ANALYSIS OF THE EFFECT OF WORKLOAD, WORK SHIFTS AND SLEEP QUALITY ON WORK PRODUCTIVITY THROUGH JOB FATIGUE IN NURSES AT BATARA GURU REGIONAL GENERAL HOSPITAL, LUWU REGENCY.

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KEYWORDS

Workload, Work Shifts, Sleep Quality, Work Fatigue, Work Productivity, Nurses.

ABSTRACT

Background. Workload, work shifts and sleep quality are several important factors that trigger fatigue in a nurse which ultimately contributes to nurse work productivity. **Objective.** This study aims to analyze the influence of workload, work shifts and sleep quality on work productivity through work fatigue in nurses at Batara Guru Regional Hospital, Luwu Regency. **Method.** This research uses a quantitative approach with a cross-sectional design. The sample consisted of 200 nurses as respondents who were selected using the Probability Random Sampling technique. Data collection was carried out using a questionnaire involving variables such as workload, work shifts, sleep quality, work fatigue and work productivity. **Results.** The analysis revealed that workload had no significant direct impact on work fatigue (P = 0.787) or productivity (P = 0.862). In contrast, shift work exhibited a significant positive direct effect on work fatigue (estimate = 0.518, P = 0.003) and a significant negative direct effect on work productivity (estimate = -0.466, P = 0.000). Meanwhile, sleep quality has a significant positive direct influence on work fatigue (estimate = 0.616) & (P = 0.004) and has a significant negative direct influence on work productivity (estimate = -0.600) & (P = 0.000). Through job tiredness, workload does not have an indirect impact on productivity, according to indirect influence results (P=0.768). In the meantime, work tiredness (P=0.006) and (P=0.001) are indirect effects of work shifts and quality on work productivity. **Conclusion.** Work shifts and sleep quality significantly impact work fatigue and work productivity directly. They also indirectly affect work productivity through work fatigue. In contrast, workload neither directly influences work fatigue and productivity nor indirectly impacts productivity through work fatigue.

Introduction

Hospital is one of the means to provide health services to the community, so the hospital must provide satisfactory health services so that patients feel happy to seek treatment at the hospital(1) . Therefore, to maintain the quality of health services, hospital management must meet the service standards that have been determined, so that each patient will get quality services that are efficient and effective for improving health (2) . The hospital is a comprehensive individual health care institution that provides outpatient, inpatient, and emergency services. Plenary services are health services that include curative, preventive, promotive, and rehabilitative .(3)

Nurses are one of the important elements of hospitals in providing health services to the community. They are professionals who interact more frequently with patients or other recipients of health services in hospitals. They are part of the health team that faces patient health problems every day for 24 hours. The responsibility as a nurse is not only to a single person or individual but also to the caregiver of the patient's family, and the community. (4). Nurses as health workers recognized by the government in Law no 38 of 2014 must be able to work professionally and must have the ability and responsibility in carrying out nursing care (5) . In addition to nursing care, nurses must also be able to do several other jobs, such as installing intravenous catheters, hacting wounds, conducting nursing documentation and cleaning medical instruments (6). In addition to the main work, nurses must also continue to be friendly, polite and warm to patients and their families. So that special skills are needed in communicating in order to maintain the continuity of information If there is a misunderstanding in communication, it will cause work stress in nurses.

Nursing is a profession with diverse work demands, including the main task of caring for patients, shift work, organizational demands, work environment, and additional tasks outside of their main function (7) . The duties and responsibilities of nurses are not light things to carry. This can cause work stress in nurses. Stress faced by nurses at work will greatly affect the quality of nursing services provided to patients. Work stress will affect the physical, psychological and attitudinal conditions of nurses (8) . The negative behavior of workers who experience stress is correlated with work results, increased absenteeism, tendency to have work accidents, so that the negative impact caused is an obstacle both in management and work operations and can reduce work productivity, especially the quality of service, this can be seen from existing data in various countries (9) . The recovery of patients who are treated is one of the goals of patient care in the hospital. In order to support the recovery of patients, the role of nurses is very decisive in providing care in hospital services (10) . Based on data from the World Health Organization (WHO) in 2020 nurses worldwide numbered 27.1 million, in Brazil as many as 3,182,024 people with a proportion (75.7%), Zimbabue as many as 1,317,614 people with a proportion (56.8%) while India as many as 976,614 people with a proportion (56.8%) (4). In Indonesia, the number of nurses working in hospitals is 219,264 (45.65%) of the total number of health workers in hospitals in Indonesia. Nationally, the number of nurses is 87.65/100,000

population. This number is still far from the national target of 180/100,000 of Indonesia's population set for 2020. If this is not matched by an adequate number of workers, it will cause the workload to increase (11).

Nurse workload is all activities carried out by nurses in carrying out their duties in a nursing service unit. Workload can also be defined as the total amount of direct and indirect nursing time in providing nursing services needed by patients and is related to the number of nurses needed to provide these services. Workload consists of quantitative workload and qualitative workload. Quantitative workload can be the amount of work that must be done to meet the health needs of patients. Qualitative workload is a high level of responsibility in providing health services to patients. High workload for nurses can cause fatigue and exhaustion so as to reduce work productivity and have an impact on the performance provided to patients (12) . In terms of workload, there are many demands such as filling out complete nursing records, changing patient bed linen, bathing patients. This is what makes the workload felt by nurses very heavy and makes it easy to get tired, so that it will have an impact on the performance of the nurses themselves so that it has an impact on the services provided by nurses to patients (13).

The workload of nurses in hospitals includes physical loads, such as lifting and caring for patients, as well as mental loads, such as working shifts, handling critical situations, and being responsible for the patient's recovery (14) . The demands of service to patients that must be optimized make nurses must be willing to work in shifts. Shift work is an option in organizing work to maximize work productivity as a fulfillment of patient demands (15) . Based on research conducted by Riska in 2019, it is stated that work shift arrangements can cause fatigue complaints in nurses on duty. Complaints of fatigue in nurses such as headache symptoms after working in the night shift, decreased concentration, frequent yawning and feeling tired throughout the body (16). The duration of work is regulated in Indonesian Law No. 13 of 2003 Article 77, with provisions of 7-8 hours / day or 40 hours / week, but nurses at Batara Guru Luwu Hospital have night shifts of 11 hours duration, causing fatigue complaints due to sleep disturbances and circadian rhythms. Disturbed sleep patterns reduce sleep quality, which negatively affects the quality of nursing services, increases the risk of errors, and threatens patient safety(17).

Night work in nurses can disrupt sleep quality, which results in decreased productivity, physiological balance (fatigue and decreased endurance), and psychological (stress, anxiety, and lack of concentration) (18). Sleep disturbances in night shift workers can reduce sleep quality, which is important for body recovery, stress reduction, and improved concentration (19). Nurses' work as health workers can experience sleep quality disturbances as a result of night work. The slow reaction of a person in doing work, one of which can be caused by a lack of sleep, can have an impact on productivity. Lack of sleep or insufficient sleep time can cause drowsiness and increase the tendency to sleep. The impact of sleep deprivation or drowsiness is that reaction time becomes slower resulting in decreased alertness and the inability to provide a quick and appropriate response (20).

Nursing services that are generally provided for 24 hours a day are often accompanied by high mental, physical, and time demands that have the

potential to cause work fatigue and disruption of sleep quality in nurses. Occupational fatigue is an acute or chronic condition that causes physical, mental, or emotional fatigue, thus preventing a person from carrying out their activities. The main characteristic of fatigue is a decrease in physical capacity or a decrease in performance (21). The impact of work fatigue includes decreased alertness and concentration, disruption of the decision-making process, reduced motivation, and reduced energy in carrying out tasks that can increase the risk of work accidents to fulfillment Productivity (22). Work fatigue in nurses reduces effectiveness, physical capacity, productivity, and increases the risk of errors, stress, injuries, and occupational diseases (23). So the purpose of this study is to analyze the effect of workload, work shift, and sleep quality on work productivity through work fatigue in nurses at Batara Guru Hospital, Luwu Regency.

Participants & Methods

This study used quantitative methods with analytic observational research design and cross-sectional design. The research was conducted at Batara Guru Regional General Hospital (RSUD), Luwu district, South Sulawesi, in October - November 2024. The population of nurses was 380 people. So that the sample selection was carried out using the probability random sampling technique and the Slovin formula so that the number of samples used was 197 which was rounded up to 200 nurses. Research instruments include respondent willingness forms, respondent identity, and questionnaires to measure workload, work shifts, sleep quality, work fatigue and work productivity. Data were analyzed univariate, bivariate with chi-square test, and multivariate using path analysis using AMOS software.

Findings

The characteristics of the 200 nurses who were respondents in this study. For the age of respondents, it is known that the majority are <35 years old, namely 160 respondents or 80%. For gender, the majority of respondents were female as many as 169 respondents or 84.5%. For the tenure of the majority of workers ≤ 5 years of work as many as 104 respondents or 52%. And in the distribution of length of work, it is known that all nurse respondents work for 8 hours / day or more with a percentage of 100%

In the Workload variable where the final assessment results will be categorized into two categories, namely, Nurses with heavy workloads as many as 167 respondents or a percentage of 83.5% and Nurses with light workloads as many as 33 respondents or a percentage of 16.5%. measurement of the impact of work shifts on nurses shows that, there are 165 or (82.5%) Nurses feel the bad impact of work shifts and as many as 35 or (17.5%) Nurses feel the good impact of work shifts. The results of measuring Sleep Quality in Nurses show that, there are 181 or (90.5%) Nurses with poor Sleep Quality and as many as 19 or (9.5%) Nurses with good sleep quality. the results of measuring Work Fatigue in Nurses show that, 178 or (89%) Nurses in the category of Fatigue and as many as 22 or (11%) Nurses in the category of not experiencing fatigue. the results of measuring Work Productivity in Nurses

show that, 147 or (73.5%) Nurses in the category of less Work Productivity, there are 53 or (26.5%) Nurses in the category of Good Productivity.

1. Bivariate Analysis

The results of the crosstabulation between the independent variables and the dependent variable are as follows.

Table 1. Relationship between workload and work productivity

Load Work	Work Productivity				Total		P-value
	Less		Good				
	N	%	n	%	N	%	
Weight	118	59.0	47	23.5	165	82.5	0.740
Lightweight	26	13.0	9	4.5	35	17.5	
Total	144		56		200	100	

Based on the chi-square test analysis, the P-value is 0.740 where the result is > 0.05, meaning that there is no significant relationship between workload and work productivity in nurses at Batara Guru Hospital, Belopa, Luwu Regency.

Table 2 . Relationship between work shift and work productivity

Shift Work	Work Productivity				Total		*P-value*
	Less		Good				
	N	%	n	%	N	%	
Bad	123	61.5	40	20.0	163	81,5	0.022
Good	21	10.5	16	8.0	37	18,5	
Total	**144**		**56**		**200**	**100**	

Based on the chi-square test analysis, the P-value is 0.022. Where these results are <0.05, meaning that there is a significant relationship between work shifts and work productivity in nurses at Batara Guru Belopa Hospital, Luwu Regency.

Table 3. Relationship between Sleep Quality and Work Productivity

Sleep Quality	Work Productivity				Total		*P-value*
	Less		Good				
	N	%	N	%	N	%	
Bad	137	68.5	43	21.5	180	90.0	0.000
Good	7	3,5	13	6.5	20	10.0	
Total	**144**		**56**		**200**	**100**	

Based on the chi-square test analysis, the P-value is 0.000 where the result is <0.05, meaning that there is a significant relationship between sleep quality and work productivity in nurses at Batara Guru Hospital, Belopa, Luwu Regency.

Table 4. Relationship between job fatigue and work productivity

Fatigue Work	Work Productivity				Total		*P-value*
	Less		Good				
	N	%	N	%	N	%	
Tired	8	4.0	14	7.0	22	11	0.000
Not Tired	136	68.0	42	21.0	178	89	
Total	**144**		**56**		**200**	**100**	

Based on the chi-square test analysis, the P-value is 0.000 where the result is <0.05, meaning that there is a significant relationship between job fatigue and work productivity in nurses at Batara Guru Belopa Hospital, Luwu Regency.

2. Multivariate Analysis

In this study, the path model that will be constructed is the effect of workload, work shifts and sleep quality on work productivity through job fatigue. The following is an image of the construction of the path analysis model In this model, the work fatigue variable becomes an intermediate variable in modeling workload, work shifts and sleep quality on work productivity.

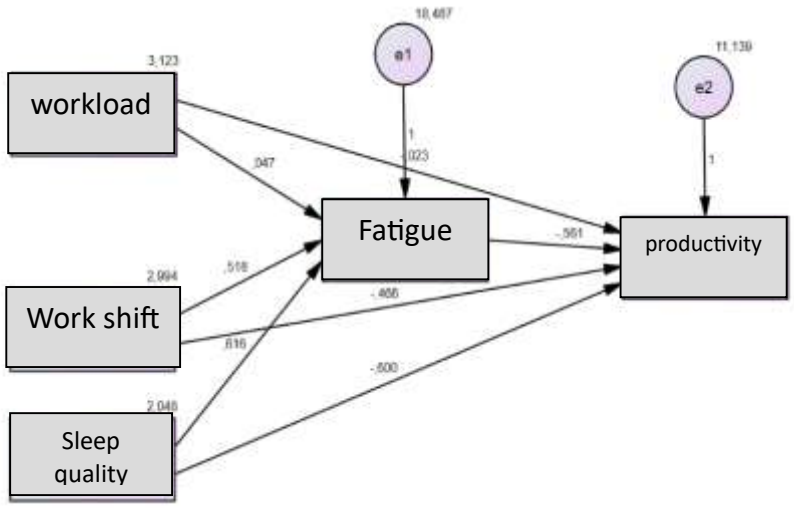

Figure 1. Path Analysis Model Construction

There are 7 hypotheses that can be investigated in the direct effect, here are the results of testing the direct hypothesis:

Table 5. Parameters and hypothesis testing of direct effects

Influence			Estimate	S.E.	C.R.	P
Fatigue	<---	Workload	,047	,173	,270	,787
Fatigue	<---	Shift_Work	,518	,177	2,926	,003
Fatigue	<---	Quality_Sleep	,616	,214	2,882	,004
Prodocivity	<---	Fatigue	-,561	,055	-10,201	***
Prodocivity	<---	Workload	-,023	,135	-,174	,862
Prodocivity	<---	Quality_Sleep	-,600	,169	-3,544	***
Prodocivity	<---	Shift_Work	-,466	,140	-3,319	***

* p-Value < 0.05: Significant effect

The analysis showed that Workload had no significant effect on Work Fatigue (P=0.787) or Work Productivity (P=0.862). In contrast, Work Shift had a significant effect on Work Fatigue (estimate=0.518; P=0.003) and Work Productivity (P=0.000), with fatigue having a significant negative impact on productivity (estimate=-0.561; P=0.000). Sleep Quality also had a significant effect on Work Fatigue (estimate=0.616; P=0.004) and Work Productivity (estimate=-0.600; P=0.000), suggesting that poor sleep quality increases fatigue and decreases productivity.

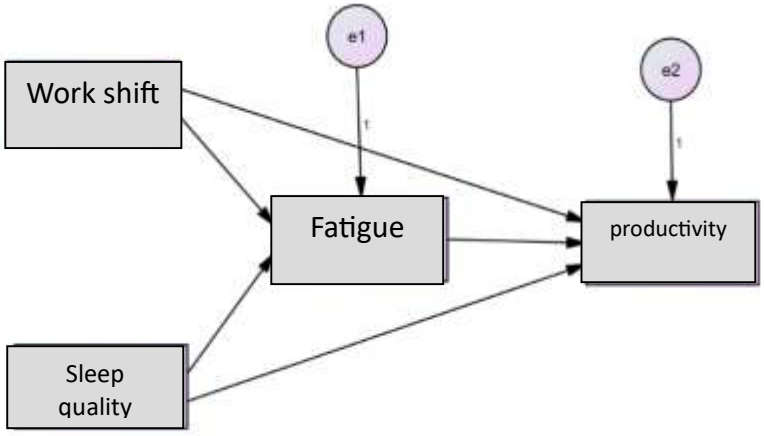

Figure 2. Construction of the Latest Modified Model Path Analysis

Table 6. Parameters and hypothesis testing of indirect effects

Indirect influence	Path Coefficient	P value
Workload-> Fatigue -> Productivity	-0,167	0,768
Shift work -> Fatigue -> Productivity	-0,466	0,006
Sleep quality -> Fatigue-> Productivity	-0,539	0,001

*P value <0.05 there is a significant effect

Based on the analysis, Sleep Quality has a significant negative effect on Work Productivity through Work Fatigue (P=0.001; coefficient=-0.539), and Work Shift also has a significant negative effect on Work Productivity through Work Fatigue (P=0.006; coefficient=-0.466). In contrast, Workload has no indirect effect on Work Productivity through Work Fatigue (P=0.768; coefficient=-0.167).

3. Discussion

a. Effect of Workload on Job Fatigue

Overall, the measurement of workload on nurses carried out, the results of hypothesis analysis show that workload has no influence on job fatigue. The results of the analysis showed an Estimate value of 0.047; a Std Error value of 0.173; a C. R value of 0.270; and P-value of 0.787. The P-value obtained is 0.787 which indicates that this effect is not statistically significant, meaning that Ho is accepted with the conclusion that there is no significant direct effect between workload and job fatigue. One study that supports this argument is a study by

Amini et al. (2020) which showed that although nurses in hospitals had high workloads, psychosocial factors such as social support from coworkers and leaders had more influence on their fatigue levels than the workload itself. In this study, although there was an association between high workload and fatigue, social support and positive working conditions could reduce the negative impact of workload on fatigue (24).

b. Effect of Workload on Work Productivity

The results of the hypothesis analysis show that mental workload has a significant effect on work productivity The results of the analysis show an Estimate value of -0.023; Std Error value of 0.135; C value. R value of -0.174; and P-value of 0.862. The P-value obtained is 0.862 which indicates that this effect is not statistically significant, meaning that Ho is accepted with the conclusion that there is no significant direct effect between workload and work productivity.
Hospitals with well-planned rotation systems, equitable task sharing, and effective supervisory support show stable levels of nurse productivity despite workload variations. This suggests the importance of collaboration with work teams and management support in helping nurses manage their workload (25).

c. The Effect of Shift Work on Occupational Fatigue

The results of hypothesis analysis show that work shifts have a significant influence on Work Fatigue. The results of the analysis show an Estimate value of 0.518; a Std Error value of 0.177, a C. R value of 2.926; and P-value of 0.003. The P-value obtained is 0.003 which indicates that this direct effect is statistically significant. This indicates that there is a significant direct effect between work shifts and job fatigue, in the sense that there is a unidirectional relationship between work shifts and job fatigue, the worse the impact of work shifts, the more tired nurses will be. Through the change in working hours from day to night causes changes in cicardian rhythm which results in impaired body function, including causing fatigue and decreased blood pressure, especially in night shift workers (26).

d. Effect of Work Shift on Work Productivity

The results of hypothesis analysis show that work shifts have a significant influence on work productivity. The analysis results show an Estimate value of -0.600, a Std Error value of 0.169; a C. R value of -3.544; and P-value of 0.000. The P-value obtained is 0.000 and the estimate is -0.600 which indicates that this direct effect is statistically significant. This indicates that there is a significant negative influence between work shifts and work productivity, in the sense that there is an unidirectional relationship between work shifts and work productivity. The higher or worse the impact of work shifts, the more nurses' productivity will decrease.

e. Effect of Sleep Quality on Work Fatigue

The results of hypothesis analysis show that quality has a significant influence on Work Fatigue. The analysis results show an Estimate value of 0.616; a Std Error value of 0.214; a C. R value of 2.882,

and P-value of 0.004. The P-value obtained is 0.004 and the estimate is 0.616 which indicates that this direct effect is statistically significant. This indicates that there is a significant influence between sleep quality and work fatigue, meaning that there is a unidirectional relationship between sleep quality and work fatigue. The worse the quality of sleep, the more tired the nurse will be. One of the causes of work fatigue is sleep disturbance which can be influenced by lack of sleep time and disruption of circadian rhythms due to work shifts. Cyrcardian rhythms function in regulating sleep, readiness for work, autonomic and vegetative processes such as metabolism, body temperature, heart rate and blood pressure. These functions are called regular daily cycles (27).

f. Effect of Sleep Quality on Work Productivity

The results of hypothesis analysis show that sleep quality has a significant influence on work productivity. The analysis results show an Estimate value of -0.466; Std Error value of 0.140; C value. R value of -3.319; and P-value of 0.000. The P-value obtained is 0.000 and the estimate value that mines indicates that this direct effect is negatively statistically significant. This indicates that there is a significant direct effect between sleep quality and work productivity, in the sense that the worse the quality of sleep, the more nurses' work productivity will decrease. Sleep disorders can have several effects on humans. When sleep deprived a person will think and work more slowly, make many mistakes, and find it difficult to remember things. This results in decreased work productivity and can cause accidents (28).

g. The Effect of Job Fatigue on Work Productivity

The results of the analysis show that Work Fatigue has a significant negative effect on Work Productivity (estimate=-0.561; P=0.000), which means that the more tired the nurse is, the lower their work productivity. Fatigue reduces energy, concentration, and decision-making, increases operational errors, and decreases work efficiency and quality, which adversely affects overall team productivity (29).

h. The Effect of Workload on Work Productivity through Job Fatigue

The analysis shows that job burnout does not have a significant mediating effect between workload and work productivity. The path coefficient of job fatigue is -0.167 and the P-value of 0.768, which is greater than 0.05, indicates that job fatigue does not act as a significant mediator in the relationship between workload and work productivity.

i. The Effect of Shift Work on Work Productivity through Job Fatigue

The results of this study indicate that job fatigue has a significant mediating effect between work shifts and worker productivity. The path value of the work fatigue coefficient is -0.466 and the P value of 0.006 is smaller than 0.05, which indicates that the mediating effect of work fatigue is significant. The negative value of the path coefficient indicates that there is an inverse direction in influencing the variable,

the worse the impact of work shifts, the more tired workers are, the more workers' productivity will decrease, and vice versa.

j. Effect of Sleep Quality on Work Productivity through Job Fatigue

The results of this study indicate that job fatigue has a significant mediating effect between sleep quality and workers' work productivity. The path value of the work fatigue coefficient is -0.539 and the P value of 0.001 is smaller than 0.05, which indicates that the mediating effect of work fatigue is significant. The negative value of the path coefficient indicates that there is an inverse direction in influencing the variable, the worse the sleep quality, the more tired the worker, the more the worker's productivity will decrease, and vice versa.

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