Research

Analysis of Risk Factors for Subjective Work Fatigue Levels Among Nurses at RS.Otak DR.Drs. M. Hatta Bukittinggi, West Sumatra, In 2024

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A B S T R A C T

Background: Nursing services provided by nurses in hospitals 24 hours a day require physical, mental and time readiness. This has the potential to cause job fatigue which results in decreased alertness and concentration, impaired decision-making and the occurrence of work errors or accidents.

Purpose : This study aims to analyse the risk factors of subjective work fatigue level in Nurses at the Brain.DR.Drs.M.Hatta Bukittinggi Hospital in 2024.

Methods: Quantitative research with cross-sectional research design on 100 nurses in RS.Otak DR.Drs.M. Hatta Bukittinggi West Sumatra in 2024. The risk factors are individual characteristics, work-related factors and lighting work environment. Measurement of job fatigue with SSRT (Subjective Self Rating Test) questionnaire from IFRC; mental workload with NASA-TLX (National Aeronautics & Space Administration Task Load Index) questionnaire; for role, control and job satisfaction with COPSOG (Copenhagen Psychosocial Questionnaire) III questionnaire; measurement of lighting with lux meter.

Results: The results showed that 79% of nurses experienced mild levels of job fatigue and moderate levels of job fatigue (21%). Risk factors that have a significant relationship with the level of fatigue are age (p 0.013; OR 6.82), nutritional status: obese (p 0.020; OR 3.77), sleep duration (p 0.050; OR 3.14).

Conclusion: he implementation of fatigue management and regular fatigue screening is expected to reduce the level of work fatigue..
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INTRODUCTION

Fatigue is a state or condition where the mental and physical capacity of workers is reduced, as a result of stimulating factors either from work or outside work factors that cause several symptoms of fatigue (1). Fatigue is a response of the body to be able to recover or rest so that the body avoids further damage (2). The impact of fatigue is decreased alertness and concentration, impaired decision-making, reduced motivation and energy in carrying out their work activities which contribute to the occurrence of work accidents (3).

In 2023, 61.9% of patients admitted to RS Otak DR. Drs. M. Hatta Bukittinggi were diagnosed with brain and nerve diseases such as ischemic stroke, hemorrhagic stroke, brain tumors, and other neurological

disorders, while 38.1% were patients with non-neurological diseases. (4). Patients with Ischemic Stroke and Hemorrhagic Stroke experience weakness in part of their body (right/left side of the body) which requires assistance from others to meet their needs. Almost all types of patient dependency levels on care are in the *partial care category* (requiring partial nursing assistance) and *total care* (requiring total nursing assistance). In 2023, BOR (Bed Occupancy Rate) data was obtained at 81.4% (BOR target 60-85%) (9). BOR data that is close to the target and type of patient care that requires special attention, requires long-term time and there are physical, mental, time demands, and other risk factors that have the potential to cause work fatigue in nurses.

Based on workplace accident data from 2017 to 2022, there have been incidents of needlestick injuries. Approximately 69.3% of these incidents occurred during critical hours, specifically at the end of work shifts and between midnight and early morning. Analysis of these incidents suggests that these are hours prone to drowsiness, which may also result from the accumulation of work demands that need to be completed, potentially leading to work fatigue. According to Sagherian et al. (2017), a decline in performance is frequently reported during the last hours of a work shift (5), with drowsiness being particularly common at the end of the shift, especially around 7 a.m (6).

Based on the type of hospital, patient characteristics, and time analysis, work accidents tend to occur at critical times which are thought to have the potential to cause fatigue in nurses so that it is necessary to conduct an in-depth study of the phenomenon of fatigue including the magnitude of the problem or the prevalence of fatigue. This study describes the description and relationship of risk factors associated with the level of subjective job fatigue in nurses at the Drs M. Hatta Bukittinggi Brain Hospital in 2024. This research is expected to contribute input/basis for designing policies, programmes, developing intervention strategies in order to improve the welfare and productivity of nurses, as well as improving the quality of service at the DR. Drs. M. Hatta Bukittinggi Brain Hospital.

METHOD

This study is a quantitative study with a cross-sectional design, observing or collecting data to explore the relationship between the variables studied at one specific point in time. The research was conducted at the Drs M. Hatta Bukittinggi Brain Hospital and was conducted in April-May 2024. The sample of this study used the simple random sampling formula, and obtained a minimum sample size of 100 people. Exclusion criteria are nurses whose positions are in top management and committees, nurses who are not willing to be respondents and when data collection does not submit questionnaires.

This study used primary and secondary data. The questionnaire instrument obtained data on individual characteristic factors (age, gender, marital status, nutritional status, length of service, health status, sleep duration, length of travel, exercise habits) and work-related factors (workload, work shift, work unit, work duration, role in the organisation, control over work, and job satisfaction). Measurement variables were measured using several instruments, namely the SSRT (Subjective Self Rating Test) questionnaire to see general work fatigue from the IFRC (Industrial Fatigue Research Committee Of Japanese Association Of Industrial Health by Yoshitake, 1971(7), the NASA-TLX (National Aeronautics & Space Administration Task Load Index) questionnaire to see subjective mental

workload by Sandra G. Hart (NASA-Ames Research Center). Hart (NASA-Ames Research Center) and Lowell E Staveland, San Jose State University (8), and the COPSOG (Copenhagen Psychosocial Questionnaire) III questionnaire to assess organisational roles, job control and job satisfaction by Tage S Kristensen and Vilhelm Borg (the Danish National Research Centre for the Working Environment, 1995-2007(9).

Data analysis using SPSS version 24 and the analysis carried out univariate and bivariate analysis. In the bivariate analysis using the Chi-Square Test, Mann Whitney mean difference test (Non Parametric) and simple logistic regression test. This research has been conducted and approved for ethical review based on Number Ket-245 / UN2.F10.D11 / PPM.00.02 / 2024 and No: 001346 / KEP.RSOMH BUKITTINGGI / 2024.

RESULT AND DISCUSSION

Measurement of work fatigue in study This use SSRT (*Subjective Self Rating Test*) questionnaire , is subjective and see fatigue in a general .

Table 1 Distribution Respondents based on Fatigue Level with SSRT (*Subjective Self Rating Test)*

Fatigue Level	n	%
Severe Fatigue	0	0.0
Moderate Fatigue	21	21.0
Mild Fatigue	79	79.0
Not Tired	0	0.0
Amount	100	100

Based on results research , work fatigue level subjective on nurses at the DR. Drs . M. Hatta Bukittinggi Brain Hospital using SSRT questionnaire found experience mild fatigue level (79%) and moderate fatigue level (21%).

Analysis Univariate

Table 2 Distribution Respondents based on Risk Factors Characteristics Individual

Variables	Amount	
	n	%
Age		
$\geq$ 40 years	65	65.0
<40 years	35	35.0
Gender		
Male	14	14.0
Female	86	86.0
Marital status		
Marry	98	98.0
Single	2	2.0
Nutritional status		
Obese (> 27)	36	36.0
Fat/Overweight (>25-27)	24	24.0
Normal (18.5 – 25)	40	40.0
Thin (17-<18.5)	0	0.0
Very thin (<17)	0	0.0
Length of Service		
>10 years	82	82.0
<10 years	18	**18.0**
Health Status		
Sick (having a history of illness/undergoing treatment)	18	18.0
Sleep Duration		
Less (< 7 hours)	50	50.0
Sufficient (7-9 hours)	50	50.0
Commute Time		
>1 Hour	4	4.0
≤1 Hour	96	96.0
Physical Exercise Habit		
Inadequate (<3 times per week for 30 minutes or never)	75	75.0
Adequate (3-5 times per week for 30 minutes)	25	25.0

Based on the results of research conducted on 100 respondents, the results of individual characteristics, respondents aged> 40 years (65%), female gender (86%), 98% of respondents are married, have nutritional status with normal BMI (Body Mass Index) (40%). As many as 82% of respondents have a length of service of > 10 years, the Health Status of respondents in the category healthy (82%), have sufficient sleep duration (50%), respondents have a commuting time of < 1 hour (96%), and have inadequate physical exercise habits (75%)..

Table 3 Distribution Respondents based on factor risk related work

Variables	Amount	
	n	%
Mental Workload		
High	6	6.0
Medium	76	76.0
Low	18	18.0
Work Shift		
Night	29	29.0
Afternoon	35	35.0
Morning	36	36.0
Work unit		
Critical	29	29.0
Non- Critical	71	71.0
Duration Work		
>40 hours	28	28.0
$\leq$ 40 hours	72	72.0
Role in Organization		
Low	45	45.0
High	55	55.0
Control to work		
Low	50	50.0
High	50	50.0
Job Satisfaction		
Low	36	36.0
High	64	64.0

Based on the results of the analysis, 76% of respondents felt that they had a moderate workload, 36% of respondents with work shifts in the morning category, 71% of respondents worked in non-critical work units, 72% of respondents had a work duration of <40 hours, 55% of respondents understood their role in organization, 50% of respondents had control to work in the high category, and 64% of respondents had high job satisfaction.

Table 4 Distribution Respondents based on factor environment Lighting

Lighting Level	n	%
Not Appropriate	0	0.0
Appropriate	100	100.0
Amount	100	100

Based on results study obtained , as much as 100% level lighting in category in accordance with the Minister of Health Regulation number 2 of 2023 concerning Regulation Implementation Regulation Government number 66 of 2014 concerning Environmental Health (10).

Analysis Bivariate

Table 5. Relationship factor risk characteristics individuals with high levels of work fatigue

Variables	Fatigue				P-value	OR	95%CI
	Moderate		Mild				
	n	%	n	%			
Age							
≥ 40 years	19	29.00	46	71.00	**0.0 13**	**6.82**	(1.48-3.29)
<40 years	2	5.7	33	94.3		1	
Gender							
Male	4	28.6	10	71.4	0.4 85	1.62	(0.45-5.81)
Female	17	19.8	69	80.2		1	
Marital status *							
Marry	21	21.4	77	78.6	-	-	
Single	0	0.00	2	100			
Nutritional status							
Obese (>27)	4	11, 1	32	88, 9	0.0 58	4, 31	(1.26-14.58)
Fat/Overweight (>25-27)	3	12.5	21	87.5	**0.020**	**3.77**	(0.96-14.88)
Normal (18.5 – 25)	14	35.00	26	65.00		1	
Length of Service*							
≥ 10 years	21	25.6	61	74.4	-	-	
<10 Years	0	0.00	18	100			
Health Status							
Sick (having a history of illness/undergoing treatment)	4	22.4	14	77.8	1,000	1.09	(0.32-3.75)
Healthy	17	20.7	65	79.3		1	
Sleep Duration							
Less (< 7 hours)	15	30.00	35	70,, 00	**0.0 50**	**3.14**	(1.61-8.94)
Sufficient (7-9 hours)	6	12.00	44	88.00		1	
Commute Time *							
>1 Hour	0	0.00	4	100.00	-	-	
≤1 Hour	21	21.9	75	78.1			
Physical Exercise Habits							
Inadequate (<3 times per week for 30 minutes or never)	18	24.00	57	76.00	0.321	2.32	(0.62-8.65)
Adequate (3-5 times per week for 30 minutes)	3	12.00	22	88.0		1	

Note: * available cells with value "0"/ distribution abnormal

Based on table 5 above obtained that variable type gender , nutritional status obesity categories , health status, and physical exercise habits do not have a significant relationship with the level of work fatigue. While for age variables , nutritional status in the category fat/overweight , and sleep duration have a significant relationship with the level of subjective job fatigue in nurses.

Table 6 Relationship between Marital Status , Length of Service and Length of Travel
with score work fatigue level subjective

Variables	Mean	Median	SD	Min-Max	P value
Marital status *					
Marry	56.00	56.00	7.97	31-71	
Single	49.00	49.00	0.0	49-49	0.154
Length of Service*					
≥ 10 years	49.35	51.00	8.01	31-71	
<10 Years	52.06	52.00	7.42	40-67	0.288
Commute Time					
> 1 Hour	52.75	51.50	5.12	48-60	
≤ 1 Hour	49.72	51.00	8.03	31-71	0.524

For the variables of marital status, length of service, and commute time, the Mann-Whitney test was used to assess the differences in means and the analysis results indicated that there is no significant relationship with subjective work fatigue among nurses.

Table 7 Relationships factor risk related work with high level of work fatigue Subjective

Variables	Fatigue				P-value	OR	95%CI
	Moderate		Mild				
	n	%	n	%			
Mental Workload *							
Medium-High	3	3.7	79	96.3	-	-	-
Low	18	100	0	0			
Work Shift							
Night	7	24.1	22	75.9	0. 566	1, 38	(0.46-4.19)
Afternoon	3	8.6	32	91.4	**0.028**	4.69	(1.18-18.65)
Morning	11	30.6	25	69.4		1	
Work unit							
Critical	4	13.8	25	86.2	0 ,390	0.51	(0.16-1.67)
Non- Critical	17	23.9	54	76.1		1	
Duration Work							
>40 hours	6	21.4	22	78.6	1,000	1.04	(0.36-3.01)
< 40 hours	15	20.8	57	79.2		1	
Role in Organization							
Low	6	13.3	39	86.7	0 ,145	0.41	(0.14-1.17)
High	15	27.3	40	72.7		1	
Control to work							
Low	7	14.0	43	86.0	0 ,141	0.42	(0.15-1.15)
High	14	28.0	36	72.0		1	
Job Satisfaction							
Low	5	13.9	31	86.1	0 ,292	0.48	(0.16-1.46)
High	16	25.0	48	75.0		1	

Note: * available cells with value 0 / distribution abnormal

In Table 7, the analysis results show that the factor associated is the afternoon shift, with a p-value of 0.028 and an OR of 4.69, meaning that respondents working the afternoon shift are 4.69 times more likely to experience moderate fatigue compared to those working the morning shift.

Table 8. Relationships burden mental work with scores work fatigue level subjective.

Variables	Mean	Median	SD	Min-Max	P value
Mental Workload					
Medium-High	51.26	51.00	7.16	32-71	
Low	43.39	40.00	8.30	31-60	<0.001*

In Table 8, the variable of mental workload was analyzed using the Mann-Whitney test, and the results showed a significant relationship between mental workload and the level of work fatigue (p-value <0.001). Respondents with a moderate to high workload had a higher fatigue score of 51.26 with a standard deviation of 7.16, while those with a low workload had a fatigue score of 43.39 with a standard deviation of 8.30.

The relationship between age and subjective work fatigue levels

With age comes a decline in physical and mental abilities. This can lead to increased body limitations and a decline in other health parameters, such as VO2 max, visual and auditory sensitivity, ability to respond quickly, make decisions, and short-term memory (11). In the age range of 50 to 60 years, there is a 25% decrease in muscle strength and as much as 60% decrease in sensory abilities. At the age of 60 years and above, physical abilities only reach about 50% of the ability at the age of 25 years (12). The results of the analysis found a significant relationship between age and the level of fatigue with a p-value of 0.013 and OR 6.82. A total of 65% of respondents aged > 40 years with an age range of 40-58 years experienced mild levels of job fatigue (71%) and moderate levels of job fatigue (29%). Although related, most only cause mild levels of fatigue. Although increasing age goes hand in hand with decreasing physical and mental abilities, most respondents studied at the age of 43-49 years still have good physical and mental

abilities compared to those aged 50 years and above. The length of age also increases experience, knowledge, emotional maturity/control, communication techniques and ways to overcome problems, so that the level of fatigue felt is in the mild category.

In line with research by Muzakir (2023), where the age factor has a relationship with job fatigue (p-value 0.013) but OR 0.579 which means that the age factor could be a protective factor for job fatigue (13). Older nurses have a lot of experience, and are better able to cope with work demands, able to communicate better and problem solve so as to prevent further fatigue.

Suggestions that can be made to prevent increased fatigue are to get used to regular exercise in order to increase muscle strength and body fitness, healthy and balanced lifestyle.

The relationship between nutritional status and subjective work fatigue levels

The study shows that respondents with a nutritional status categorized as overweight (BMI >25-27) experienced moderate fatigue (12.5%) and mild fatigue (87.5%). The analysis revealed a significant relationship between overweight status and work fatigue, with a p-value of 0.020 and an OR of 3.77. A total of 87.5% of respondents with an overweight status (BMI >25-27) experienced mild fatigue. Respondents with a lower nutritional status tend to pay more attention to their nutritional intake, whereas those with excess body weight are less concerned because they have more energy reserves.

According to theory, nutritional status greatly influences productivity and work efficiency. The body requires adequate energy to perform tasks, and if nutritional intake (both quality and quantity) is insufficient, work capacity can be impaired (11). Poor or excessive nutritional status leads to faster fatigue during work. Individuals with poor nutrition tend to experience fatigue more easily due to an imbalance in nutrient reserves needed for energy during activity (14). Meanwhile, workers with obesity are prone to fatigue because they require additional energy to support their body weight during each activity (15).

Research conducted by Indah (2022) found a significant relationship between nutritional status and fatigue among nurses at Bhayangkara Hospital in Pontianak, with a p-value of 0.010 (16). Similarly, a study by Lallukka et al. (2005) on male and female workers over 12 months revealed that work fatigue and overtime were significantly associated with weight gain (17). Obesity and work-related stress are correlated with work fatigue.

To prevent increased fatigue, recommendations include adopting a healthy diet, maintaining a healthy lifestyle, engaging in regular exercise, and seeking nutritional consultation if necessary.

The relationship between sleep duration and subjective work fatigue levels

According to Gall (1996), during sleep, the body reduces overall energy use and increases blood and energy supply to the brain, making a person feel refreshed rather than fatigued (18). During sleep, the body engages in important processes such as tissue recovery, memory consolidation, and hormone regulation (19). In this study, 50% of respondents with less sleep duration (<7 hours) experienced mild work fatigue (70%) and moderate fatigue (30%). The p-value was 0.050, indicating a significant relationship between sleep duration and subjective work fatigue levels. The OR was 3.14 (1.61-8.94), meaning that respondents with shorter sleep durations (<7 hours) had 3.14 times higher odds of experiencing moderate work fatigue compared to those with sufficient sleep.

Statistical tests found a significant relationship between sleep duration and fatigue levels among nurses at RS. Otak DR. Drs. M. Hatta Bukittinggi (p-value 0.050). This analysis suggests that factors such as family or home

responsibilities, long time commutes, or other factors may prevent nurses from resting immediately after their shifts or sleeping in preparation for night shifts. However, some nurses were able to achieve sufficient recovery between shifts, especially in May, there are many major holidays so that they get more time off.

This is consistent with Surantri's (2022) study on nurses at RSUD DR. Soedarso Pontianak, which showed a significant relationship between sleep quality and work fatigue (p-value 0.003). Nurses experiencing mild fatigue tend to have better sleep quality (20). Suggestions include time management at home, role and responsibility sharing, ensuring adequate sleep, health promotion and training, and regular physical exercise.

The relationship between mental workload and subjective work fatigue levels

Each workload must be adapted to the physical abilities, cognitive abilities, and limitations of the individual. Physical workload is closely related to the time it takes a person to work to the best of their ability (14). High work demands can cause the nervous system to constantly feel pressure, so it remains mildly active and continues to overproduce stress hormones over a long period of time. As a result, the body's energy reserves can be depleted, making one feel tired or overwhelmed, which can ultimately contribute to fatigue.

A total of 82% of respondents with medium-high category workloads felt mild levels of fatigue (96.3%) and moderate fatigue (3.7%). While 18% of respondents with low workload felt moderate fatigue (100%). Based on the score of the level of work fatigue with mental workload, it was found that the medium-high category workload was higher at 51.26 with a standard deviation of 7.16. The results showed that there was a significant relationship between mental workload and the level of fatigue (p-value <0.001). The results of the mean total score on each indicator of workload measurement in the NASA-TLX questionnaire obtained the highest was mental demands (190.2), physical demands (186.7), time demands (173.9), performance (167), effort (170.9) and frustration (15.1). The most perceived workload is mental load (cognitive ability in thinking, remembering, calculating, analyzing and making decisions) and then physical load.

The development of computer technology information that is increasingly rapid and advanced encourages all hospital-based service information using the Patient Health Information System Application (computer system, namely e-kamek). This encourages every nurse to be able to operate at every stage of the process and encourages nurses to be in front of the computer for a short time which has the potential to cause eye fatigue. Not to mention if there are other obstacles such as network access, level of knowledge, patient emergencies, other physical task demands that will affect the level of fatigue felt. In addition, the second perceived demand is physical demands, where with the type of hospital, patient characteristics and levels of care that require more care assistance that has the potential to cause fatigue.

This is in accordance with research by Kondi, 2019 on nurses at Awal Bross Bekasi Hospital on work fatigue, where it was found that workload and work fatigue were related with a p-value of 0.001 (21) and research by Amalia (2022) there was a relationship between mental workload and nurses' work fatigue at the Bhayangkara Pontianak Hospital Inpatient Installation during the COVID-19 pandemic with p = 0.006 (22).Suggestions that can be given are by setting and monitoring work schedules; workload arrangements: division of tasks, team coordination, etc.; health promotion about teamwork systems, fatigue, workload, intershift recovery / rest; placement is adjusted to competence and needs.

Relationship between work shifts and subjective work fatigue levels

Shift work is closely related to circadian rhythms, which are rhythms in the body that have a 24-hour cycle. During the day, body functions generally increase and weaken in the afternoon and decrease at night in order to recover and renew (23). One of the effects of night shift work is a decrease in sleep patterns due to disruption of circadian rhythms and increased sleep homeostatic pressure that can interfere with work capacity. In addition, drowsiness tends to occur at certain times regardless of whether the need for sleep is met or not. Sleepiness usually occurs during the early morning hours (02.00-07.00 a.m) and more or less during the afternoon at 02.00-05.00 p.m (24). Respondents with work shifts in the morning category (36%) experienced moderate fatigue (30.6%), afternoon shift (35%) with moderate fatigue (8.6%) and night shift (29%) experienced moderate fatigue (24.1%). The results of the statistical test found no relationship between the night work shift and the level of fatigue (p-value 0.566). While the afternoon shift has a significant relationship with the level of fatigue (p-value 0.028; OR 4.69), which means that respondents with afternoon shifts have a chance of 4.69 times to become moderate levels of fatigue compared to the morning shift.

Analysis on afternoon shift besides existence task main , sometimes found existence delegation unfinished tasks completed in the morning shift due to because a number of constraint good from side patient or work so that task piling up in the day shift . In addition, short working hours (7 hours) and less manpower than the morning shift (2-3 people) can potentially lead to job fatigue, especially if there is a change in service rotation. Another factor is that there are many demands or activities at home in the morning, which causes respondents to not have time to rest before starting work.

Research by Nurjannah (2023) found No existence significant relationship work shift with fatigue work p-value 0.531 (25). Difference characteristics patient each shift no too different and the work shift rotation is not long so that make fatigue work that is felt at the same level . In addition there is other factors that influence it like factor duration sleep , duration work , amount time holidays that can influence nurse in to obtain adequate recovery / rest , so that influence level fatigue is felt . Lack of connection between fatigue and shift work or on- site support work , consistent with research by Akerstedt et al, 2002a (26). The results showed that shift work with task Afternoon days (odds ratio [OR] = 1.05, 95% confidence interval [CI]: 0.99-1.12) and with task night (OR = 1.04, 95% CI: 0.93-1.16) not predictor fatigue . Possible explanation is that shift work is just becoming problem If recovery intershift No sufficient . Different with research by Amalia (2022) shows there is work shift relationship with fatigue Work nurses at the Inpatient Installation of the Bhayangkara Hospital Pontianak during the COVID- 19 pandemic , p = 0.016 (22). Suggestions that can be given is supervision and regulation timetable Work.

CONCLUSION

The conclusion of this study is that the prevalence of subjective work fatigue among nurses at RS Otak DR. Drs. M. Hatta Bukittinggi, West Sumatra, in May 2024 showed that 79% of nurses experienced mild fatigue, while 21% experienced moderate fatigue. Factors significantly associated with subjective work fatigue included age, overweight nutritional status, sleep duration, afternoon shift work, and mental workload. Meanwhile, variables such as gender, marital status, length of service, health status, commuting

time, physical exercise habit, work unit, work hours, role in the organization, control to work, job satisfaction, and lighting level did not show significant relationships with subjective work fatigue levels.

It is necessary to implement fatigue management to prevent an increase in fatigue levels. First, health promotion related to fatigue should be carried out through education, training, and health campaigns such as pamphlets, stickers, banners, and other media. Second, monitoring of work schedules and workload distribution is essential. Third, implementing regular exercise programs should be prioritized. Fourth, regular medical check-ups tailored to specific areas and risk levels should be conducted, along with follow-ups. Fifth, periodic fatigue screening should be carried out, and a psychological support team should be established.

For the nurses themselves, it is recommended to manage their time effectively both at work and at home to ensure optimal rest; maintain a balanced diet; adopt a regular exercise routine; ensure adequate sleep; and receive full support from their families in fulfilling their rest and sleep needs.

ACKNOWLEDGEMENT

REFERENCE

[1] Kurniawidjaja , LM., Martomulyono , S., Susilowati, Indri H. (2020), Theory and Application Promotion HealthInPlace Work , Jakarta: UI Publishing

[2] Tarwaka . (2011). Ergonomics Industry , Basics Knowledge Ergonomics and On- Site Applications Work . Surakarta : Harapan Press

[3] Sadeghniiat -Haghighi, K., & Yazdi, Z. (2015). Fatigue management in the workplace. Industrial Psychiatry Journal, 24(1), 12. https://doi.org/10.4103/0972-6748.160915

[4] RSOMH (2024), Data from the DR. Drs. M. Hatta Brain Hospital, Bukittinggi, West Sumatra

[5] Sagherian, K., Clinton, ME and Huijer, HAS (2017) Fatigue, Work Schedules and Perceived Performance in Bedside Care Nurses. Workplace Health & Safety, 65, 304-312. https://doi.org/10.1111/jocn.15307

[6] Tucker, P., Barton, J and Folkard, S. (1996). Comparison of Eight and 12 Hour Shifts: Impacts on Health, Wellbeing, and Alertness during the Shift. Occupational and Environmental Medicine, 1996; 53(11): 1-13.

[7] Yoshitake, H. (1971). Relationship between the symptoms and the feeling of fatigue. Ergonomics, 14(1), 175–186. https://doi.org/10.1080/00140137108931236Sagherian, K., Clinton, M.E. and Huijer, HAS (2017) Fatigue, Work Schedules and Perceived Performance in Bedside Care Nurses. Workplace Health & Safety, 65, 304-312. https://doi.org/10.1111/jocn.15307

[8] Hart, SG, & Staveland , LE (1988). Development of the NASA-TLX (Task Load Index): Results of a study. empirical and theoretical . In P. A. Hancock & N. Meshkati (Eds.), Human mental workload (pp . 139 -183). Amsterdam: North Holland

[9] Kristensen, T.S., Hannerz , H., Høgh, A., & Borg, V. (2005). The Copenhagen Psychosocial Questionnaire— a tool for the assessment and improvement of the psychosocial work environment. Scandinavian Journal of Work, Environment & Health, 31(6), 438-449. https://doi.org/10.5271/sjweh.948. Retrieved from PubMed: https://www.ncbi.nlm.nih.gov/pubmed/16425585

[10] Minister of Health Regulation Number 2 of 2023 concerning Regulation Implementation Regulation Minister of Health Regulation Number 66 of 2014 concerning Environmental Health

[11] Tarwaka ., Solichul HA.Bakri ., Lilik Sudiajeng .(2004). Ergonomics For Occupational Safety , Health and Productivity . 1st Edition , 1st Printing . Surakarta: UNIBA PRESS.

[12] Astrand PO and Rodahl, K. 1997. "Textbook of Work Physiology-Physiological Bases of Exercise, Neuromuscular Function. 2nd Edition". New York:McGraw -Hill Book company

[13] Muzakir, Haris. (2023). Factors Associated with Work Fatigue among Nurses in South Tangerang City Public Hospital. Journal Horizon Promkes Vol. 5, no. 2, August 2023, pp. 107-114 pISSN : 2654-9980 http://journal2.uad.ac.id/index.php/cp/index   e-ISSN: accessed https://journal2.uad.ac.id/index.php/cp/article/download/8846/3850/33642

[14] Suma'mur. (2009). Company Hygiene and Occupational Health (HIPERKES). Jakarta: Sagung Seto

[15] Almatsier , S. (2004). Basic Principles of Nutritional Science . Jakarta: PT Gramedia Pustaka Utama.

[16] Amalia , Indah , Saleh, Ismael, & Ridha, Abduh.(2022). Factors related to Work Fatigue of Nurses in the Inpatient Installation of Bhayangkara Hospital, PONTIANAK. Journal Health Students and Researchers , Vol   9(2),   94-103.   P-ISSN   2407-2559,   E-ISSN   2503-4731.DOI:http://dx.doi.org/10.29406/jjum.v9i2.Website   : http://openjurnal.unmuhpnk.ac.id/index.php/JJUM

[17] Lallukka T, Laaksonen M, et al. Psychosocial working conditions and weight gain among employees. International DOI:10.1038/sj.ijo .0802962. Journal of Obesity, 2005; Access 29:909-915. at https://www.proquest.com/docview/219208085?sourcetype=Scholarly%20Journals

[18] Gall H. (1996). The basis of cancer fatigue : where does it come from? Eur J. Cancer Care. 5(Suppl.2):31-34

[19] Walker, Matthew. (2017). Why we sleep : the Power of Sleep and Dreams. Scribner Book Company. ISBN: 781501144318.   Accessed   at https://ia802300.us.archive.org/2/items/a_20210818_202108/BOOKS.YOSSR.COM-Why-We-Sleep.pdfUnlocking

[20] Surantri , Feby. (2022). Determinants of Work Fatigue in Nurses in the Inpatient Ward of DR. Soedarso Pontianak Regional Hospital . Publication Media Indonesian Health Promotion (MPPKI), 5(7), 796-801.

[21] Kondi , Andrianus E.(2019). Factors related to work fatigue in nurses at Awal Bross Hospital, Bekasi. Journal The Kingdom Husada Indonesia. Vol 6. No.20(2019):1-9. Accessed at https://jurnal.stikesphi.ac.id/index.php/kesehatan/article/view/245/142

[22] Amalia , Indah , Saleh, Ismael, & Ridha, Abduh.(2022). Factors related to Work Fatigue of Nurses in the Inpatient Installation of Bhayangkara Hospital, PONTIANAK. Journal Health Students and Researchers , Vol   9(2),   94-103.   P-ISSN   2407-2559,   E-ISSN   2503-4731.DOI:http://dx.doi.org/10.29406/jjum.v9i2.Website   : http://openjurnal.unmuhpnk.ac.id/index.php/JJUM

[23] Astrand, P.-O., & Rodahl, K. (1986). *Textbook of work physiology: Physiological bases of exercise* (3rd ed.). . Imprint. New York : McGraw Hill

[24] Nurmianto , Eko.(2004). Ergonomics , Basic Concepts and Applications . Surabaya: Prima Printing.

[25] Nurjannah , Widiyanti , Febriana Muchtar, Indah Ade Prianti . (2023). Factors related to work fatigue in nurses in the IGGD and ICU BLUD Benyamin Guluh Hospital Kab Kolaka 2023. Journal of Health Management Research. 2 (2), p.62-71. eISSN : 2502-2083, pISSN : 2443-4019

[26] Åkerstedt , T., Anund, A., Axelsson, J., & Kecklund , G. (2014). Subjective sleepiness is a sensitive indicator of insufficient sleep and impaired waking function. Journal of Sleep Research, 23(3), 240-252. https://doi.org/10.1111/jsr.12158