

Analysis of Factors Affecting Work Fatigue Among Nurses at Malahayati Islamic Hospital in Medan

Ahmad Nur Hidayat *, Romiza Arika

Universitas Islam Negeri Sumatera Utara

Jl. Lap. Golf No.120, Kp. Tengah, Kec. Pancur Batu, Kabupaten Deli Serdang, Sumatera Utara 20353, Indonesia

Article Info

Article history:

Received October 15, 2025

Revised October 28, 2025

Accepted December 15, 2025

Keywords:

Work Fatigue, Nurses, Hospital

ABSTRACT

Fatigue can be felt by anyone who does heavy work activities with different professions, especially nurses. This study aims to analyze the factors related to work fatigue in nurses at the Malahayati Islamic Hospital in Medan City using the KAUPK2 questionnaire. This study uses a quantitative method with a cross-sectional approach design using the chi-square test. The study population is all nurses at the Malahayati Islamic Hospital in Medan City with a sample of 112 respondents obtained through simple random sampling techniques. The results of this study indicate that there is a significant relationship between workload and work fatigue in nurses with a p-value of 0.000 and the rest do not show a significant relationship between age and work fatigue (p-value 0.746), nutritional status with work fatigue (p-value 0.160), work shifts with work fatigue (p-value 0.078), work period with work fatigue (p-value 0.526), and length of work with work fatigue (p-value 0.254). Research suggestions for hospitals should re-evaluate the division of tasks and the number of nurses per shift to avoid complaints of work fatigue and to prevent an increase in workload in accordance with existing nursing service standards. For future researchers, it is hoped that they can improve the validity of the KAUPK2 questionnaire or try other instruments that have international standards. Furthermore, it is also recommended to expand the research location to increase the sample so that the research results are more comprehensive, examine other variables and also be consistent in conveying the language of the questionnaire to respondents.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Ahmad Nur Hidayat

Universitas Islam Negeri Sumatera Utara

Email: ahmad2004hidayat@gmail.com

INTRODUCTION

Work fatigue is a condition in which individuals feel exhausted. Fatigue can be felt by anyone who performs strenuous activities and has different backgrounds and professions. Broadly speaking, work fatigue is a condition experienced by workers that results in decreased work productivity and worker capabilities. In the medical world, fatigue is inevitable, and indirectly, medical personnel only take breaks in the course of providing care. In this case, fatigue can be caused by working hours that exceed normal working hours, excessive stress, excessive physical and mental activities, insufficient rest, and a combination of these factors.(1)

According to a 2018 report from the International Labor Organization (ILO), approximately 32% of the global workforce experiences fatigue related to their work activities. The percentage of severe fatigue among

workers worldwide ranges from 18.3% to 27%, while the prevalence of fatigue in the industrial sector reaches 45%. The International Labor Organization (ILO) estimates that every year, approximately 2.78 million workers die from work-related accidents or illnesses. Of this number, approximately 2.4 million deaths (86.3%) are caused by work-related illnesses, while more than 380,000 cases (13.7%) occur due to accidents in the workplace. Various factors contribute to this situation, one of which is work fatigue.(2)

A survey conducted by the Indonesian National Nurses Association (PPNI) in 2020 revealed that 50.9% of nurses in Indonesia experience pressure or stress related to their work. Work stress also causes physical effects, such as frequent dizziness, neck pain, and fatigue due to overwork and lack of sleep.(3)

Fatigue is actually regulated centrally by the nervous system. The term fatigue can have different meanings for each individual, but in general it refers to a condition that causes decreased performance, reduced work capacity, and decreased endurance.(4)

Fatigue can be triggered by various factors. There are two factors that can cause work fatigue, namely external factors and internal factors. Internal factors consist of gender, age, medical history, nutritional status, and mental or psychological condition. Meanwhile, external factors consist of working hours, length of work, monotonous work, workload, work attitude, and environmental conditions.(5) Not only that, work fatigue in the workplace can also be caused by various factors related to the workplace, such as temperature, noise, exposure to chemicals, and psychosocial problems experienced by workers.(6)

Nurses are workers or medical personnel who are a very important resource in providing care to patients in hospitals. Nurses bear a great responsibility not only to the patients themselves, but also to the caregivers who look after them and their communities.(7)

Malahayati Islamic Hospital Medan is a private healthcare facility engaged in medical and public health services located in Medan City, Jl. Pangeran Diponegoro No. 2 – 4, Petisah Tengah, Medan Petisah District, Medan City, North Sumatra, and is classified as a type C hospital. RSI Malahayati provides health services involving specialists and subspecialists, as well as complete medical facilities. The facilities at Medan Materna General Hospital include medical services, patient care, an emergency unit, a medical record system, and management administration.

Based on the results of a preliminary survey conducted by researchers, it was found that the work schedule for nurses at Malahayati Islamic Hospital in Medan uses a shift system with 3 shifts, namely the morning shift from 08.00-14.00 WIB, the afternoon shift from 14.00-20.00 WIB, and the night shift from 20.00-08.00 WIB. Through interviews with 10 nurses at Malahayati Islamic Hospital in Medan, it was found that several nurses complained that the increase in the number of patients had led to an increase in their workload. Based on this background, the researcher aimed to conduct a study entitled “Analysis of Factors Affecting Work Fatigue in Nurses at Malahayati Islamic Hospital in Medan.”

METHOD

This study used a quantitative method with a cross-sectional design, which is an observational approach that collects independent and dependent variable data simultaneously in a single period of time. The research was conducted at Malahayati Islamic Hospital in Medan, located at Jl. Pangeran Diponegoro No. 2–4, Medan Petisah, North Sumatra, from February to May 2025, with the research subjects being nurses working at the hospital. The location was chosen due to its ease of data access and its relevance to the research objective of identifying factors that influence nurse work fatigue. The research population consisted of 156 nurses, while the sample was determined using the Slovin formula with a 5% error rate, resulting in 112 respondents. The sampling technique used simple random sampling, in which each nurse had an equal chance of being selected. The inclusion criteria included active nurses and ward heads who also served as implementers, while the exclusion criteria were nurses who were still in the learning stage and nurses who were sick during the study.

Independent variables include age, work shift, nutritional status, and workload, while the dependent variable is the level of work fatigue. The research instrument used the KAUPK2 questionnaire (Work Fatigue Measurement Questionnaire), which measures three main aspects, namely activity impairment, motivation impairment, and physical symptoms. The data used consisted of primary data, obtained through the distribution of questionnaires to nurses, and secondary data, obtained from hospital administrative records. Data analysis was performed univariately to describe the characteristics of each variable, as well as bivariately using the Chi-square test to determine the relationship between fatigue factors and the level of work fatigue. The significance level was set at $\alpha = 0.05$, so that if the p-value < 0.05 , there was a significant relationship between the two variables, while a p-value > 0.05 indicated no significant relationship.

RESULTS

1. Description of Research Location

Malahayati Islamic Hospital in Medan is a type C private general hospital with a total of 156 nurses and adequate facilities. Malahayati Islamic Hospital in Medan also serves BPJS patients and various other types of health insurance. Islamic Hospital Malahayati Medan City was established on April 4, 1974, coinciding with the Islamic New Year 1 Muharram 1395 H. The hospital is located at Jl. Pangeran Diponegoro No. 2-4, Petisah Tengah, Kec. Medan Petisah, Medan City, North Sumatra 20112. It was inaugurated by the Governor of North Sumatra at that time, the late Mr. Marah Halim, under the name Malahayati Islamic Hospital. The purpose of establishing this hospital is to ensure the healing and recovery of patients, their comfort and safety, Islamic attitudes and behavior in medical and non-medical services, and patient satisfaction.

The sample in this study consisted of 112 nurses, with 104 females and 8 males. The majority of the respondents had a D3 degree (81 respondents), S1 degree (30 respondents), and D4 degree (1 respondent).

2. Univariate Analysis

Table 1. Univariate Analysis

Variable	Frequency (n)	Percentage (%)
Age		
≤ 25 Years (Not Risk)	41	36,6
> 25 Tahun (Risk)	71	63,4
Nutritional Status		
Thin (IMT ≤ 18,4)	9	8,0
Normal (IMT 18,5 – 25,0)	68	60,7
Fat / <i>Overweight</i> (IMT 25,1 – 27,0)	12	10,7
Obesity (IMT ≥ 27,0)	23	20,5
Work Shift		
Morning Shift	42	37,5
Afternoon Shift	32	28,6
Night Shift	38	33,9
Employment Period		
≤ 5 Years (Not Risk)	41	36,6
> 5 Tahun (Risk)	71	63,4
Length of Service		
6 Hours (Not Risk)	59	52,7
> 6 Hours (Risk)	53	47,3
Workload		
Light Workload	69	61,6
Moderate Workload	38	33,9
Heavy Workload	5	4,5
Level of Work Fatigue		
Not Fatigue	1	0,9
Fatigue	24	21,4
Very Fatigue	87	77,7
Total	112	100.0

Based on the frequency distribution of the characteristics of 112 workers, it can be explained that most respondents were in the >25 years (at risk) age group, namely 71 people (63.4%), while those aged ≤25 years (not at risk) numbered 41 people (36.6%). In terms of nutritional status, the majority of respondents had normal nutritional status (BMI 18.5–25.0), namely 68 people (60.7%), followed by those in the obese category (BMI ≥27.0), namely 23 people (20.5%), overweight (BMI 25.1–27.0), namely 12 people (10.7%), and underweight (BMI ≤18.4) 9 people (8.0%). Based on work shifts, most respondents worked the morning shift, namely 42 people (37.5%), followed by the night shift with 38 people (33.9%), and the afternoon shift with 32 people (28.6%). In terms of length of service, 71 people (63.4%) had worked for >5 years (at risk), while 41 people (36.6%) had worked for ≤5 years (not at risk).

Based on the length of work per day, most respondents worked for 6 hours (not at risk), namely 59 people (52.7%), while 53 people (47.3%) worked more than 6 hours. In terms of workload, the majority of respondents experienced a light workload, namely 69 people (61.6%), while 38 people (33.9%) had a moderate workload, and 5 people (4.5%) had a heavy workload. Meanwhile, based on the level of work fatigue, most respondents were in the very tired category, namely 87 people (77.7%), 24 people (21.4%) were in the tired category, and only 1 person (0.9%) was not tired. Overall, it can be concluded that the majority of workers

have risky ages and work tenure, work morning shifts with light to moderate workloads, and show high levels of fatigue despite most having normal nutritional status.

3. Bivariate Analysis

Table 2. Bivariate Analysis

Variable	Level of Work Fatigue								P Value
	Not Fatigue		Fatigue		Very Fatigue		Total		
	n	%	n	%	n	%	N	%	
Age									
≤ 25 Years (Not Risk)	0	0,0	9	8,0	32	28,5	41	36,6	0,746
> 25 Tahun (Berisiko)	1	0,8	15	13,3	55	49,1	71	63,3	
Nutritional Status									
Thin (IMT ≤ 18,4)	0	0,0	3	2,6	6	5,3	9	8,0	0,160
Normal (IMT 18,5 – 25,0)	0	0,0	14	12,5	54	48,2	68	60,7	
Fat (IMT (25,1 – 27,0)	1	0,9	2	1,8	9	8,0	12	10,7	
Obesity (≥ 27,0)	0	0,0	5	4,4	18	16,0	23	20,5	
Employment Period									
≤ 5 Years (Not Risk)	0	0,0	13	11,6	49	43,7	62	55,3	0,526
> 5 Years (Risk)	1	0,9	11	9,8	38	33,9	50	44,6	
Length of Service									
≤ 6 Hours (Not Risk)	0	0	10	8,9	49	43,7	59	52,6	0,254
> 6 Jam Berisiko)	1	0,9	14	12,5	38	33,9	53	47,3	
Workload									
Light Workload	0	0	14	12,5	55	49,1	69	61,6	0,000
Moderate Workload	0	0	9	8	29	25,9	38	33,9	
Heavy Workload	1	0,9	1	0,9	3	2,6	5	4,4	
Total	1	100,0	24	100,0	87	100,0	112	100,0	

Based on the results of the analysis of the relationship between respondent characteristics and work fatigue levels, it can be explained that the age variable shows that most respondents, both those aged ≤25 years and >25 years, are in the very tired category, with 32 people (28.5%) and 55 people (49.1%), respectively. Although workers aged >25 years appear to experience more fatigue, the statistical test results show a p-value = 0.746, which means that there is no significant relationship between age and work fatigue levels. In terms of nutritional status, most workers with normal nutritional status (BMI 18.5–25.0) experienced fatigue in the very tired category, namely 54 people (48.2%), while in the obese group (BMI ≥27.0), 18 people (16.0%) were also in the very tired category. The statistical test results showed a p-value = 0.160, which means that there is no significant relationship between nutritional status and work fatigue levels.

Furthermore, in terms of length of service, it appears that respondents with >5 years of service (at risk) tend to experience more fatigue than those who have worked for ≤5 years. However, the statistical test results show a p-value = 0.526, which means that there is no significant relationship between length of service and level of work fatigue. This means that the length of time a person works at a company does not significantly affect the level of fatigue they experience. For the variable of working hours, most respondents who worked 6 hours or >6 hours per day were in the very tired category, with a p-value of 0.254, so it can be concluded that there is no significant relationship between working hours per day and the level of work fatigue.

The workload showed significant results. Most workers with light and moderate workloads experienced severe fatigue, but it was found that the higher the workload, the greater the proportion of workers who were extremely fatigued. Statistical test results showed a p-value = 0.000, which means that there is a very significant relationship between workload and work fatigue levels. Overall, it can be concluded that of the several variables studied, only workload had a meaningful relationship with the level of work fatigue, while the variables of age, nutritional status, length of service, and duration of work did not show a significant relationship.

DISCUSSION

1. The Relationship Between Age and Work Fatigue Levels in Nurses

Age has the potential to affect work, where the older a person gets, the more fatigue they experience at work. Age is one factor that has the potential to affect a person's capabilities, such as causing a decline in productivity and organ function, which can make a person more prone to fatigue. However, the findings of this study show no significant relationship between age and the level of work fatigue, which is categorized into two categories: ≤ 25 years old (not at risk) with 32 respondents (28.5%), and > 25 years old (at risk) with 55 respondents (49.1%) with a p-value of 0.746.

In this study, the absence of a significant relationship between age and work fatigue was due to nurses aged > 25 years being more experienced in handling their work, enabling them to adapt to the tasks performed. Furthermore, the researcher observed that most nurses aged > 25 years worked at nursing stations in a seated position.

As this is in line with the research by Kessi & Mulir,(8) stated that nurses at the Haji Makassar Regional General Hospital did not find a significant correlation between age and work fatigue among inpatient nurses (p-value = 0.229). This may be because new/young nurses aged ≤ 25 years certainly still have less experience in dealing with various adaptation challenges that cause work fatigue. Meanwhile, older nurses are already able to adapt well and maintain their health through exercise and a healthy lifestyle.

However, this contradicts the research by Tenggor et al,(9) which shows that age is related to work fatigue with a p-value of $0.006 < 0.05$. This may occur because nurses aged > 25 years experience work fatigue due to decreased physical capacity, even though they also have strategies to manage work fatigue, while nurses aged ≤ 25 years tend to experience work fatigue due to a lack of adaptation and experience in managing workloads and work pressure. In addition, physiologically, declining bodily functions with age can affect endurance and work capacity, so older individuals are potentially more prone to fatigue.

2. The Relationship Between Nutritional Status and Work Fatigue Levels in Nurses

Nutritional status is one aspect of work capacity that affects work performance and efficiency, especially if a person is malnourished in a situation of heavy workload. However, the nutritional status of nurses does not always affect their level of work fatigue because there are other factors that have a more dominant effect on work fatigue, one of which is workload. As the findings in this study show, there is no significant relationship between nutritional status and work fatigue levels, which are grouped into 4 categories. The thin category had 6 respondents (5.3%), normal had 54 respondents (48.2%), overweight had 9 respondents (8%), and obese had 18 respondents (16%) with a p-value of 0.160 or > 0.05 . With the majority of nurses working at Malahayati Islamic Hospital in Medan having normal nutritional status, nutritional status does not influence work fatigue levels.

This study is in line with research conducted by Sasmita et al,(10) stated that there was no significant relationship between nutritional status and work fatigue levels among nurses at Sinar Husni General Hospital, with a p-value of 0.128 or > 0.05 . This was because the nurses at Sinar Husni General Hospital had normal nutritional status/BMI.

However, this study contradicts the research conducted by Sary & Rakhma,(11) which shows a relationship between nutritional status and work fatigue among hospital nutritionists in the Sukoharjo region with a p-value of $0.040 < 0.05$. This is because the majority of hospital nutritionists in the Sukoharjo region have abnormal nutritional status (underweight, overweight, obese), which can affect their ability to work effectively and efficiently.

3. The Relationship Between Work Shifts and Work Fatigue Levels in Nurses

Work shifts are the division of working hours in accordance with existing regulations. These work shifts allow for worker rotation so that work that must be done 24 hours a day can be fulfilled effectively and efficiently. Based on the findings in this study, there is no significant relationship between work shifts and the level of work fatigue among nurses at Malahayati Islamic Hospital in Medan, with a p-value of 0.078 (> 0.05).

In this case, work shifts are not related to the level of work fatigue because work shift arrangements are not always fixed for nurses working every day. If nurses working the night shift are replaced by those working the morning or afternoon shift, and vice versa, then nurses have sufficient time to rest when shifts change. The same results were found in a study conducted by Dian & Kurniawidjaja,(12) which shows that there is no relationship between work shifts and work fatigue levels, with a p-value of 0.595 or > 0.05 . However, this study contradicts the research conducted by Amir et al,(13) which shows that there is a significant relationship between work shifts and work fatigue levels, with a p-value of 0.00 or < 0.05 . This may be due to work shifts affecting workers' rest time. Jobs with irregular shift rotations often disrupt the body's cycle, making it difficult to rest, which can affect overall productivity and well-being.

4. The Relationship Between Length of Service and Levels of Work Fatigue Among Nurses

Working hours are one of the factors that can affect a person's fatigue level. This is because the longer a person works, the more their body's mechanisms will change. If working hours are >5 years, muscle contractions will tend to occur more quickly, indicating a significant influence between the length of working hours and the level of work fatigue. However, the findings in this study show that there is no significant relationship between length of employment and work fatigue, with a p-value of 0.526 or >0.05. The majority of participants in this study had worked for ≤ 5 years, so no significant relationship was observed between length of employment and work fatigue.

This is in line with research conducted by Putro & Modjo, whose findings show that there is no significant relationship between length of service and fatigue. This may be because fatigue in this study was measured only through questionnaires that describe subjective conditions. Therefore, the p-value is 0.890 (>0.05).

In contrast to the findings of the study conducted by Rasyid et al., which showed that there was a significant relationship between length of service and work fatigue with a p-value of 0.01 or <0.05. The findings obtained in this study are consistent with previous studies Tarwaka,(15) which states that extended working hours over a period of more than ten years will affect worker fatigue.

5. The Relationship Between Length of Service and Work Fatigue Levels in Nurses

Length of service is the total period of time an individual has worked at a company or organization, reflecting that individual's experience, loyalty, and work ability. Length of service is one of the factors that can affect work fatigue. However, in this study, length of service did not affect work fatigue, as shown by the statistical test results, which yielded a p-value of 0.254 or >0.05, meaning that there was no significant relationship between length of service and the level of work fatigue among nurses at Malahayati Islamic Hospital in Medan.

This shows that nurses at Malahayati Islamic Hospital in Medan have good coping mechanisms or ways of dealing with stressful situations. This allows them to cope with long working hours and adapt to their work as nurses.

The results of this study are in line with research conducted by Dian & Kurniawidjaja,(12) which shows that there is no significant relationship between working hours and work fatigue with a p-value of 0.368 (>0.05). Based on these results, this is due to the coping mechanisms of nurses, who are good at and positive in dealing with excessive working hours or are accustomed to long working hours, so that they are not at risk of work fatigue.

This is not in line with the results of research conducted by Yulia & Yunashastuti, which shows that there is a relationship between working hours (length of work) and work fatigue, with a p-value of 0.049 <0.05. In this study, many nurses who had long working hours complained of work fatigue due to long working hours, the large number of tasks, and having to replace colleagues who were unable to attend work on that day.

6. The Relationship Between Workload and Work Fatigue Levels in Nurses

The workload of nurses is a condition that burdens nurses, both physically and non-physically, from all activities carried out by nurses during their duties, whether directly or indirectly, in providing optimal service to patients.(17) Based on the findings in this study, the workload level can be categorized into three categories, namely light workload for 55 respondents (49.1%), moderate workload for 29 respondents (25.9%), and heavy workload for 3 respondents (2.6%).

The results of statistical analysis using the chi-square test showed a p-value of 0.000, which indicates that the p-value is <0.05. This means that there is a significant relationship between workload and work fatigue levels among nurses at Malahayati Islamic Hospital in Medan. This relationship can be explained by the fact that the number of patients that nurses have to handle exceeds the existing service standard, which is a maximum of 3 patients per nurse. However, the increase in the number of patients has required each nurse to handle 5-6 patients, which has increased the workload of nurses to an excessive level.

Excessive workload can have a negative impact on nurses' ability to perform their duties properly. Workload includes all tasks that nurses must perform, both physically and mentally, as well as their responsibilities. It is very important in the world of work to ensure that the workload is in line with the abilities and limitations of the people who have to deal with it. The level of workload borne by an individual can be used to determine how long nurses can work without experiencing fatigue or the risk of physical disorders.

The results of this study are in line with the results of research conducted by Siregar & Ananda in 2023,(18) which also found a relationship between workload and work fatigue levels with a p-value of 0.002 among nurses in the Inpatient Ward of Granmed Lubuk Pakam Hospital. This study is also in line with the results of research conducted by Nurjannah et al,(19) where the factor of workload and work fatigue has a positive correlation with a p-value of 0.032 <0.05. This is because nurses working in the emergency room and

ICU have a great deal of responsibility, considering that the emergency room and ICU are 24-hour service and care units that require a wide range of skills and are always faced with conditions that require special treatment and care. Additionally, another factor of workload is additional work during shifts that is not balanced with the number of nurses.(20)

In this case, the impact of work fatigue can cause a decrease in alertness, concentration, and caution, thereby potentially leading to workplace accidents. Work fatigue can also result in reduced attention, competition, and perception inhibition, sluggishness and slow thinking, decreased willingness or motivation to work, decreased efficiency, and physical and mental activity, which ultimately lead to workplace accidents and decreased work productivity.(21)

CONCLUSION

Berdasarkan hasil penelitian dapat disimpulkan bahwa sebagian besar faktor yang diteliti tidak Based on the results of the study, it can be concluded that most of the factors studied did not have a significant relationship with the level of work fatigue. The results of the analysis showed that age (p-value = 0.746), nutritional status (p-value = 0.160), work shift (p-value = 0.078), length of service (p-value = 0.526), and working hours (p-value = 0.254) are not significantly related to the level of fatigue experienced by nurses. This means that differences in age, nutritional status, shift patterns, length of service, and working hours do not directly affect the level of work fatigue among nurses at Malahayati Hospital in Medan. However, the results of the study show that there is a significant relationship between workload and work fatigue levels (p-value = 0.000). This finding indicates that the heavier the workload borne by nurses, the higher the level of fatigue experienced. Thus, workload is a dominant factor influencing work fatigue among nurses at Malahayati Islamic Hospital in Medan.

REFERENCES

- [1] Wahyu, A., Salmah, U., Syafar, M., Ashar, M., & Yanti IH. Kelelahan Kerja di Sektor Informal. Ponorogo: Uwais Inspirasi Indonesia : Ponorogo; 2024.
- [2] International Labor Organization. Meningkatkan Keselamatan dan Kesehatan Pekerja Muda. Kantor Perburuhan Internasional , CH- 1211 Geneva 22, Switzerland. Jakarta: Organisasi Perburuhan Internasional; 2018.
- [3] Cesilia R, Kosasih. Pengaruh Beban Kerja dan Kelelahan Kerja Terhadap Kinerja Perawat. 2024;4(10):909–22.
- [4] Tarwaka, Bakri SHA. Ergonomi untuk Keselamatan, Kesehatan Kerja dan Produktivitas. Surakarta: UNIBA PRESS; 2004. 383 p.
- [5] Frely Nataria A, Kawatu P, Maddusa Seprianto S. Hubungan Antara Umur Masa Kerja dan Lama Kerja Dengan Kelelahan Kerja Pada Pengemudi Truk Tangki Di Terminal Bahan Bakar Minyak (BBM) PT. Pertamina Bitung. Semantic Scholar. 2017;
- [6] Setyawati L. Buku Panduan Pengukuran Waktu Reaksi Dengan Alat Pemeriksa Waktu Reaksi/Reaction Timer L77. Yogyakarta: LAKASSIDAYA; 2015.
- [7] Maharja R. ANALISIS TINGKAT KELELAHAN KERJA BERDASARKAN BEBAN KERJA FISIK PERAWAT DI INSTALASI RAWAT INAP RSU HAJI SURABAYA. Indones J Occup Saf Heal. 2015;4(1):93.
- [8] Tenriola Fitri Kessi A, Pratiwi Mulir A. Faktor Yang Mempengaruhi Kelelahan Kerja Pada Perawat Di Ruang Rawat Inap Rumah Sakit Daerah Haji Makassar Tahun 2024. J Ilm Kesehat Diagnosis. 2024;19(3):2302–531.
- [9] Putro WK, Modjo R. Analisis Faktor yang Berhubungan dengan Kelelahan Kerja pada Pegawai di UPT Puskesmas Kota Karang Kota Bandar Lampung Tahun 2024. 2025;
- [10] Sasmita M, Asriwati A, Daryanto E. Analisis Faktor Resiko Kelelahan Kerja pada Perawat di Rumah Sakit Umum Sinar Husni Tahun 2021. Vol. 9, Journal of Healthcare Technology and Medicine. 2023.
- [11] Sary AA, Rakhma LR. HUBUNGAN ANTARA STATUS GIZI DENGAN KELELAHAN KERJA AHLI GIZI RUMAH SAKIT DI WILAYAH SUKOHARJO. 2023;4:1297–306.
- [12] Dian D, Kurniawidjaja M. Hubungan Faktor Pekerjaan Dengan Kelelahan Kerja Pada Perawat Puskesmas Di Kabupaten Sambat Tahun Tahun 2023. J Kesehat Tambusai. 2023;4(2):2253–9.
- [13] Amir APR, Salam J, Harma A, Ariyanto J. Hubungan Karakteristik Individu dan Shift Kerja Dengan Kelelahan Kerja Pada Karyawan Aviation Security. 2025;8(1):147–53.
- [14] Rasyid AWZ, Sabilu Y, Asfian P. HUBUNGAN MASA KERJA , STATUS PERKAWINAN DAN KELUHAN MUSCULOSKELETAL DISORDERS TEHADAP KELELAHAN KERJA GURU SMAN 4 DAN SMAN 1 KOTA KENDARI. 2024;5(3):87–96.
- [15] Tarwaka. EKONOMI INDUSTRI : Dasar-Dasar Pengetahuan Ergonomi dan Aplikasi Di Tempat Kerja. Surakarta: Harapan Press; 2015.
- [16] Yulia A, Yunashastuti R. Hubungan antara shift kerja , kualitas tidur dan durasi kerja terhadap kelelahan kerja pada perawat di rumah sakit umum daerah muhammad sani kabupaten karimun. 2024;3(2):100–9.
- [17] Gumelar H, Kusmiran E, Haryanto MS. Hubungan Beban Kerja Dengan Kelelahan Kerja Pada Perawat Pelaksana Di Instalasi Rawat Inap. J Persat Perawat Nas Indones. 2021;6(2):89.
- [18] Pramono Siregar A, Ananda ZP. Pengaruh Beban Kerja Terhadap Kelelahan Pada Perawat Di Instalasi RSUD Lubuk Pakam Tahun 2023. JIKES J ILMU Kesehat Tahun 2023. 2023;2:22–31.
- [19] Nurjannah W, Muchtar F, Ade Prianti I, Kesmas P, Kesehatan Masyarakat F, Halu Oleo Kendari U, et al. Faktor yang

- Berhubungan dengan Kelelahan Kerja pada Perawat di Ruang IGD dan ICU BLUD RS Benyamin Guluh Kab. Kolaka Tahun 2023 Factors Associated with Work Fatigue of Nurses in IGD and ICU Rooms BLUD RS Benyamin Guluh Kolaka Regency in 2023 Indexing Abstr. 2023;2(2):2443–4019.
- [20] Rosmiati, Abdullah R, Nurlinda A. Pengaruh Beban Kerja dan Sikap Terhadap Kelelahan Kerja pada Perawat Di Ruang Rawat Inap Rumah Sakit Islam Faisal Makassar. *J Muslim Community Heal.* 2021;2(3):81–94.
- [21] Amalia R. Hubungan Shift Kerja dan Beban Kerja Terhadap Kelelahan Kerja Pada Perawat Rumah Sakit Umum Daerah Kota Makassar Tahun 2023. Fakultas Kesehatan Masyarakat Universitas Hasanuddin. Universitas Hasanuddin : Makassar; 2023.