Multilevel Analysis of Nurse's Performance Predictors at Dr. Moewardi Hospital, Surakarta

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ABSTRACT

Background: Nurse Performance plays a role as a determinant of patient satisfaction when providing nursing care. Nursing services in hospitals are one of the determining factors for good or bad service, quality and image of a hospital. Factors that influence nurse performance are gender, working time arrangements, education, work experience and job satisfaction. The aim of this study was to analyze the performance of inpatient and outpatient ward nurses at Dr. Moewardi Hospital.

Subjects and Method: This was a cross-sectional study. The study was conducted at the inpatient and outpatient wards, Dr. Moewardi Hospital, Surakarta, in October-November 2023. A sample of 200 nurses was selected using random sampling. The dependent variable was nurse's performance. The independent variables were gender, working time arrangements, education, work experience and job satisfaction. Data collection was carried out using questionnaires and it was analyzed using a multiple multilevel linear regression.

Results: Gender has an influence and is significant between gender and nurse performance (b = -1.79; 95% CI= -3.13 to -0.45; p = 0.009). Working time arrangements have an influence on nurse performance, and this influence is statistically significant (b = 1.96: 95% CI = 0.39 to 3.54; p = 0.014). Job satisfaction has a positive and significant influence on nurse performance (b = 0.32 CI 95% = 0.10 to 0.4). The results of education and work experience did not show a statistically significant difference in nursing performance between nurses with DIII education and the nursing profession (b = 0.32; 95% CI = -0.86 to 1.51) and work experience of more than 12 years and less than 12 years (b = 0.71; 95% CI= -0.75 to 2.17). There was a contextual influence of the ward on nurse performance (ICC= 15.09%).

Conclusion: Nurse performance is directly influenced by gender, working time arrangements and job satisfaction. Variations at level 2 wards have a contextual influence on nurse performance.

Keywords: multilevel analysis, nurse performance, wards

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BACKGROUND

Hospitals are health services that pay attention to quality which is influenced by human resources. Human resources are a key element for improving the performance of health care systems. The largest number of Human Resources (HR) in hospitals are nurses (Ayalew et al., 2019). Nurses are

workers who provide services and have first contact for up to 24 hours with patients and their families. Nurse performance as a determinant of patient satisfaction when providing nursing care.

Nursing services in hospitals are one of the determining factors for good or bad service, quality and image of a hospital (Zraychikova et al., 2023). Nurses are members of the health team who have a core role in direct patient care, detecting and preventing side effects that occur in patients (Silero and Adelaida, 2019). The increasing workload of nurses in carrying out their duties in health services currently has a negative impact on patients and nurses.

Performance is the result of work that is closely related to the organization's strategic goals, customer satisfaction and economic contribution. The predictors considered to influence nurse performance are gender, working time arrangements, education, work experience and job satisfaction. The individual characteristics possessed by a person can be one of the causes of work stress and will also affect the performance of nurses. Individual characteristics include gender, working time arrangements, education and work experience.

A hospital is a health service institution that provides comprehensive individual health services that provide inpatient, outpatient and emergency services (Permenkes, 2020). Inpatient services according to the Ministry of Health of the Republic of Indonesia in 1997 are services for patients admitted to hospital who occupy treatment beds for the purposes of observation, diagnosis, therapy, medical rehabilitation and/or other medical services. Apart from inpatient services, the hospital also has the rawest outpatient care. Outpatient is one of the work units in a hospital that serves outpatients and provides no more than 24 hours of service,

including diagnostic and therapeutic procedures.

Therefore, the researchers conducted research entitled Multilevel Analysis of Performance Predictors for Inpatient Ward Nurses at Dr. Hospital. Moewardi Surakarta is one of the efforts to improve the quality of nursing services in inpatient wards.

SUBJECTS AND METHOD

1. Study Design
This research is an analytical observational study with a cross-sectional approach.

2. Population and Sample
The population in this study were nurses at Dr Moewardi Hospital. Sample was selected from 25 wards randomly. Total of 200 nurses was included for analysis.

3. Study Variables
The dependent variable was nurse performance. The independent variables were gender, working time arrangements, education, work experience, and job satisfaction.

4. Operational Definition
Nurse Performance: Work performance shown by implementing nurses in carrying out nursing care tasks so as to produce good output to customers (organizations, patients, nurses themselves) within a certain period of time.

Sex: One of the biological characteristics that differentiates between men and women in living organisms, including humans.

Work Time Settings: The time specified to do work. To achieve high work performance, work demands and work capacity must always be in balance, in other words it must not be too low (underload) and it must not be excessive (overload).

Education: All teaching and learning activities carried out consciously, using theory and practice, in order to improve the competence of individuals and groups of people, by bringing about optimal changes

in terms of skills, knowledge and attitudes by using certain learning methods

Work Experience: Time to do an activity or the length of time someone has worked. Work period is a period of time that workers work in a place

Job Satisfaction: An individual's general attitude towards the work they do. Psychological feelings that employees feel about the work they do.

5. Study instruments
The research instruments used for data collection were questionnaires and interviews.

6. Data analysis
Univariate analysis to obtain frequency distribution and percentage characteristics of research subjects. Bivariate analysis to analyze the influence of independent and dependent variables using the chi-square test with a significance level of $p<0.050$, and multivariate analysis using the multiple linear regression test.

7. Research Ethics
Research ethics including informed consent, anonymity, and confidentiality, were handled carefully throughout the research process. A letter of approval for research ethics permission was obtained from the Research Ethics Committee of Dr Moewardi Hospital, Surakarta City No.1.786/X/-HREC/2023, on 09 October 2023.

RESULTS

1. Univariate Analysis
Table 1 shows the results of the 200 research subjects studied, there were 53 male nurses with a percentage of (26.50%), while there were 147 female subjects with a percentage of (73.50%).

Table 1. Univariate analysis of gender, working time arrangements, education, work experience, job satisfaction and performance

Variables	Category	Frequency	Percentage (%)
Gender	Male	53	26.50
	Female	147	73.50
Working Time Management	Shifts	68	34.00
	Non-Shift	132	66.00
Education	Diploma III	95	47.50
	Nursing Profession	105	52.50
Work experience	<12 Years	101	50.50
	≥ 12 Years	99	49.50
Job satisfaction	Not satisfied	47	23.50
	Satisfied	143	76.50`
Performance	Poor	88	44.00
	Good	112	56.00

Nurses who attained DIII education level were 47.50%, 50.50% nurses had <12 years working experience, 23.50% nurses dissatisfied with their job, 56.00% nurses had good performance.

2. Bivariate Analysis
Table 2 shows that male nurses had a good performance compared to female, but it was statistically not significant (OR= 1.36; 95% CI= 0.26 to 1.05; p= 0.071).

There is a significant relationship between working time arrangements and job performance (OR= 0.44; 95% CI= 0.21 to 0.93; p= 0.033). Education level had no significant relationship with job perform-ance (OR= 1.05; 95% CI= 0.57 to 1.93; p= 0.861). Work experience ≥12 years (OR= 1.98; 95% CI= 0.96 to 4.05; p= 0.063) and job satisfaction (OR= 1.36; 95% CI= 0.69 to 2.67; p= 0.371) increased job performance.

Table 2. Bivariate analysis of gender, working time management, education, work experience, job satisfaction and performance

Variables	Category	Performance				Total		OR	CI (95 %)	p
		Poor		Good						
		n	%	n	%	N	%			
Gender	Male	18	20.45	35	31.25	53	100	1.36	0.26-1.05	0.071
	Female	70	79.55	77	68.75	147	100			
Working Time Management	Shifts	25	28.41	43	38.39	68	100	0.44	0.21-0.93	0.033
	Non-Shift	63	71.59	69	61.61	132	100			
Education	Diploma III	39	44.32	56	50.00	95	100	1.05	0.57-1.93	0.861
	Nursing Profession	49	55.68	56	50.00	105	100			
Work experience	<12 Years	47	53.41	54	48.21	101	100	1.98	0.96-4.05	0.063
	≥ 12 Years	41	46.59	58	51.79	99	100			
Job satisfaction	Not satisfied	23	26.14	24	21.43	47	100	1.36	0.69-2.67	0.371
	Satisfied	65	73.86	88	78.57	153	100			

3. Multilevel Analysis

This multivariate analysis explains the influence of more than one independent variable on one dependent variable. Inpatient wards and outpatient wards were studied as level two. There were 25 wards analyzed, namely 15 inpatient wards and 10 outpatient wards at Dr Moewardi Hospital.

a. Gender and Performance

Table 3 shows that there are differences in nurse performance according to gender. Female nurses performed on average 1.79 units lower than male nurses, and the difference was graphically significant (b = -1.79; 95% CI = -3.13 to -0.45; p = 0.009).

b. Working Time Management and Performance

Table 3 shows that there is an influence of work arrangements on nurse performance, and this influence is statistically significant. Nurses who worked without set working hours (non-shift) on average performed 1.96 units better than shift workers (b = 1.96: 95% CI = 0.39 to 3.54; p= 0.014).

c. Education and Performance

Table 3 shows that there is no statistically significant difference in nursing performance between nurses with DIII education and the nursing profession (b = 0.32; 95% CI= -0.86 to 1.51).

d. Working Experience and Performance

Table 3 shows that there is no statistically significant difference in performance between nurses with work experience of more than 12 years and less than 12 years (b= 0.71; 95% CI = -0.75 to 2.17).

e. Job Satisfaction and Performance

Table 3 shows the results that there is a positive and significant influence of job satisfaction on nurse performance. Every 1 unit increase in job satisfaction score will be followed by an increase in performance of 0.32 units (b = 0.32 CI 95% = 0.10 to 0.4).

f. Suitability of Multilevel Analysis Models

Table 3 shows that there is a constant variation in nurse performance originating from the ward with a constant variation= 2.69. The variation at the ward level is relatively large compared to the residual variation = 15.11, which indicates that there is contextual influence at the ward level. The multilevel analysis model is statistically significantly different compared to the multiple linear regression analysis model.

The ward is relatively large compared to the residual variation = 15.11 which indicates contextual influence at the ward level. The contextual influence of the ward is large enough that it cannot be ignored, with ICC = 15.09% > 8 - 10%.

Table 3. Multilevel Analysis Results

Independent Variable	b	CI 95%		p
		Lower Limit	Upper Limit	
Fixed Effect				
Gender	-1.79	-3.13	-0.45	0.009
Working time settings	1.96	0.39	3.54	0.014
Education	0.32	-0.86	1.50	0.593
Work experience	0.71	-0.74	2.16	0.340
Job satisfaction	0.32	0.09	0.544	0.005
Random Effect				
Ward				
Variation (constant)	2.68	0.96	7.46	
N observations = 200				
Group average= 8, min= 7, max= 8				
LR test vs. linear model: chibar2(01) = 8.56				
Prob ≥ chibar2 = 0.0017				
Intra Class Corelation (ICC)= 15.09%				

DISCUSSION

Work carried out in hospitals in inpatient and outpatient wards requires extra energy for nursing actions on patients such as pushing wheelchairs and sleeping places, helping to lift patients, or other emergency actions (Wahyuni and Dirdjo, 2020). Someone with a masculine personality is better able to face incoming stressors without excessive emotional feelings and with lower levels of anxiety compared to someone with a feminine personality (Awalia et al, 2021). Based on table 4, the results of the multilevel analysis of nurse performance according to gender have a significant relationship between gender and nurse performance. Female nurses performed on average 1.79 units lower than male nurses, and the difference was graphically significant (b = -1.79; 95% CI = -3.13 to -0.45; p = 0.009).

Setting working hours can affect work quality and productivity. This is in line with research by Ramadhani et al (2021) that work shifts have a positive and significant effect on nurse performance. The results of multilevel multiple linear regression analysis showed that nurses who worked non-shift on average performed 1.96 units better than shift workers (b = 1.96: 95% CI = 0.39 to 3.54; p= 0.014). Excessive working hours, work shift arrangements can reduce performance efficiency because fatigue and lack of sleep affect performance. Setting working hours can affect work quality and productivity.

The research results show that most professional nurses with education have good performance. This is in line with research by Welembuntu and Iswanto (2020) that there is no significant relationship between recent education and nurses' performance in carrying out nursing care where p value = 0.417. The results of multilevel multiple linear regression showed that there was no statistically significant difference in nursing performance between nurses with DIII education and the nursing profession (b= 0.32; 95% CI = -0.86 to 1.51). Faruk's study (2019) explains that education is a necessity

to support a form of competency improvement activity and is an integral part of human resource management.

Length of work is an important factor in nurse performance. Because the longer someone works, the more experienced they become in their field, even though the results are not significant, this experience also becomes a reference. However, it is not always the case that nurses with more experience and a long period of service will provide better performance (Welembuntu and Iswanto, 2020). The results of the multilevel multiple linear regression analysis showed no statistically significant differences in performance between nurses with work experience of more than 12 years and less than 12 years (b= 0.71; 95% CI= -0.75 to 2.17). This is in line with Welembuntu and Iswanto (2020) that there is no significant relationship between length of work and nurses' performance in carrying out nursing care where p value = 0.416.

The higher the job satisfaction, the better the employee's performance, according to the correlation coefficient value in this study which shows a positive value and has a strong relationship. In line with Novitasari and Niken (2019) that satisfaction is related with nurse performance and has a significant influence at Putera Bahagia Hospital, Cirebon. Multilevel results show a positive and significant influence of job satisfaction on nurse performance. Every 1 unit increase in job satisfaction score will be followed by an increase in performance of 0.32 units (b = 0.32 CI 95% = 0.10 to 0.4).

High job satisfaction gives rise to productive work behavior. In Blomberg and Welander's (2019) research, nurses who find happiness and satisfaction in their work will serve several years and develop satisfaction and enthusiasm that drives them towards productive work behavior.

The influence of wards on nurse performance varies such as ward specialization, number of patients, severity of cases and hospital management system. Ward specialization may require special knowledge and skills from nurses, as well as limited human resources can be an obstacle in providing optimal services. Apart from that, ward management also has an impact, where managers can create a supportive work environment.

Therefore, the ward has a strong influence on the performance of nurses, both in inpatient and outpatient wards. The multilevel analysis model is statistically significantly different from the ordinary linear regression model (p= 0.002). The ward provides quite a large contextual influence on the decision to stop smoking with ICC= 15.09%. This figure is greater than the rule of thumb benchmark figure of 8-10%. This means that 15.09% of the variation in nurse performance is determined by factors at the ward level.

AUTHOR CONTRIBUTION

CONFLICT OF INTEREST

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