Dan Produktivitas*. 1st ed. Surakarta: UNIBA Press; 2004.
- (10). Rodahl K. *The Physiology of Work*. London: Taylor & Francis; 1989.
- (11) Moghadam NK, Chehrzad MM, Reza Masouleh S, Maleki M, Mardani A, Atharyan S, et al. Nursing Physical Workload and Mental Workload in Intensive Care Units: Are they related? *Nurs Open* [Internet]. 2021;17;8(4):1625–33.
- (12) Waddill-Goad SM. Stress, Fatigue, and Burnout in Nursing. *J Radiol Nurs* [Internet]. 2019 Mar;38(1):44–6.
- (13) Pourteimour S, Yaghmaei S, Babamohamadi H. The relationship between mental workload and job performance among Iranian nurses providing care to COVID-19 patients: A cross-sectional study. *J Nurs Manag* [Internet]. 2021 September 20;29(6):1723–32.
- (14) Werdani YDW. The Effect of Mental Workload On The Nurse's Burnout Level In The Private Hospitals. In: *Proceedings of the 8th International Nursing Conference on Education, Practice and Research Development in Nursing (INC 2017)* [Internet]. Paris, France: Atlantis Press; 2017. p. 36–9.
- (15) Maslach C, Jackson SE, Leiter MP. Maslach Burnout Inventory. In: Zalaquett CP, Wood RJ, editors. *Evaluating Stress: A Book of Resources*. 3rd ed. Lanham: Scarecrow Press; 1997. p. 191–218.
- (16) Dyrbye LN, Shanafelt TD, Johnson PO, Johnson LA, Satele D, West CP. A Cross-sectional Study Exploring the Relationship Between Burnout, Absenteeism, and Job Performance Among American Nurses. *BMC Nurs* [Internet]. 2019 Dec 21;18(1):57.
- (17) Wu G, Hu Z, Zheng J. Role Stress, Job Burnout, and Job Performance in Construction Project Managers: The Moderating Role of Career Calling. *Int J Environ Res Public Health* [Internet]. 2019 July 5;16(13):2394.
- (18) Utami MS. Faktor-Faktor Yang Berhubungan Dengan Kinerja Pada Perawat Di Rumah Sakit Umum Bhakti Asih Ciledug Tangerang Tahun 2018. Universitas Esa Unggul; 2019.
- (19) Dall'Ora C, Ball J, Reinius M, Griffiths P. Burnout in Nursing: a Theoretical Review. *Hum Resour Health* [Internet]. 2020 December 5;18(1):41.
- (20) Yestiana Y, Kurniati T, Hidayat AAA. Predictors of Burnout in Nurses Working in Inpatient Rooms at a Public Hospital in Indonesia. *Pan Afr Med J* [Internet]. 2019 Jun 27;33:148.

