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Determination of Work Fatigue Index among Nurses at Makassar City Hospitals in Increasing Productivity and Quality of Life

Atjo Wahyu^{a*}, Andi Ummu Salmah^b, Makmur Selomo^c, Yahya Thamrin^a

²
^aDepartment of Occupational Safety and Health, Faculty of Public Health, Hasanuddin University, Makassar 90245, Indonesia

^bDepartment of Biostatistic, Faculty of Public Health, Hasanuddin University, Makassar 90245, Indonesia

^cDepartment of Environmental Health, Faculty of Public Health, Hasanuddin University, Makassar 90245, Indonesia

³
*Corresponding author.

E-mail Address: atjowahyu.2006@gmail.com (A. Wahyu)

Abstract

Objective: This study expected to find physical and psychological work fatigue of nurses in Makassar City hospitals to improve work performance.

Methods: The study stages, first is conducting FGDs of nursing and nursing experts, results of FGD are compiled with supporting theories and followed by quantitative research to find fatigue index with Confirmatory Factor Analysis.

Result: The results show 3 characteristic factors, 5 work stress factors, 17 feelings of fatigue, 5 work quality factors, 4 organizational climate factors, 5 job satisfaction factors, namely indicators that can affect fatigue, the formula for the work fatigue index obtained is $0.53x$ characteristics + $0.32x$ work stress + $0.3x$ quality of life + $0.41x$ job satisfaction + $0.45x$ work climate + $0.39x$ feelings of fatigue.

Conclusion: Characteristics, job stress, quality of life, job satisfaction, work climate and feeling of tiredness affect the work fatigue of nurses in hospitals in Makassar.

KEYWORD: CFA ; Fatigue Index; Hospital; Nursing,

Introduction

In the world of professional, especially in the health sector, worker fatigue (nurses) has been identified as a chronic problem in several of countries, including in developed countries such as the United States, Canada, England, the Netherlands, Japan, Brazil, Germany, France, to the states. Southern and Southeastern Europe¹ In fact, considering the principal roles of nurses' duties quite the same as doctors, that increasing access, efficiency and quality of care.^{2,3}

Work fatigue is an impact that often experienced by workers including nurses, which has an effect on the quality of care provision.⁴⁻⁶ Fatigue will have an impact on work motivation, performance, work quality, productivity, lots of mistakes, work-induced stress, work-related illnesses, injuries and work accidents, so handling is needed in its completion.⁷

The demanding nature of the work among nurses and the lack of nurses now days, make them get additional shifts, work long hours, and take on more responsibilities, that nurses find it difficult to provide optimal health care procedures.⁸ Thus, the person who receives the fatigue signal from his body due to the ongoing activity whether physical or mental must end.⁹

Pusdatin data (2017) shows the estimated number of nurses in Indonesia is 216,652 people, on average each 96 nurses are responsible to providing health services to 100,000 residents, the chairman of the Indonesian National Nurses Association stated that the number of nurses is still below world

standards with a ratio of ± 10 proportional 10,000, which should be 18 to 10,000.¹⁰ The number of nurses in Makassar City alone was 394 people in 2014¹¹ with an estimated population of 1.5 million, which means that the availability of nursing resources is still far from expected standard. Meanwhile, the imbalance between the workload and the number of nurses causes overload workload.¹² Even according to Studnek et al (2018), the workload of nurses tends to be high and causes fatigue during night shifts.¹³

Reviewing the important role of nurses and the vulnerability to fatigue will have an impact on the quality of service that is not optimal.¹⁴ Therefore, in order to increase the acceptance of the quality of health services, the team attempted to examine the fatigue index of nurses in Makassar City to measure how much fatigue was occurring and to review the risk factors that affect fatigue in nurses.

Methods

Time and Location of Research

This research will be carried out for 1 year in 2020 with details of 6 months of research implementation, and then completion of administration and completeness of study output. The research locations were Labuang Baji General Hospital, Faisal Islamic Hospital, and Ibnu Sina Hospital.

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Population and Sample

The population in this study were female nurses at Makassar City Hospital. The number of samples after being analyzed using the minimum size formula so that the study sample is around 72 people, while the sampling is from each work unit (Interna, midwifery, children, and surgery) 3 female nurses are selected in each shift (morning, day and night), so that the sample of each hospital is 36 people.

Research Design and Data Collection

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This research is an observational analytic study with a Cross Sectional Study design that assesses the work fatigue index of nurses, with the study stages, namely first, conducting a qualitative study or conducting FGDs of professional nurses to collect information about things that affect fatigue in nurses, then The results of the FGD that have been analyzed in-vivo will be compiled with supporting theories.

Data analysis

The statistical test used to analyze the work fatigue index of nurses in the Makassar city hospital was logistic regression and CFA analysis using the AMOS program.

Results

Descriptive Analysis

Distribution of nurse characteristics shows that respondents with the highest age group were at the age of 30-39 years as many as 63 people (57.3%), based on married status at least 86 respondents (78.2%) were already married. The highest level of D3 education were 43 people (39.1%). The highest group of children was 1-2 children as many as 39 people (47.3%), with the highest age group of children at ≤ 18 years as many as 101 people (91.8%).

Respondents with a working period of ≥ 5 years, namely 73.6%, respondents with the highest working hours group, namely at > 8 working hours were 105 people (95.5%), respondents with the

highest number of shifts (per week) were at > 6 Shifts as many as 106 people (96.4%), respondents with the highest contract work status were 68.2%. Respondents with the highest private motorbike transportation group were 82 people (74.5%), respondents with the highest healthy clinical condition were 87.3%. The highest level of fatigue was in the moderate category, namely as many as 58 respondents (52.7%).

Based on work stress variables there were 85 respondents (77.2) with poor job demands, for role demands there were 87 respondents (79.0%) who were not good, for Interpersonal relationship indicators of 109 respondents (99.0%) were not good, for organizational leadership as many as 109 respondents (99.0%) were not good and for the last indicator variable Job stress, technological changes as many as 109 respondents (99.0%) were not good.

Based on variables *Quality of Worklife* there are highest with low compensation, for communication there are highest with not good communication, for employee engagement almost all were not good, for poor career development, for the available facilities which is not good.

Based on work climate variables, there were highest who were not good. In terms of structure, only 12.8% were good, for the standard there were highest who were not good. For responsibility, there were highest who were not good, for recognition there were highest who were not good. For support and commitment indicators, each of them has the same number, who highest are not good. For job satisfaction variables, there were highest who were not good.

Bivariate Analysis

Table 1 Analysis of the Relationship between Nurse Characteristics and Fatigue Levels in Several Makassar City Hospitals in 2020

	Fatigue Level			p-value
	High	Moderate	Low	
Age				
20 - 29 years	1 (16.7%)	17 (29.3%)	7 (15.2%)	0.145
30 - 39 Years	3 (50.0%)	30 (51.7%)	30 (65.2%)	
40 - 49 Years	0 (0.00%)	8 (13.8%)	4 (8.7%)	
50 - 59 years	2 (33.3%)	3 (5.2%)	5 (10.9%)	
Marital status				
Married	5 (83.3%)	48 (82.8%)	33 (71.7%)	0.382
Not yet	1 (16.7%)	10 (17.2%)	13 (28.3%)	
Number of children				
> 2 Children	0 (0.00%)	15 (25.9%)	11 (23.9%)	0.457
1-2 Children	5 (83.3%)	26 (44.8%)	21 (45.7%)	
0 Child	1 (16.7%)	17 (29.3%)	14 (30.4%)	
Children Age				
≤ 18 years	4 (66.7%)	54 (93.1%)	43 (93.5%)	0.069
> 18 Years	2 (33.3%)	4 (6.9%)	3 (6.5%)	
Education				
3-year diploma	3 (50.0%)	21 (36.2%)	19 (41.3%)	0.457
S1 / equivalent	0 (0.0%)	17 (29.3%)	13 (28.3%)	
Profession	3 (50.0%)	19 (32.8%)	12 (26.1%)	
S2	0 (0.0%)	1 (1.7%)	2 (4.3%)	
Work Periode				
≤ 5 years	1 (16.7%)	17 (29.3%)	11 (23.9%)	0.707
> 5 Years	5 (83.3%)	41 (70.7%)	35 (76.1%)	
Job status				

Contract	5 (83.3%)	48 (82.8%)	33 (71.7%)	0.382
Permanent	1 (16.7%)	10 (17.2%)	13 (28.3%)	
Workload				
> 3 Patients	2 (33.3%)	24 (41.4%)	9 (19.6%)	0.060
≤ 3 Patients	4 (66.7%)	34 (58.6%)	37 (80.4%)	
Pershift Work Hours				
> 8 Hours	6 (100%)	55 (94.8%)	44 (95.7%)	0.843
≤ 8 hours	0 (0.0%)	3 (5.2%)	2 (4.3%)	
Shift Frequency				
> 6 Times / Week	6 (100%)	56 (96.6%)	44 (95.7%)	0.861
≤ 6 Times / Week	0 (0.0%)	2 (3.4%)	2 (4.3%)	
Means of transportation				
On foot	0 (0.0%)	1 (1.7%)	0 (0.0%)	0.733
Online Car	0 (0.0%)	10 (17.2%)	4 (8.7%)	
Online Motorbike	0 (0.0%)	2 (3.4%)	3 (6.5%)	
Private car	0 (0.0%)	4 (6.9%)	4 (8.7%)	
Private Motorbike	6 (100%)	41 (70.7%)	35 (76.1%)	
Clinical Conditions				
Minor illness	2 (33.3%)	6 (10.3%)	6 (13.0%)	0.273
Healthy	4 (66.7%)	52 (89.7%)	40 (87.0%)	
Oxygen levels in the blood				
Hypoxia	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.401
Less	0 (0.0%)	2 (3.4%)	0 (0.0%)	
Normal	6 (100%)	56 (96.6%)	46 (100%)	

Table 1 shows that the level of moderate fatigue of nurses at Makassar Hospital is mostly felt in the 30-39 year age group, namely 30 respondents (51.7%), with a marital status of 48 respondents (82.8%), having 1-2 children as many as 26 respondents (44.8%), age category ≤ 18 years old as many as 54 respondents (93.1%), Diploma 3 as many as 21 respondents (36.2%), working period >5 years as many as 41 respondents (70.7%), contract employment status as many as 48 respondents (82.8%), workload ≤3 patients as many as 34 respondents (58.6%), length of work per shift > 6 times / week as many as 56 respondents (96.6%), private motorbike transportation as many as 41 respondents (70.7%), healthy clinical conditions as many as 52 respondents (89.7%)⁵, normal blood oxygen levels were 56 respondents (96.6%). The bivariate analysis test showed that there was no significant relationship between the variable characteristics of nurses and the level of work fatigue where the p value > 0.05.

Table 2 Analysis of the Relationship of Job Stress, Quality of Worklife, Work Climate and Job Satisfaction of Nurses with Fatigue Levels in several Makassar City Hospitals in 2020

Variable	Fatigue Level			P-Value
	High	Moderate	Low	
Work stress				
Job Demands				
Not good	4 (66.7)	41 (70.7)	40 (87.0)	0.118
Well	2 (33.3)	17 (29.3)	6 (13.0)	
Role Demands				
Not good	4 (66.7)	47 (81.0)	45 (97.8)	0.111
Well	2 (33.3)	11 (19.0)	1 (2.2)	
Interpersonal Relations				
Not good	5 (83.3)	58 (100)	46 (100)	0.000
Well	1 (16.7)	0 (0.0)	0 (0.0)	
Organizational Leadership				
Not good	6 (100)	57 (98.3)	46 (100)	0.636
Well	0 (0.0)	1 (1.7)	0 (0.0)	
Technology changes				
Not good	5 (83.3)	57 (98.3)	46 (100)	0.016
Well	1 (16.7)	1 (1.7)	0 (0.0)	
Quality of Worklife				
Balanced Compensation				
Low	5 (83.3)	44 (75.9)	30 (65.2)	0.396
High	1 (16.7)	14 (24.1)	16 (34.8)	
Communication				
Not good	5 (83.3)	52 (89.7)	36 (78.3)	0.279
Well	1 (16.7)	6 (10.3)	10 (21.7)	
Employee Engagement				
Not good	6 (100)	58 (100)	45 (97.8)	0.496
Well	0 (0.0)	0 (0.0)	1 (2.2)	
Career development				
Not good	5 (83.3)	53 (91.4)	36 (78.3)	0.167
Well	1 (16.7)	5 (8.6)	10 (21.7)	
Available Facilities				
Not good	4 (66.7)	35 (60.3)	38 (82.6)	0.048
Well	2 (33.3)	23 (39.7)	8 (17.4)	
Organizational Climate				
Structure				
Not good	6 (100)	56 (96.6)	45 (97.8)	0.846
Well	0 (0.0)	2 (3.4)	1 (2.2)	
Standard				
Not good	6 (100)	56 (96.6)	44 (95.7)	0.242
Well	0 (0.0)	2 (3.4)	2 (4.3)	
Responsible				
Not good	6 (100)	49 (84.5)	38 (82.6)	0.341
Well	0 (0.0)	9 (15.5)	8 (17.4)	
Recognition				
Not good	5 (83.3)	48 (82.8)	32 (69.6)	0.262

Well	1 (16.7)	10 (17.2)	14 (30.4)	
Support				
Not good	6 (100)	56 (96.6)	44 (95.7)	
Well	0 (0.0)	2 (3.4)	2 (4.3)	0.861
Commitment				
Not good	6 (100)	58 (100)	43 (93.5)	
Well	0 (0.0)	0 (0.0)	3 (6.5)	0.117
Job satisfaction				
Not good	5 (83.3)	50 (86.2)	44 (95.7)	
Well	1 (16.7)	8 (13.8)	2 (4.3)	0.240

Source: Primary Data, 2020

Table 2 shows that the level of moderate fatigue is mostly felt by nurses based on work stress indicators with the category of not good job demands as many as 70.7%, role demands 47 respondents (81.0), 58 respondents (100%) have not good personal relationship, not good organizational leadership as many as 57 respondents 98.3%, not good technology changes as many as 57 respondents 98.3.

Based on the indicators of quality of work life with a balanced low compensation category as many as 44 respondents (75.9%), not good communication were 52 respondents (89.7%), employee involvement was not good as many as 58 respondents (100%), not good career development 53 respondents (91.4)%, the available facilities were not good as many as 35 respondents (60.3%). Not good communication as many as 52 respondents (89.7%), not good employee engagement 58 respondents (100%), career development was not good 53 respondents (91.4%), the available facilities are not good as many as 35 respondents (60.3%).

Table 4 shows that the level of moderate fatigue was mostly felt by nurses based on indicators of organizational climate with a category of structure that was not good as many as 56 respondents (96.6%), the standard was not good as many as 56 respondents (96.6%), not good responsibility as many as 49 respondents (84.5%), not good recognition as many as 48 respondents (82.8%), support variables with not good category were 56 respondents (96.6%), 58 respondents (100%) had not good commitment. For not good job satisfaction as many as 50 respondents (86.2%) who felt moderate fatigue.

Based on table 2, it is known that there are 3 variables that have a significant value (<0.05), namely interpersonal relations (0.000) technology changes (0.016), available facilities (0.048) and based on table 2 it is also known that 14 variables have a p value (>0.05).

Analysis of Structural Equation Model (SEM)

Analysis of determining the work fatigue index of nurses using the confirmatory factor analysis method with the initial model which will be attached to Figure 1 and the final model in Figure 2 below:

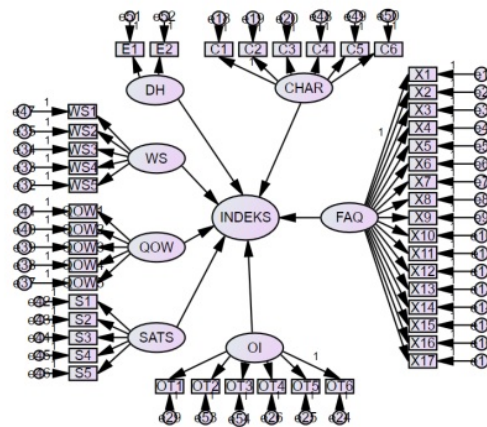


Figure 1 Initial model of nursing fatigue index

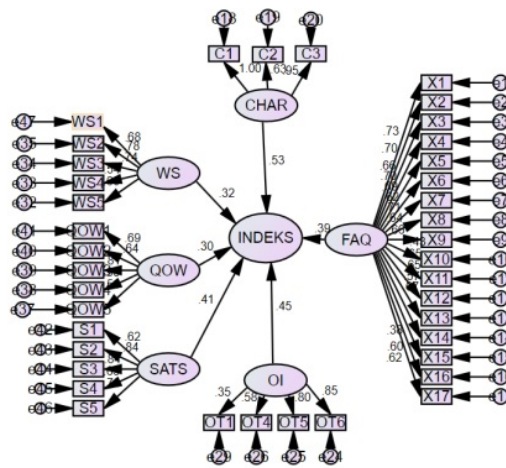


Figure 2 The final model of the nursing exertion fatigue index

¹ Based on the results of the analysis using Confirmatory Analysis in Figure 2, it shows that there were three characteristic factors (CHAR), five work stress factors (WS), seven feelings of fatigue (FAQ), five work quality factors (QOW), four organizational climate factors (OI), and five job satisfaction factors (SATS) which are indicators that can influence the onset of fatigue in nursing personnel. The variable degree of health (DH) as measured by the Body Mass Index and Saturation indicator (Figure 1) is not significant in determining the fatigue index in the research.

Table 3 The Significance Value of the Analysis Results from the Initial Model to the Final Model

Variable	Regression Weight		Standardized Regression
	Estimate	Probability	
Difficulty Thinking (X1) ← Fatigue	1		0.727
Tired While Talking (X2) ← Tiredness (FAQ)	0.89	***	0.697
Nervousness After Work (X3) ← Fatigue (FAQ)	0.758	***	0.657
Difficult to Concentrate (X4) ← Fatigue (FAQ)	0.912	***	0.700
Difficulty to Focus (X5) ← Fatigue (FAQ)	0.875	***	0.694
Often Forgetting (X6) ← Fatigue	0.808	***	0.619
Lack of Confidence (X7) ← Fatigue (FAQ)	0.82	***	0.711
Feeling Anxious (X8) ← Fatigue	0.765	***	0.637
Difficulty to Control Attitude (X9) ← Fatigue (FAQ)	0.79	***	0.664
Feeling Lazy (X10) ← Fatigue (FAQ)	-0.453	***	-0.430
Headache (X11) ← Fatigue (FAQ)	0.904	***	0.649
Shoulders Feel Stiff (X12) ← Fatigue (FAQ)	1,018	***	0.653
Back Pain (X13) ← Fatigue (FAQ)	0.835	***	0.569
Shortness of Breath (X14) ← Fatigue (FAQ)	0.73	***	0.668
Thirsty (X15) ← Fatigue (FAQ)	0.497	***	0.378
Hoarseness (X16) ← Fatigue (FAQ)	0.627	***	0.600
Trembling Body (X17) ← Fatigue (FAQ)	0.837	***	0.624
Commitment ← Organizational Climate (CO)	1		0.851
Structure ← Organizational Climate (OI)	0.384	***	0.346
Recognition ← Organizational Climate (OI)	0.66	***	0.584
Support ← Organizational Climate (OI)	0.898	***	0.797
Changes in Technology ← Job Stress (WS)	1		0.598
Organizational Leadership ← Job Stress (WS)	0.726	***	0.544
Interpersonal Relations ← Job Stress (WS)	0.775	***	0.737
Job Demands ← Job Stress (WS)	0.873	***	0.776
Role Demands ← Job Stress (WS)	1,443	***	0.675
Available Facilities ← Quality of Work (QOW)	1		0.560
Communication ← Quality of Work (QOW)	1.97	***	0.899
Career development ← Quality of Work (QOW)	1,624	***	0.814
Employee Engagement ← Quality of Work (QOW)	0.894	***	0.635
Balanced Compensation ← Quality of Work (QOW)	1,663	***	0.688
Career Development ← Job Satisfaction (SATS)	1		0.777
Policies and Leaders' Role Affect Work Comfort ← Job Satisfaction (SATS)	0.813	***	0.652

Coworker Support ← Job Satisfaction (SATS)	0.923	***	0844
Feeling Comfortable with Work ← Job Satisfaction (SATS)	0.935	***	0842
Salary / Service ← Job Satisfaction (SATS)	1.01	***	0.616
Years of service ← Characteristics (CHAR)	0.949	***	0.948
Number of children ← Characteristics (CHAR)	0.112	***	0.633
Age ← Characteristics (CHAR)	1		0.995

Source: Primary Data, 2020

Table 3 shows that the regression weight shows that the dimensions and indicators of the final model (Figure 2) are all significant because the probability value is <0.05 and there is a *** sign. The standardized regression weight is all valid because it has a standard loading factor value > 0.5. The results of the analysis of the final model (Figure 2) using Amos software obtained the formula for calculating the fatigue index as follows:

$$\text{Work Fatigue Index} = (0.53X_{\text{char}} + 0.32x_{\text{WS}} + 0.3X_{\text{QOW}} + 0.41X_{\text{SATS}} + 0.45X_{\text{XCO}} + 0.39X_{\text{XFAQ}}).$$

Information:

Char: Characteristics

WS: Work Stress

QOW: Quality Work

SATS: Job Satisfaction

XCO: Working Climate

XFAQ: Subjective Fatigue

Discussion

The effect of age on work fatigue occurs because the physiological functions of the body can change because age affects a person's endurance and work capacity.¹⁵ Age becomes a part of workers that must be considered, because it can affect a person's physical, mental, work ability and responsibility. The results showed that age had an effect on fatigue, other studies also mentioned the effect of age on fatigue in nurses.¹⁶⁻¹⁸

The 30-39 year age group was quite dominant in this study, as much as 57.3%, This group age is a productive group, when the age > 35 years the decline in body function begins to decline, then 40-49 years the condition of deterioration began to be seen from the discovery of the disease diagnosis.¹⁹

This study shows that work periode is one of the characteristics indicator of nurses who have an influence¹² fatigue. In this study, it was found that there were 73.6% of nurses in Makassar City Ho¹¹als with a work period of ≥ 5 years and most of the nurses felt a monotonous state in their work.

In line with the results of this study, Dita et al²⁰ and Kindagen et al²¹ explained that there is an influence of work periode and work fatigue, But on the other side, the study of Kusgiyanto et al¹⁵ shows inversely proportional results where work periode does not affect fatigue. Work Periode has a positive and negative impact.

Not a few nurses have a married status (78.2%) and only a few who do not have children (29.1%), the dual role played by nurses will affect their physical condition. The results of this study show that the number of children is an indicator of the characteristics of nurses that have an influence on the fatigue index, other studies also show that a dual role can cause chronic fatigue.²²⁻²⁴

The significance of the three indicators of nurse characteristics in this study, namely age, work periode and number of children with p-value <0.05 and standard regression of 0.995, 0.948 and 0.633

respectively in the results of the final analysis show that they are one of the exogenous variables that determine the fatigue index formula. work for nurses at Makassar City Hospital.

The results of the cross tabulation showed that of the nurses who experienced moderate fatigue, there were 70.7% of them with not good demands, 81.0% of nurses with not good role demands, almost all of them had poor interpersonal relationships, there were 98.3% of nurses who were in poor leadership and there are 98.3% changes in technology that are not good at Makassar City Hospital.

This study shows the significance of work stress on work fatigue. The study conducted by Jalilian et al. Showed the same results that there was a significant positive relationship between psychological work demands which is an indicator of work stress and fatigue.²⁵

Quality of Worklife it is very important to retain employees, improve the quality of leadership and management, and the home patient will affect the workload and nurses.^(44,45) Nurses are workers who have the lowest quality of life among employees and doctors in hospitals.²⁸

The results of the cross tabulation showed that of the nurses who experienced moderate fatigue, 75.9% rated the balanced compensation as low, 89.7% of the nurses had poor communication, almost all had poor interpersonal relationships, there were 98.3% of nurses who rated employee involvement as poor, 91.4% The nurses considered that career development was not good and there were 60.3% of nurses who felt that the available facilities were not good at Makassar City Hospital.

The expected employee involvement is giving employees the opportunity to be involved in decision making, responding to suggestions, and granting authority and responsibility to subordinates. For career development, it is assessed how the hospital provides training opportunities and short courses, skills building, career paths and a career development platform for employees. Indicators of available facilities are the completeness of supporting work equipment, holding a family gathering program, and the availability of a counseling program that is running well.

The results of this study indicate an influence on quality of life and work fatigue. Digdyani and Dian's research shows that the quality of life of nurses at Private X Hospital in Semarang City is 82.78% high and 15.57% very high, there are 1.63% nurses who have a low quality of life and there are no nurses who are in the very low category.²⁸

Nurses who have a high quality of life can affect the patient's health, because nurses who have a high quality of life will have a positive impact on the care of patients.²⁹ The impact of good care and patient care can accelerate patient recovery and will affect the satisfaction of nurses at work.

The significance of work quality as an index of work fatigue for nurses in this study, from several indicators it has a p value <0.05 and standard regression respectively, namely balanced compensation of 0.688, communication 0.899, employee involvement 0.635, career development 0.814 and 0.560 available facilities.

Working conditions that are good, comfortable, harmonious, healthy and safe are supported by supportive labor conditions (physically and mentally healthy), will be able to provide an atmosphere or work climate that supports the creation of a high efficiency and productivity. On the other hand, work carried out in unfavorable conditions and unfavorable labor conditions will have a negative impact on work efficiency and productivity, and will not be able to create a peace of work and business.³⁰

The results of the cross tabulation showed that of the nurses who experience moderate fatigue, there were 96.6% who think the organizational structure is not good, there were 96.6% who think that the organizational standards were not good, there are 84.5% of the responsibility was not good, 83.8% recognition was not good, there was 96.6% lack of support good and all the respondent feel not good committed.

The results of the final analysis showed that of the five indicators, the remaining four indicators were included in the work fatigue index formula, namely structure, recognition, commitment and support. A good work climate is characterized by a clearly defined and structured organizational structure, it is clear who has formal authority in decision making, employees know their superiors and employee productivity is well organized and planned.

Another factor that can affect satiety is job ¹⁰satisfaction. Job satisfaction is a feeling of liking and disliking when employees assess their work.³¹ Job ¹³satisfaction has a significant positive impact on employee performance, employee performance also has a positive impact on customer satisfaction³². Nurses who do not have job satisfaction tend not to be able to reach psychological maturity and nurses will often feel objections related to the work being done.³³

The results of the cross tabulation showed that of the nurses who experienced moderate fatigue, there were 86.2% who rated job satisfaction as poor. The final results of the analysis obtained four valid indicators, namely career development, policies and leadership roles, support from colleagues and feeling comfortable with work.

Other studies in America and China have shown a negative ⁹relationship between job satisfaction and fatigue in nurses. The higher the dissatisfaction, the lower the level of work fatigue experienced by nurses.^(56,57)

The significance of job satisfaction on nurses' work fatigue in this study, with indicators of career development, leadership policies, coworker support and work comfort with p value <0.05 with standard regression respectively 0.777, 0.652, 0.844 and 0.842.

The results of the analysis of the final model obtained 17 (seventeen) valid indicators used in the measurement of fatigue, namely complaints of difficulty thinking, tired when speaking, nervous at work, difficulty concentrating, difficulty focusing, frequent upsets, lack of confidence, anxiety, difficulty controlling attitudes, laziness, headache, stiff shoulders, back pain, shortness of breath, thirsty throat, hoarseness and trembling.

Forty-six observable variables measured on nurses, in the initial model there were seven constituent factors which then after obtaining the final model the variable degree of health (DH) was dropped so that in the final model six valid variables were found to be constituent factors, namely the first characteristic (CHAR) which consists of 3 (three) valid observed variables, namely age, years of service and number of children. Second, job stress (WS) which consists of five constituent variables, namely worker demands, role demands, interpersonal relationships, organizational leadership and technological change.

Then the third variable, work quality (QOW) which is composed of balanced compensation, employee involvement, career development, communication and available facilities. Fourth, work climate (OI) which consists of commitment, structure, recognition and support (two constituent variables that are dropped, namely responsibility and standards). The five job satisfaction consists of career development, leadership policies, work comfort and peer support. Sixth, the feeling of fatigue (FAQ) which consists of seventeen complaints felt by the body of the nurse.

The use of the work fatigue index formula for nurses makes it possible to calculate the risk of fatigue faced by nurses in an objective manner so that it can then be used as a basis for management planning and policies at Makassar Hospital in order to improve nurse performance.

Conclusion

The characteristics of nurses, work stress, work quality, organizational climate, fatigue which are categorized into three that are low, medium and high are the constituent variables for the development of indicators of work fatigue index in nurses. The work fatigue index factor with each contribution was characteristic 0.53, work stress 0.32, quality of life 0.3, job satisfaction 0.4, work climate 0.45 and feeling tired 0.39. The more risky characteristics, job stress, quality of life, job satisfaction, work climate and feelings of fatigue, the greater the fatigue level of hospital nurses in Makassar City.

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