

ISSN 2597- 6052DOI: <https://doi.org/10.56338/mppki.v7i11.6077>**MPPKI****Media Publikasi Promosi Kesehatan Indonesia**
*The Indonesian Journal of Health Promotion***Research Articles****Open Access****Determinants of Work Fatigue in Inpatient Nurses at RSI Siti Hajar Sidoarjo****Fisilmi Kaffah^{1*}, Nafilatul Fitri², Fresvian Jenrivo³, Rizki Mustika Riswari⁴**^{1,2,3,4}Occupational Health and Safety Study Program, Departement of Health Promotion, Politeknik Kesehatan
Kemenkes Malang* Corresponding Author: fslmkaaaf@gmail.com**ABSTRACT**

Introduction: Nurses are an important part of patient care so they are often required to provide optimal service which sometimes causes fatigue. With different individual characteristics of each worker such as age and physical condition of workers and job characteristics such as length of service and duration of work, it is possible to experience fatigue at different levels of fatigue.

Objective: To determine the relationship between age, work period, and work shifts with work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo and identify the relationship between age with work fatigue, work period with work fatigue, work shifts with work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo.

Method: This type of research is quantitative with random sampling technique. Data collection was carried out with IFRC (Industrial Fatigue Research Committee) questionnaire instrument on 125 inpatient nurses at RSI Siti Hajar Sidoarjo. The bivariate analysis process is carried out by testing the data with the SPSS program using the Spearman Rank Correlation test. Independent variables include age, length of service, work shifts while the dependent variable is work fatigue. This variable is a factor that influences work fatigue. These factors are interconnected and can influence nurse fatigue.

Result: The majority of inpatient nurses who have the potential to work fatigue are ≤ 35 years old, had worked for ≤ 5 years, working on the morning shift, experienced low fatigue and the majority of nurses felt thirsty, wanted to lay down after work, often yawned, sleepy, and tired all over. Based on the hypothesis test, between age and fatigue was obtained sig. $0.002 < 0.05$, between tenure and fatigue obtained sig. $0.001 < 0.05$, and between work shifts and work fatigue obtained sig. $0.032 < 0.05$.

Conclusion: There is a relationship between age, length of service, work shifts with work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo.

Keywords: Age; Tenure; Shift Work; Fatigue

INTRODUCTION

Work fatigue is a feeling of fatigue and a decrease in alertness that starts with fatigue which then leads to mental or physical fatigue and can prevent a person from being able to carry out his functions within normal limits. In addition, this fatigue occurs after a person reaches a point where his physical or mental condition, as well as decreased motivation and productivity at work [1]. Work fatigue is the most common problem felt by shift workers that will affect concentration and motivation, making them vulnerable to stress. Symptoms of fatigue can range from quite mild to so exhausting that it is impossible to continue working. This leads to lower quality work, more mistakes being made, and reduced morale, all of which can result in work accidents [2].

Many factors, including circadian rhythms, noise levels, lighting levels, and work atmosphere, as well as the volume and duration of work, physical problems (such as worries, conflicts within the organization, and responsibilities), nutritional status, monotonous work, and workload, can lead to work fatigue. Working hours, gender, age, tenure, nutritional status, and health issues all have an impact on how tired you feel at work [2]. Work fatigue may develop in various degrees due to each worker's unique qualities, such as age and physical condition, as well as job characteristics, such as tenure and length of service. Long periods of static standing, repetitive motions while working, irregular work-rest schedules, and workloads organized according to individual worker preferences are some of the elements that increase the risk of occupational fatigue [3].

Data on workplace accidents in Indonesia shows an average of 414 accidents occur every day, with 27.8% of these accidents caused by extreme fatigue, as reported by the Ministry of Manpower in 2014 [4]. Data from the International Labor Organization (ILO) shows that there were 18,828 samples or around 32.8% of the total sample, out of 58,155 samples experiencing fatigue and causing work accidents. Based on research there were 18,828 samples or around 32.8% of the total sample, out of 58,155 samples experiencing fatigue [5]. Based on data from the National Safety Council (NSC) that of the 2,010 workforce in the United States in 2017, it was found that approximately 13% of workplace accidents occurred due to fatigue factors, 97% of workers had two or more risk factors for fatigue. Occupational fatigue affects 40% of the workforce, which increases absenteeism, decreases productivity, and increases the incidence of workplace accidents [6]. According to research by Pratiwi & Setyawan (2017), it shows that nurses in the intensive care unit of K.R.M.T. Hospital. Wongsonegoro and Tugurejo Semarang, the majority of respondents 63.0% experienced work fatigue in the moderate category, 23.5% experienced severe fatigue, and 13.6% experienced mild fatigue [7]. In addition, research conducted by Rahmayani, et al (2022), showed that most nurses in the inpatient hospital of Pidie Jaya Regency experienced fatigue levels of 70.49 in mild fatigue and 29.51 with moderate fatigue [8].

The relationship between age and fatigue is that increasing age is associated with a process of organ damage that reduces organ capacity and makes workers more vulnerable to fatigue. A person's physical performance peaks in their mid-twenties and then declines with age, and workers experience physical decline at the age of thirty or older [9]. Young nurses are generally physically stronger, dynamic, and creative, but get bored quickly, lack responsibility, tend to have high absenteeism and turnover. Older nurses have less physical condition but work tenaciously, have great responsibility, and have low absenteeism and turnover [10]. This is supported by research conducted by Chesnal, et al (2015) showing that in workers > 31 years, the incidence of fatigue was found to be 31.3%, while in workers < 31 years, the percentage of workers who experienced severe fatigue was 27.1% [11].

A period of work can have both positive and negative impacts. If a person works, they will gain experience in performing their duties, which is beneficial to the world of work. On the other hand, if they work too long, their endurance will be taxed, leading to fatigue [12]. According to research by Poursadeqiyani (2020), a p-value of 0.05 was obtained, which means that there is a significant relationship between long working period and fatigue [13]. In addition, based on the results of research by Izzati, et al (2018), 83.3% of workers with a work period of 6-10 years experienced moderate fatigue [14].

Work shifts have an impact on work fatigue which can lead to work accidents, 63% of workers experience work fatigue. Fatigue will affect work shifts by inhibiting napping, reducing appetite, causing indigestion, and causing abdominal pain [15]. According to Sugiono et al (2018: 135), states that resting during the day and working at night is contrary to the body's biological clock, resulting in a decrease in appetite and causing indigestion in addition to making a person feel tired and sleepy. Improper work shift planning has an impact or negative effect on workers including physiological effects, psychosocial effects and performance effects [16].

After a preliminary study at RSI Siti Hajar to nurses, 2 out of 4 nurses complained of experiencing fatigue such as sometimes feeling sleepy while working, feeling like lying down after work, feeling thirsty, sometimes anxious and nervous while working, and sometimes heavy legs while working. Some of the tasks that must be done such as accompanying doctors when examining patients, completing patient data, delivering patients when there is a need, observing patients, changing patient infusions and administering drugs.

Based on the description above, the authors want to further identify the determinants of work fatigue in nurses in the inpatient department at RSI Siti Hajar Sidoarjo.

METHOD

The type of research used in this study is quantitative research. In this study, quantitative research was used to identify the relationship between age, working period, work shift with work fatigue in inpatient nurses. This study used a Cross Sectional approach. One of the types of observational research design that collects data on independent and dependent variables simultaneously is cross-sectional research.

The dependent variable in this research is work fatigue and the independent variable is age, work period, and work shifts. The independent variables are taken from internal and external factors that influence work fatigue. All variable data were collected using IFRC (Industrial Fatigue Research Committee) questionnaire. The IFRC questionnaire was used because researchers wanted to measure the level of work fatigue experienced by respondents subjectively, measuring work fatigue experienced by workers when carrying out their work activities. Early symptoms can be identified using this questionnaire.

Categories score of fatigue is 1) Scoring 30-52 as low fatigue, 2) Scoring of 53-75 include moderate fatigue, 3) Scoring 76-98 are high fatigue, 4) Scoring 99-120 including very high fatigue. Working period is categorized into 2 categories which are 1) New work period: ≤ 5 years, 2) Long work period: >5 years. Categories of work shift are 1) Morning shift (07.30-14.30), 2) Afternoon shift (14.30-21.00), 3) Night shift (21.00-07.30).

RESULTS

Characteristics of Respondents Based on Age, Work Period, Work Shift, Work Fatigue

The results of the univariate analysis conducted on each variable to determine the characteristics of each data are presented in the following frequency distribution table.

Table 1. Respondents Characteristics

No	Characteristics	F	%
1	Age		
	> 35 years	38	30,4
	≤ 35 years	87	69,9
	Total	125	100
2	Work Period		
	> 5 years	53	42,4
	≤ 5 years	72	57,6
	Total	125	100
3	Work Shift		
	Morning	59	47,2
	Afternoon	28	22,4
	Night shift	38	30,4
	Total	125	100
4	Work Fatigue		
	Low	66	52,8
	Moderate	55	44
	High	3	2,4
	Very high	1	0,8
	Total	125	100%

Source: Primary Data, 2024

Based on table 1, there are 3 independent variables, namely age, work period, and work shift. Meanwhile, the dependent variable in this research is work fatigue. The table shows that the frequency of old age > 35 years (30,4%) and young age ≤ 35 years (69,9%). It means that the majority of nurses are ≤ 35 years old. The amount and percentage of nuses work period, namely the new work period of 53 nurses (42,3%) and old work period of 72 nurses (57,6%). The work shift variable shows that most respondents work in the morning shift (47,2%), night shift (30,4), and afternoon shift (22,4%). The work fatigue variable shows that the majority of nurses have low fatigue (52,8%), moderate fatigue (44%), high fatigue (2,4%), and very high (0,8%).

The Relationship Between Age, Work Period, and Work Shift with Work Fatigue in Nurses

Table 2. Recapitulation of Relationship Test Results

Variable	Correlation Coefficient	p value
Age with Work Fatigue	0.281	0.002
Work Period with Work Fatigue	0.283	0.001
Work Shift with Work Fatigue	0.192	0.032

Source: Primary Data, 2024

Based on statistical tests of age with work fatigue, the results showed Asymp.Sig. (2-tailed) $0.002 < 0.005$, which means that there is a significant relationship between age and work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo. The correlation coefficient value of 0.281 means that the correlation is sufficient. Based on statistical tests of work period with work fatigue, the results showed Asymp.Sig. (2-tailed) $0.001 < 0.005$, which means that there is a significant relationship between work period and work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo. The correlation coefficient value of 0.283 means that the correlation is sufficient. Based on statistical tests of work shift with work fatigue, the results showed Asymp.Sig. (2-tailed) $0.032 < 0.005$, which means that there is a significant relationship between work shift and work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo. The correlation coefficient value of 0.192 means that the correlation is sufficient.

Based on the data, the age of 125 respondents consisted of 38 people aged >35 years (30.4%) and 87 people aged ≤ 35 years (69.6%). The age category > 35 years is known to have the following breakdown of fatigue: 12 people have low fatigue (31.58%), 24 people have moderate fatigue (63.16%), and 2 people have high fatigue (5, 26%). Meanwhile, in the age category ≤ 35 years, it was found that 87 people had the following details of fatigue, 54 people had low fatigue (62.07%), 31 people had moderate fatigue (35.63%), 31 people (35.63%) had high fatigue. 1 person (1.15%), and 1 person (1.15%) had very high fatigue. Data shows nurses with age ≤ 35 years old experience lower fatigue than nurses aged >35 years.

Based on the data, it is known that of the 53 respondents with a working period of >5 years, 19 people experienced low fatigue (15.2%), 32 people experienced moderate fatigue (25.5%), 1 person experienced high fatigue. (0.8%), and 1 person (0.8%) experienced very high fatigue. Meanwhile, of the 72 respondents with a working period of ≤ 5 years, 47 people had low fatigue (37.5%), 23 people had moderate fatigue (18.4%), and 2 people had high fatigue (1.6%). Data shows that nurses with <5 years of service experience lower fatigue than nurses with >5 years of service.

Based on the research results, it is known that of the 59 respondents with morning work shifts, 24 people (19.2%) had low fatigue, 34 people (27.2%) had moderate fatigue, and 34 people had moderate fatigue (27.2%), and those with high fatigue. as much as 1 person (0.8%). The results of 28 respondents with afternoon work shifts were 18 people (14.4%), 9 people had moderate fatigue (7.2%), and 1 person had very high fatigue (0.8%).). Meanwhile, of the 38 respondents who worked night shifts, 24 people had low fatigue (19.2%), 12 people had moderate fatigue (9.6%), and 2 people had high fatigue (1.6%). Data shows that nurses on the night shift experience lower fatigue than those on the morning and afternoon shifts.

DISCUSSION

The Relationship Between Age with Work Fatigue

Based on these results it can be concluded that, aged >35 years the majority experience moderate fatigue. Meanwhile, ≤ 35 years of age experienced the majority of low fatigue. Workers who have old age are more experienced in doing their jobs because they have been workers for longer, so they can be more efficient in their activities, this also affects the state of the worker's body so that it can minimize the occurrence of job fatigue [17].

The older a person is, the more quality of work will be affected, including carrying out tasks, because as one gets older, the organs in a person's body also experience changes, but there are also respondents who are in the old category but do not experience fatigue [29]. This could be because respondents made good use of their rest time.

This research is in line with research conducted by Rizki Rahmawati, et al (2019) which states that there is a significant relationship between age and work fatigue in nurses at Bangkinan Hospital ($p = 0.000$, $p = <0.05$) [18]. Other research was also conducted by Efendy, et al (2022) which stated that there was a significant relationship between age and the incidence of work fatigue in nurses at Benyamin Guluh Hospital ($p = 0.014 < \alpha = 0.05$) [19]. In light of the results of the assessment of the relationship between age and work fatigue, the recommendation for improvement is to always maintain health by getting enough rest and consuming nutritious food.

The Relationship Between Work Period with Work Fatigue

The longer the working period of workers can have a negative effect, namely the limit of excessive body resistance due to the work process, it will affect the perceived fatigue. On the other hand, a longer working period can also affect psychological work fatigue, due to burnout at work [20]. Nurses whose work period is longer are certainly no longer young so that their endurance and physical strength have decreased, especially usually people who are old have rarely done muscle stretching movements or exercise so that they are easily affected by diseases that many old people suffer from and that can support more easily experiencing work fatigue [21].

The results of this study are in line with research conducted by Alfiyah, et al (2022) from the results of the Statistical test obtained p value = 0.018 or $P < 0.05$, it can be concluded that there is a relationship between tenure with work fatigue in inpatient nurses at Pekanbaru Medical Center Hospital in 2022 [22]. Other research was also conducted by Nurul Auliya (2017) and Nur Aini (2018) based on statistical tests, it is known that there is a significant relationship between tenure and work fatigue with a P value of ($p = 0.016 < 0.05$) [23,24]. The results of this study are also in line with research conducted by Astuti et al (2017) showing that nurses who have worked > 5 years experience more moderate and severe category fatigue, namely 79.2% when compared to nurses who work < 5 years as much as 30% [25]. In light of the results of the assessment of the relationship between tenure and fatigue, the recommendations for improvement are to exercise at least once a week, consume plenty of water, and be able to stretch in between work.

The Relationship Between Work Shift with Work Fatigue

From the results of research that has been done, work fatigue is very high in the day shift. This is because the high workload is in the morning and afternoon shifts, and the low workload is in the night shift (Nathasya et al., 2023). Shift work can disturb and change the body's circadian rhythm. Disruption of the circadian rhythm will cause sleep disturbances, which disrupt the body's recovery process which, if the body's recovery process is inhibited, will lead to fatigue and decreased concentration [5]. According to Kuswadi in Kusumaningtyas (2012), working in afternoon rotational work causes a little more fatigue than working in morning rotational work. This is due to the possibility of workers doing other activities before working during the day, then in the evening it will result in feelings of fatigue before carrying out their work activities [26].

The results of this study are in line with research conducted by Dwienda, et al (2019) there is a relationship between respondents work shifts and nurses fatigue at Permata Hati Duri Hospital, Mandau District, Bengkalis Regency in 2019 with a P value = 0.048 < 0.05 [27]. Other research was also conducted by (Nuraini, 2018) where between work shifts and fatigue obtained p Value = 0.016 where $p < 0.05$, meaning that there is a relationship between work shifts and fatigue in inpatient nurses at Herna Workers Hospital Indonesia in 2018 [24]. This research is also supported by research conducted by (Astuti FW, 2017) where based on the test results obtained a p -value of 0.036, so it can be concluded that there is a relationship between work shifts and fatigue in nurses at Dr. Amino Gondohutomo Semarang Hospital [25]. In light of the results of the assessment of the relationship between work shifts and fatigue, recommendations for improvement that can be given are to maintain stamina before carrying out shift work, in order to work effectively, optimally and can minimize the appearance of fatigue.

Research Limitations

This study has limitations that may affect the results of the study. The limitations that exist in this study include the research questionnaire distributed online using Google Form, so that it can create potential difficulties for respondents in understanding the questionnaire without being accompanied.

CONCLUSION

There is a significant between age and work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo. The older a person is, the quality of a person's work will be affected, because the older the organs in a person's body also experience changes, however there are also respondents who are in the old category but do not experience fatigue. Utilizing rest time is necessary to avoid fatigue.

There is a significant between work period and work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo. The longer a worker's working period can have a negative effect, namely excessive body endurance due to the work process, this will affect the perceived work fatigue. The level of work experience with a longer working period can prevent or reduce the occurrence of work fatigue and work accidents.

There is a significant between work shift and work fatigue in inpatient nurses at RSI Siti Hajar Sidoarjo. Shift work can have the impact of reduced sleep time, decreased physical fitness which causes drowsiness and malaise, loss of appetite, digestive disorders, major social problems due to disruption of family life, loss of free time, limited opportunities to interact with friends, and disruption of group activities. Shift rotation is carried out to prevent work fatigue.

SUGGESTION

Suggestions that can be given to RSI Siti Hajar Sidoarjo are conducting performance evaluations with nurse representatives as an effort to minimize job fatigue, providing free counseling for nurses as a place to vent their complaints to professionals, provide stress management workshops, ergonomic assessments, providing guidebooks on job fatigue, symptoms, impacts and prevention of job fatigue in nurses to reduce job fatigue. These programs can increase nurse productivity so that fatigue can be overcome. Suggestions for inpatient nurses are to always maintain health by getting enough rest and consuming nutritious food, doing exercise at least once a week, consuming lots of water, and can stretch between work, maintaining stamina before carrying out shift work, in order to work effectively and optimally. In addition, for future researchers to be able to examine other factors that cause the risk of fatigue and conduct observations or interviews to strengthen the results of the study.

REFERENCES

1. Arnani, Halizah. C. Differences in Work Fatigue in the Morning Shift and Night Shift Production Employees at the PTPN IV Bah Butong Tea Factory. 2019. *Thesis*. Department of Public Health, Faculty of Public Health, State Islamic University of North Sumatra.
2. Lahay, I., et.al. The Effect of Age and Length of Service on Occupational Fatigue in Brick Making Workers in Gorontalo. *Journal SENTRA*. 2018; 4, 64-67. DOI: 10.22219.
3. Andika, Putra.P, et.al. Relationship between Age, Working Period and Work Shift with Work Fatigue of Employees in the Production Unit of PT Bara Adhi Pratama in North Bengkulu Regency. 2022. *Thesis*. Health Sanitation Study Program, Department of Environmental , Polytechnic of Health Kemenkes Bengkulu.
4. Mualin. M, Yusmidiarti. Ergonomic and Psychosocial Relationships With Work Fatigue in The Workforce of The Trading Company Sinar Harapan Teknik. *Journal of Health Science Mitra Raflesia*. 2020; 11(2), 15. DOI: 10.51712.
5. Desvitasari. The Relationship Between Work Shifts and Workload on Nurses Fatigue Levels. *Journal Ilmiah Multi Science Kesehatan*. 2019; 11(1), 65-77. DOI: 10.36729.
6. Fandani, et.al. Occupational Fatigue in Health Service Workers During The Covid-19 Pandemic. *Journal of Public Health Research and Development Indonesia*. 2022; 3(1), 18-25. DOI: 10.15294.
7. Pratiwi and Setyawan. Overview of Nurses Work Fatigue Level in the Intensive Care Unit. *Journal of the Nursing Department*. 2017. Undergraduate thesis. Diponegoro University.
8. Rahmayani. Analysis of Factors Affecting the Level of Work Fatigue in Production Workers at PT Cipta Baja Raya. 2022. *Thesis*. Department of Public Health, Faculty of Public Health, State Islamic University of North Sumatra Medan.
9. Komalig, M.R. Relationship between Age and Work Shift with Work Fatigue in Parking Ticket Officers in Megamas Area, Manado City. *Journal of Indonesian Health Promotion Publication Media*. 2020; 3(1), 26-30. DOI: 10.56338.
10. Hasibuan, et.al. Analysis of the Workload Measurement by Using Cardiovascular Load (CVL) and at PT. XYZ. *Journal of Industrial and Manufacture Engineering*. 2021; 5(1), 65-71. DOI: 10.31289.
11. Chesnal, H. Relationship between Age, Gender, and Nutritional Status with Work Fatigue in Workers in the Production Section of PT Putra Karangetang Popontolen South Minahasa. *Journal of Public Health*. 2015; 1(1), 1-7. Sam Ratulangi University Manado.
12. Trinofiandy, Kridawati, Wulandari. Analysis of the Relationship between Individual Characteristics, Work Shift, and Work Period with Job Fatigue in Nurses at Hospital X, East Jakarta. *Journal for Healthy People*. 2018; 2(2), 204-209. DOI: 10.52643.
13. Poursadeqiyan, M., M, A., S, K., A, M., Mazlumi E, & M, R. Investigation of The Relationship Between The Safety Climate and Occupational Fatigue Among The Nurses of Educational Hospitals in Zabol. *Journal of Education and Health Promotion*. 2020; 9(1), 238. DOI: 10.4103.
14. Izzati, T., & Ardyanto W., D. (2018). Analysis of Subjective Fatigue Levels Based on Tailor Work Attitudes in the Convection Industry Analysis Of Subjective Fatigue. *Jurnal.Unej.ac.id*, 7(3), 291-299. DOI: 10.20473.
15. Azmy. The Relationship between the Effect of Work Fatigue and Shift Work in Industrial Plant Employees. *Journal of Health and Nursing Sciences (DIAGNOSA)*. 2023; 1(3), 25-33. DOI: 10.59581.
16. Sugiono, P.W.W., and Sari. S.I.K, 2018. Ergonomics for Beginners: Basic Principles and Applications. *Malang: UB Press*. Page 111-114.
17. Bunga, S., Anwar, H. A., Situngkir, D., & Wahidin, M. Factors Affecting Work Fatigue in Health Workers Regarding The Dompert Dhuafa Field During The Covid 19 Pandemic. *Health Publica Journal*. 2021; 2(1), 40-51. DOI: 10.47007.
18. Rahmawati, R. Factors Related to Work Fatigue in Nurses at Bangkinang Hospital in 2019. *PREPOTIF, Public Health Journal*. 2019; 3(2), 41-45. DOI: 10.31004.

19. Efendy, et.al. Factors Related to Work Fatigue in Nurses in the Covid-19 Isolation Room. *Window of Public Health Journal*. 2022; 3(3), 407-414. DOI: 10.33096.
20. Muhamad Ramdan, I. Occupational Fatigue in Traditional Weavers of Samarinda Sarong. 2018. Faculty of Public Health, UWAIS Yogyakarta. <http://repository.unmul.ac.id/handle/123456789/4451>
21. Syarifah, M. N., Sunaryo, M., Ayu, F., & Sahri, M. THE INFLUENCE OF NOISE AND WORK CLIMATE FACTORS ON JOB FATIGUE IN MAINTENANCE WORKERS AT THE PATCHOULI CONTAINER TERMINAL. *Tambusai Health Journal*. 2023; 4(4), 5538-5544. DOI: 10.31004.
22. Alfiyah, R., Rasyid, Z., Harnani, Y., & Abidin, A. R. Determinants of Occupational Fatigue on Nurses In The Intensive Department of Pekanbaru Medical Center Hospital In 2022. *Journal of Sport and Health (ORKES)*. 2022; 1(2), 342-353. DOI: 10.56466
23. Auliya, N. Effect of Work Shift on The Level of Fatigue and Its Impact on The Performance of ARV Production Operators PT Kimia Farma (Persero) Tbk. Jakarta Plant Unit. *Nusantara Journal of Business Management Applications*. 2017; 2(2), 66-74. DOI: 10.29407.
24. Nuraini. The Relationship of Work Shift with Work Fatigue in Nurses in The Inpatient Installation at Herna Medan Hospital in 2018. *Scientific Journal of Health Research*. 2018; 4(1), 46-56. DOI: 10.30829.
25. F. W. Astuti, E. Ekawati, and I. Wahyuni. Relationship Between Individual Factors, Workload and Work Shift With Workfulness in Nurses at Dr. Amino Gondohutomo Semarang Hospital. *Journal of Public Health*. 2017; 5(5), 163-172. DOI 10.14710.
26. Kusumaningtyas, P. The Effect of Work Shift on Subjective Fatigue in Workers in The Weaving Section of PT Tyfountex Sukoharjo. 2012. *Thesis*. Department of Occupational Safety and Health, Faculty of Medicine, Sebelas Maret University.
27. Dwienda, O., & Ahmad Satria Efendi, A. S. Factors Associated with Nurses Work Fatigue at Permata Hati Duri Hospital, Mandau District, Bengkalis Regency in 2019. *Proceedings of Hang Tuah Pekanbaru*. 2021; 1(1), 17-30. DOI: 10.25311.
28. Rhamdani, I., & Wartono, M. (2019). The relationship between work shifts, work fatigue and work stress in nurses. *Journal of Biomedicine and Health*, 2(3), 104–110. <https://doi.org/10.18051/JBiomedKes.2019.v2.104-110>
29. Sasmita, M., Asriwati, A., & Daryanto, E. (2023). Analysis of Risk Factors for Work Fatigue in Nurses at Sinar Husni General Hospital in 2021. *Journal Of Healthcare Technology And Medicine*, 9(1), 354.