

Work Stress, Fatigue, Shift Work, Workload Intensity, and Patient Safety Incidents Among Nurses

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ABSTRACT

The prevalence of Patient Safety Incidents (PSIs) in Indonesia from 2015 to 2019 has increased. However, there have been limited previous studies addressing the correlation between work stress, fatigue, shift work, workload intensity, and patient safety incidents among nurses. This study aims to examine the correlation between work stress, fatigue, shift work, workload intensity, and patient safety incidents among nurses. The cross-sectional study was conducted from September to November 2023. The purposive sampling technique was used to obtain a sample of 157 respondents. Data collection used questionnaires and internal reporting of PSIs. Data analysis was performed using descriptive and Chi-Square tests. There was a significant correlation between work stress (OR=3.361, 95% CI=1.688-6.693), fatigue (OR=5.690, 95% CI=1.873-17.284), shift work (OR=1.062, 95% CI=0.560-2.015), workload intensity (OR=2.227, 95% CI=1.155-4.297), and patient safety incidents among nurses. Nurses need to be aware of their levels of stress and fatigue, and they should develop stress management and coping strategies to overcome these challenges, enabling them to work optimally. Hospital management should pay increased attention to the issues of stress and fatigue experienced by nurses, particularly those with heavy workloads and night shifts.

Kata kunci:

Kelelahan;
Perawat;
Insiden keselamatan pasien;
Shift;
Stres;
Beban kerja

Prevalensi IKP di Indonesia tahun 2015-2019 mengalami peningkatan. Namun, penelitian sebelumnya terkait hubungan stres pekerjaan, kelelahan, shift kerja, intensitas beban kerja dengan kejadian IKP pada perawat masih terbatas. Penelitian ini bertujuan untuk mengetahui hubungan antara stres pekerjaan, kelelahan, shift kerja, intensitas beban kerja dengan kejadian insiden keselamatan pasien pada perawat. Studi cross sectional ini dilaksanakan pada September-November 2023. Teknik pengambil sampel menggunakan purposive sampling dengan sampel sebanyak 157 orang. Teknik pengumpulan data menggunakan kuesioner dan data pelaporan IKP secara internal. Analisis data dengan menggunakan analisis kuantitatif. Data yang terkumpul dianalisis secara deskriptif dengan Chi Square. Terdapat hubungan antara stres pekerjaan (OR=3.361, 95% CI=1.688-6.693), kelelahan (OR=5.690, 95% CI=1.873-17.284), shift kerja (OR=1.062, 95% CI=0.560-2.015), dan intensitas beban kerja (OR=2.227, 95% CI=1.155-4.297) dengan kejadian insiden keselamatan pasien pada perawat. Perawat perlu menyadari tingkat stres dan kelelahan yang dialaminya, serta memiliki manajemen stres dan coping sebagai upaya menagatsinya agar dapat bekerja dengan optimal. Manajemen rumah sakit harus memberikan perhatian lebih terhadap permasalahan stres dan kelelahan yang dialami oleh perawat, terutama pada perawat dengan beban kerja berat dan shift malam hari.

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INTRODUCTION

The report from the National Health Service (NHS) in 2015 stated that there was a total of 825,416 incidents of patient safety in the United Kingdom, with a mortality rate of 0.22%. According to the National Patient Safety Agency (NPSA) report for January-March 2017, there were 1,879,822 incidents of Adverse Events (AEs) in the United Kingdom. The Ministry of Health Malaysia reported 2,769 cases of AEs in 2013 (Lee, 2006). The Indonesian Hospital Patient Safety Committee reported that between 2006-2011, there were



a total of 877 Patient Safety Incidents (PSIs), while between 2015-2019, there were 11,558 incidents. In 2019, there were 171 deaths as a result of PSIs (Daud, 2020). Additionally, based on the latest data until 2022, there were 1,729 reported cases of AEs, 1,689 cases of near-miss incidents, and 1,541 cases of no-harm incidents (Indonesian Ministry of Health, 2022). A patient safety incident is an event that could have resulted or did result, in unnecessary harm to a patient (WHO, 2010). According to the World Health Organization (WHO), in 2015, there were approximately 421 million inpatient admissions worldwide each year, with 42.7 million experiencing adverse effects during their hospital stay. Various medical procedures and risks associated with healthcare pose challenges to patient safety and significantly contribute to the burden of harm due to the insecurity of care (WHO, 2019).

Some studies proved that there are factors that can influence PSI, such as stress, fatigue, shift work, and workload intensity. The study conducted by Park and Kim (2013) stated that 27.9% of healthcare professionals in Korea experienced patient safety incidents. This study indicates that job stress is a significant predictor of patient safety incidents. The study conducted by Lee (2006) explained that as job stress increases, the occurrence of patient safety incidents also rises. Bilal and Sari (2020) asserted that fatigue can lead to medical errors and influence patient safety and that fatigue can result in negative outcomes in patient care (Dunn et al., 2021). National Safety Council (2017) indicates that 13% of injury incidents are associated with work-related fatigue. Olds and Clarke (2010) conducted a study that revealed a relationship between the duration of hospital staff shifts and an increased risk of medication errors. The data indicated that staff working an average of more than 40 hours per week were more likely to make medication errors (approximately 14-28%). For each additional hour of paid voluntary work exceeding 12 hours, there was a 2% increase in the likelihood of medication errors. Liu et al. (2012) stated that overtime work hours for staff were positively associated with patient safety indicators. Magalhães et al. (2017) demonstrated a significant relationship between hospital staff workload and patient safety. This study conducted in the United Kingdom revealed that hospitals with an average of 6 patients or fewer per nurse had a 20% lower mortality rate compared to hospitals with 10 patients or more per nurse. Carlesi et al. (2017) also conducted research, finding a 71.1% incidence of incidents and establishing a correlation between nurse workload and patient safety incidents. Specifically patient falls.

Reporting of PSIs in Indonesia remains low due to challenging data acquisition. Lack of understanding of incident reporting, blaming culture, fear of lawsuits, lack of socialization and training, inadequate facilities, no feedback, and no rewards and punishments system to report the incidents were identified as reasons for low patient safety incident reporting among nurses (Pramesona et al., 2023). This difficulty arises from issues within the reporting system, where, ideally, all healthcare facilities should report every incident to the patient safety committee. Failure to report incidents will escalate the social and economic burden due to preventable deaths and incidents (Tirzaningrum et al., 2022).

Healthcare professionals work in both shift and non-shift patterns (Vilia et al., 2014). Healthcare professionals in non-shift roles include department heads, deputy department heads, supervisors, and coordinators, who perform their duties in the morning from 07:00 a.m. to 02:00 p.m. Meanwhile, healthcare professionals working in the shift system are divided into three shifts: morning shift (07:30 a.m. - 02:00 p.m.), afternoon shift (02:00 p.m.

- 09:00 p.m.), and night shift (09:00 p.m. - 07:30 a.m.). The scheduling of these shifts adopts a rapid rotation with a 2-2-3 pattern (morning, morning, afternoon, afternoon, night, night, night) with days off every 4 weeks. This shift model aligns with practices recommended in the United States (Saftarina & Hasanah, 2014).

Research related to job stress (Eryuda, 2017) and work fatigue (Vilia et al., 2014) among nurses has been conducted. However, there have been limited studies examining the correlation between job stress, fatigue, work shifts, workload intensity, and patient safety incidents among nurses. This study aims to examine the correlation between job stress, fatigue, work shifts, workload intensity, and patient safety incidents among nurses.

RESEARCH METHOD

Design, sample, and study setting

This research applies a cross-sectional approach for data collection conducted from September to November 2023. The study population comprises 227 nurses in the nine inpatient units at a tertiary-level hospital in Lampung province, Indonesia. This study involved 157 nurses from 9 different departments. The departments were internal medicine, pediatrics, surgery, perinatology, midwifery, neurology, pulmonary, cardiology, ophthalmology, and Ear Nose Throat (ENT). Purposive sampling was used to obtain the respondents. The respondents who had been working for at least one year had a minimum education level of Diploma III and worked at 9 departments (internal medicine, pediatrics, surgery, perinatology, midwifery, neurology, pulmonary, cardiology, ophthalmology, and ENT) were included in this study. In contrast, respondents who were the head and deputy head of the department, supervisor, coordinator, nurse on leave, sick, or undergoing training, and refused to participate as respondents were excluded from this study.

Instruments

Primary data collection involved the use of the Perceived Stress Scale (PSS-10) questionnaire for stress assessment. The PSS-10 questionnaire is a psychological assessment instrument designed to measure the level of stress. This questionnaire consists of 10 questions, including 4 positive questions and 6 negative questions related to the feelings and thoughts of the respondents in the last month. Each question has response alternatives: (0) never, (1) almost never, (2) rarely, (3) often, (4) always. For questions number 4, 5, 7, and 8, which are positive questions, the scores are transformed as follows: 0 = 4, 1 = 3, 2 = 2, 3 = 1, and 4 = 0. Data is categorized into 3 categories based on the total scores such as mild stress (0-13), moderate stress (14-26), and severe stress (27-40) (Cohen et al., 1983).

The Assessment Instrument for Work Fatigue used the KAUPK2 questionnaire for fatigue evaluation. The KAUPK2 questionnaire is a subjective assessment instrument designed to identify early symptoms of work fatigue. This questionnaire consists of 17 questions, comprising 7 questions related to activity impairment, 3 questions on motivational decline, and 7 questions regarding physical symptoms. Each question provides response alternatives, namely (1) never, (2) rarely, and (3) often. After summing the scores, it is categorized as normal (<20), tired (20-31), and very tired (>31) (Setyawati, 1994).

The researcher developed a work shift questionnaire to classify work shifts into morning, afternoon, and night shifts. The questionnaire includes questions related to the

dominance of work shifts experienced in the last week, work shifts on the previous day, the duration of shift changes, and the duration of work shifts on each day. The data is categorized as morning shift, afternoon shift, and night shift.

The questionnaire by Nursalam (2015) was used for workload intensity assessment. The workload intensity questionnaire consists of 13 questions, comprising 6 questions related to physical aspects and 7 questions related to psychological aspects. The provided response alternatives include (1) never, (2) rarely, (3) often, and (4) always. The total scores of workload intensity data are categorized as light workload (13-25), moderate workload (26-38), and heavy workload (39-52).

Secondary data collection related to patient safety incidents (PSIs) utilized internal PSIs to report data within the hospital. This data encompasses incidents of PSIs in patients who have been treated in the inpatient unit over the past year. In this regard, the researcher collaborates with the Hospital Patient Safety and Quality Assessment Committee. The cases of PSI data are categorized as Yes (≥ 1) or No (0).

The validity and reliability of the questionnaire were measured. The validity and reliability test used the Pearson product-moment test with an R-table of 0.361. The reliability test was done with a significant level (alpha values >0.6). The work stress questionnaire, with a validity score of 0.69-0.82 and a reliability score of 0.825, was declared valid and reliable. The fatigue questionnaire, with a validity score of 0.56-0.89 and a reliability score of 0.783, was declared valid and reliable. The workload intensity questionnaire, with a validity score of 0.42-0.83 and a reliability score of 0.834, was declared valid and reliable.

Data collection and analysis

The researcher coordinated with the head nurses in all inpatient rooms. The researcher directly provided the questionnaire for the midwifery, ophthalmology, and ENT departments. Meanwhile, the questionnaire for internal medicine, pediatrics, surgery, perinatology, neurology, pulmonary, and cardiology departments was provided by head nurses to the respondents. The researcher and the head nurses have carried out a common perception before providing the questionnaire. The respondents were instructed on how to fill out the questionnaire by the researcher, and they had 10-15 minutes to fill out the questionnaire. After that, the researcher collected and ensured that the respondents filled out all questionnaires. The data were analyzed using SPSS 26. As a result, the Chi-Square test was chosen as the bivariate test in this study. Furthermore, the results are shown in the table 2, table 3, and table 4.

Ethical consideration

This study has Ethical Approval by the Institutional Review Board of Health Research Faculty of Medicine of the Universitas Lampung with Number 3439/UN26.18/PP.05.02.00/2023 on October 31, 2023, and the Institutional Review Board of Health Research at Dr. H. Abdul Moeloek Regional General Hospital Bandar Lampung with Number 016/KEPK-RSUDAM/X/2023 on October 31, 2023.

RESULTS AND DISCUSSION

Distribution of Work Stress, Fatigue, Work Shifts, and Workload Intensity

According to Vincent, Taylor-Adams, and Stanhope (1998), patient safety incidents are influenced by several factors, including external, organizational, and management, work environment, team, individual, task, and patient characteristics. Individual factors encompass work stress and fatigue, while work environment factors include work shifts and workload intensity. The following outlines the distribution of work stress, fatigue, work shifts, and workload intensity among nurses:

Table 1. Characteristics of the Respondents (n=157)

Characteristic	Frequency (n)	Percentage (%)
Age		
< 38 years old	71	45.2
≥ 38 years old	86	54.8
Gender		
Man	34	21.7
Woman	123	78.3
Education Level		
Diploma IV	12	7.6
Diploma III	89	56.7
Bachelor's degree	55	35
Master's degree	1	0.7
Length of Working		
< 14 years	84	53.5
≥ 14 years	73	46.5
Departments		
Internal medicine	18	11.5
Pediatrics	18	11.5
Surgery	28	17.8
Perinatology	22	14
Midwifery	19	12
Neurology	14	8.9
Pulmonary	13	8.3
Cardiology	15	9.6
Ophthalmology and ENT	10	6.4

Table 1 indicates that most respondents were women (78.3%), ≥38 years old (54.8%), had a Diploma III educational background (56.7%), were working at the surgery department (17.8%), and had been working for <14 years (53.5%).

Table 2. Distribution of Work Stress, Fatigue, Work Shifts, and Workload Intensity among Nurses (n=157)

Variable	Frequency (n)	Percentage (%)
Work Stress		
Mild	67	42.7
Moderate	90	57.3
Severe	0	0

Table 2. Distribution of Work Stress, Fatigue, Work Shifts, and Workload Intensity among Nurses (n=157) (cont')

Variable	Frequency (n)	Percentage (%)
Fatigue		
Normal	29	18.5
Tired	78	44.6
Very tired	58	36.9
Work Shifts		
Morning	73	46.5
Afternoon	33	21
Night	51	32.5
Workload Intensity		
Light	0	0
Moderate	71	45.2
Heavy	86	54.8

Table 2 indicates that respondents experienced moderate stress (57.3%), felt tired (44.6%), worked morning shifts (46.5%), and had a high workload intensity (54.8%). The following are the contributing factors to the occurrence of patient safety incidents:

1) Work Stress

Work stress is defined as an emotional and psychological reaction that occurs in situations hindering the achievement of goals and is beyond one's coping abilities. Nurses with work responsibilities exceeding their capacity can lead to serious health issues, including physical, physiological, and psychological disorders (Herqutanto, 2017).

2) Fatigue

Fatigue can be identified through a decrease in motivation to work, resulting from various factors. Fatigue can diminish the work capacity and physical resilience of nurses in performing their duties. Nurses in the inpatient department have highly diverse responsibilities that require extra effort, impacting their ability to carry out tasks. The unpredictable number of patients and their medical diagnoses necessitate nurses to be consistently ready to provide care (Rhamdani & Wartono, 2019).

3) Work Shifts

Work shifts are a choice in the organizational structure aimed at optimizing productivity in response to patient needs. Hospitals providing inpatient services need to organize work shifts to ensure continuous healthcare services for all patients. Efficient weekly working hour standards typically range from 40-48 hours over 5 or 6 working days or 6-8 working hours in a day (Perwitasari & Tualeka, 2014). Work shifts also generally categorized into morning shift (07:00 a.m. - 03:00 p.m.), mid-shift (10:00 a.m. - 06:00 p.m.), afternoon shift (03:00 p.m. - 11:00 p.m.), and night shift (11:00 p.m. - 07:00 a.m.). Night shift workers are not in optimal conditions for work. Nurses on morning shifts tend to feel more refreshed as they have adequate rest the night before and a larger time window, allowing for a more evenly distributed workload (Rhamdani & Wartono, 2019). Exceeding the stipulated working hours may lead to decreased work efficiency, health issues, increased sickness absenteeism, and a decline in work productivity. Night shift workers are not in optimal conditions for work.

4) Workload Intensity

The workload in quantitative terms encompasses the number of tasks that need to be completed, while in qualitative dimensions, expertise is required to accomplish all these tasks. If the number of tasks to be performed is unbalanced with the nurse's physical ability, skills, and available time, it can increase the workload for the nurse (Haryanti et al., 2013). Nurses experience a high workload as they are required to provide direct care and treatment to patients. Patient conditions and hospital settings significantly influence the increase in nurses' workload as they affect the level of expertise possessed by the nurse (Haryanti et al., 2013).

Distribution of Patient Safety Incidents

The forms of Patient Safety Incidents (PSIs), according to the Hospital Patient Safety Committee in our study site, are categorized into Adverse Events, No Harm Incidents, Near Miss Incidents, Potential Injury Events, and Sentinel Events. Adverse Events are occurrences that can result in patient injury due to the implementation or failure to act, unrelated to the underlying disease. Near Miss Incidents are events that do not lead to patient injury due to the execution or failure to perform an action that should have been carried out. Potential Injury Events are conditions with a high potential for injury even before an incident occurs. Sentinel Events are events arising from Adverse Events (AEs) that cause injury, permanent disability, or even death (Indonesian Ministry of Health, 2010). The following presents the distribution of patient safety incidents in the inpatient unit:

Table 3. Distribution of Patient Safety Incidents

Unit	Type of Patient Safety Incidents					Total	
	Adverse Event	Near Miss	No Harm	Potential Injury	Sentinel	n	%
Internal medicine	0	0	1	0	0	1	16.7
Pediatric	0	2	1	0	0	3	50
Surgery	0	0	0	0	0	0	0
Perinatology	0	0	0	0	0	0	0
Midwifery	1	0	0	0	0	1	16.7
Neurology	0	0	0	0	0	0	0
Pulmonary	0	0	0	0	0	0	0
Cardiology	0	0	0	0	0	0	0
Ophthalmology and ENT	1	0	0	0	0	1	16.7
Total	2	2	2	0	0	6	100

Source: Committee for Quality and Patient Safety

Over the past year, there have been a total of 6 incidents, 2 No Harm Incidents, 2 Adverse Events, and 2 Near Miss Incidents. This finding aligns with the research conducted by Rahayu (2017), which indicated Patient Safety Incidents (PSIs) in the Haji Surabaya Regional General Hospital's inpatient department, amounting to 6 incidents, specifically 2 AEs incidents and 4 No Harm Incidents. It contradicts the Indonesian Ministry of Health Decision Number 129/Menkes/SK/II/2008, which stipulates that PSIs in hospitals should ideally be 0% or have zero incidents (Indonesian Ministry of Health, 2008). These incidents

need to be addressed by carefully considering each risk factor to prevent harm to patients, including complications, injuries, or deaths. The implementation of a patient safety culture must be enforced across all elements to be deemed successful.

Referring to the Indonesian Ministry of Health Decree about minimum service standards at hospitals in 2008, the researcher grouped PSIs into “No” and “Yes” categories. The “No” category refers to the nurses in departments that have no incidents. The “Yes” category referred to the nurses in departments that are incidents.

Table 4. Associated Factors of Patient Safety Incidents among Nurses (n=157)

Variable	Patient Safety Incidents				Total n (%)	p	OR (95% CI)
	No (n=92)		Yes (n=65)				
	n	%	n	%			
Work Stress							
Mild	50	31.8	17	10.8	67 (42.7)	0.001	3.361 (1.688-6.693)
Moderate	42	26.8	48	30.6	90 (57.3)		
Severe	0	0	0	0	0		
Fatigue							
Normal	25	15.9	4	2.5	29 (18.5)	0.002	5.690 (1.873-17.284)
Tired-Very tired	67	42.7	61	38.9	128 (81.5)		
Shift Work							
Morning	51	32.5	26	16.6	77 (49)	0.001	1.062 (0.560-2.015)
Afternoon-Night	41	26.1	39	24.8	80 (51)		
Workload Intensity							
Light	0	0	0	0	0	0.025	2.227 (1.155-4.297)
Moderate	49	31.2	22	14	71 (45.2)		
Heavy	43	27.4	43	27.4	86 (54.8)		

Work Stress and Patient Safety Incidents

Table 4 shows that the occurrence of patient safety incidents among mildly stressed nurses is 10.8%, while among moderately stressed nurses is 30.6%. Cross-tabulation results indicate a correlation between job stress and patient safety incidents. Moderately stressed nurses tend Patient Safety Incidents (PSIs) to occur 3.361 times more than light-stressed nurses. Additionally, there were no nurses with severe stress. This finding aligns with the respondents' answers. Moderately stressed respondents felt angry due to unexpected events (40.1%), were unable to control important aspects of their lives (39.5%), couldn't complete tasks (38.9%), were frustrated by uncontrollable problems (35.7%), and had difficulty coping with accumulating challenges (30.6%) in the past month. The multitude of stressors experienced by nurses makes them unfocused, unable to control their emotions, and lacking in confidence, thereby impacting work productivity and diminishing the performance of nurses and the healthcare services provided to patients (Rhamdani & Wartono, 2019).

This finding is consistent with the research conducted by Park and Kim (2013) among nurses at Daejeon and Chungcheong Hospitals in Korea. The study revealed a significant correlation between incidents and job stress, with a correlation coefficient (r) of 0.217. This finding is supported by Nurhayati, Dhian, and Putri's (2021) research on the determinants of patient safety culture at the Islamic Hospital in Cawas Klaten. The research results, with a p-value of 0.001, indicate a significant influence of job stress on patient safety incidents.

Similarly, Yupartini, Rustiawati, and Sulastri's (2021) study in Serang City's community health centers supported these findings. The p -value < 0.01 revealed that 0.001 signifies a meaningful relationship between healthcare workers' job stress and caring behavior. The study also explains that increased stress among nurses leads to less caring behavior, potentially resulting in suboptimal healthcare services.

Nurses may experience stress when assigned job responsibilities that exceed their capabilities, making it difficult to fulfill or complete their tasks. Suppose the stress faced by nurses is too substantial. In that case, it can lead to a decline in their performance due to disruptions in task execution, loss of the ability to control situations, difficulty in decision-making, and unstable behavior (Eryuda, 2017). Additionally, job demands that compel nurses to execute their duties hastily can induce stress and impact the delivery of nursing care, potentially leading to incidents that should not have occurred and could have been prevented (Nurcahyani et al., 2016).

Fatigue and Patient Safety Incidents

Table 4 indicates that the occurrence of patient safety incidents among normal nurses is 2.5%, while among tired-very tired nurses, it is 38.9%. Cross-tabulation results show a correlation between fatigue and patient safety incidents. Tired-very tired nurses tend to have patient safety incidents 5.690 times greater compared to normal nurses. This finding is reflected in tired respondents who reported feeling forgetful about something (61.8%), experiencing overall body fatigue (58.6%), feeling anxious about something (56.1%), having difficulty thinking (51.6%), being restless facing something (51%), and being unable to concentrate on a task (51%) in the past week. Fatigue experienced by nurses may result from an insufficient number of nurses compared to the high patient load, leading to decreased work productivity and an increased likelihood of experiencing fatigue before starting work (Perwitasari & Tualeka, 2014). A high patient load can contribute to nurse fatigue as the number of patients exceeds their capacity.

Yarnita and Efitra (2020), in the inpatient unit of Arifin Achmad Riau Regional Hospital, found a p -value of 0.013, indicating a significant relationship between fatigue and patient safety incidents. Another supporting study is the research by Nurhayati, Dhian, and Putri (2021) regarding determinants of patient safety culture at the Islamic Hospital Cawas Klaten. The research result showed a p -value of 0.001, signifying that fatigue significantly influences patient safety incidents. This study explains that one of the causes of work fatigue is excessive working hours. Another relevant study is the research on the impact of nurse job burnout on patient safety culture by Djaja (2021) at XYZ Hospital. This research resulted in a Correlation Risk (CR) of 7.14, meaning that job burnout affects patient safety incidents. The findings of this study elucidate that job burnout or work fatigue leads to decreased performance, thereby increasing the occurrence of unexpected accidents during patient care in the inpatient ward.

Nurses have diverse responsibilities requiring a range of skills to provide care for various patient conditions. The multitude of tasks that must be performed promptly can lead to fatigue among nurses due to the execution of duties exceeding their capacities. Fatigued nurses may experience a decline in focus, performance, and productivity (Rhamdani &

Wartono, 2019). It has implications for the delivery of services and patient care, posing a risk of unsafe practices and contributing to the occurrence of patient safety incidents.

Work Shifts and Patient Safety Incidents

Table 4 indicates that the occurrence of patient safety incidents among morning shift nurses is 16.6%, while for afternoon night shift nurses, it is 24.8%. Cross-tabulation results show a correlation between work shifts and patient safety incidents. Afternoon-night shift nurses tend Patient Safety Incidents (PSIs) to occur 1.062 times more than morning shift nurses.

Park and Kim (2013) on nurses at Daejeon and Chungcheong Hospitals in Korea demonstrated that shift workers had a 6.97 times higher likelihood of experiencing incidents compared to those with fixed working hours. Another relevant study is the research by Djaja (2021) on the impact of nurse shift work on patient safety incidents at XYZ Hospital. This research yielded a CR=2.48, indicating that shift work has an impact on patient safety incidents. The findings of this study explain that shift work leads to decreased physical conditions due to prolonged shifts, and nurses working beyond their capacity can reduce their precision, thus increasing the likelihood of patient safety incidents.

Work shifts influence the lifestyle of nurses. According to Kroemer (2017), the human body is in the ergotropic phase (active) during the day and in the tropotropic phase (rest and energy restoration) during the night. Therefore, night shift workers are not in optimal conditions for work. Nurses on morning shifts tend to feel more refreshed as they have adequate rest the night before and a larger time window, allowing for a more evenly distributed workload (Rhamdani & Wartono, 2019). An efficient shift duration is 6-8 hours per day, whereas, in this study, nurses work 8 hours per day on morning and afternoon shifts and 11 hours per day on the night shift, causing nurses working the night shift to experience symptoms of work fatigue. The risk of incidents increases by 20% during the first two hours of the night shift, with a slight increase between 3 and 4 in the morning. Nurses on the night shift bear a heavy workload and must perform their duties during the night, which should ideally be a time for rest. More incidents were reported during the fourth consecutive night shift compared to the first night shift (CCOHS, 2023).

Workload Intensity and Patient Safety Incidents

Table 4 indicates that the occurrence of patient safety incidents among nurses with a moderate workload is 14%, while among nurses with a heavy workload is 27.4%. Cross-tabulation results demonstrate a significant correlation between workload intensity and patient safety incidents. Nurses with a heavy workload are inclined to experience Patient Safety Incidents (PSIs) at a rate 2.227 times greater than those with a moderate workload. Additionally, there were no nurses with a light workload. Based on respondents' answers, it was found that respondents with a heavy workload are responsible for carrying out patient care and treatment (74.5%), performing patient rescue actions (73.2%), meeting the hospital leadership's expectations for quality service (71.3%), dealing with patients with different characteristics (68.2%), and administering medications intensively (68.2%).

The findings of this research align with a study conducted by Yunita and Sumiati (2022) at the Regional General Hospital of Madiun City. This study obtained a p-value of

0.000, indicating a significant relationship between workload factors and patient safety incidents. The results of this research are also supported by the study conducted by Kusmaningsih, Gunawan, Zainaro, and Widiyanti (2020) at the Inpatient Primary Health Care Center of Pesawaran District, with a p-value of 0.019. Consequently, this study concludes that there is a correlation between the physical workload of nurses and the implementation of patient safety. The research findings indicate that respondents experiencing excessive physical workload have a 0.198 risk of compromising patient safety. Another relevant study is the one conducted by Retnaningsih and Fatmawati (2018) in the inpatient ward of Tugurejo Semarang Regional General Hospital. The results of this research demonstrate a significant relationship between nurse workload and the implementation of patient safety, with a p-value of 0.009. This study explains that an excessively heavy workload may have negative effects, potentially endangering both nurses and patients.

Nurses bear a high workload due to the multitude of tasks they perform, facing diverse patient characteristics and providing direct patient care. The number of nurses also influences this workload in a given area. Balancing a large number of patients with an adequate number of nurses is essential to ensure an even distribution of the workload. Shortages in nursing staff can result in an uneven distribution of workload among nurses, exceeding their capacities. Additionally, patient conditions must align with the number and expertise of nurses to optimize task execution. Nurses with heavy workloads may experience fatigue and stress, leading to decreased concentration and performance, ultimately impacting the safety of the nursing care provided (Mudayana, 2013). This situation increases the risk of patient safety incidents.

CONCLUSION

In this present study, nurses predominantly experience moderate stress, fatigue, work during morning shifts, and heavy workload. This study revealed a correlation between work stress, fatigue, work shifts, workload intensity, and patient safety incidents. This research has limitations in its study design, which only establishes a correlation between factors influencing an event without providing a true causality depiction. In this study, questionnaire responses rely on the subjective perceptions of the respondents. Thus, the obtained results may not fully portray the actual levels of stress, fatigue, and workload intensity.

Recommendations can be directed toward both the nurses and the hospital. Nurses need to be aware of their levels of stress and fatigue, and they should develop stress management and coping strategies to overcome these challenges, enabling them to work optimally. Hospital management should pay increased attention to the issues of stress and fatigue experienced by nurses with heavy workloads and night shifts. Hospitals need to reoptimize the distribution of nurse workloads by ensuring an adequate number of nurses to maintain balance with the demands and the number of patients to be handled.

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