

## The Relationship Between Physical and Mental Workload with Fatigue on Nurses

Indah Budi Lestari, Nusavia Astra Jingga, Y. Denny A. Wahyudiono

Department of Occupational Safety and Health, Faculty of Public Health Universitas Airlangga, Indonesia  
Campus C Mulyorejo, Surabaya, East Java, 60115 Indonesia

### ABSTRACT

**Introduction:** Workload and work fatigue are problems that are often experienced in a hospital. Nurses' fatigue can occur due to an unbalanced workload. Nurses who experience work fatigue, the work motivation of the nurses will decrease, performance is low, work quality is low, there are many mistakes, low work productivity, work-related stress, occupational diseases, injuries, and work accidents. This study aims to analyze the relationship between physical and mental workload with work fatigue on nurses in the Emergency Room at Surabaya Haji General Hospital. **Methods:** This study was an observational study with a cross-sectional design conducted in the Emergency Room Installation of Surabaya Haji General Hospital with a research population of 30 nurses. The sampling technique was total sampling. The independent variable in this study is physical workload and mental workload while the dependent variable in this study is work fatigue. Data collection was using pulse oximeter, National Aeronautics and Space Administration Task Load Index (NASA-TLX) and Industrial Fatigue Research Committee (IRFC) questionnaires with statistical analysis using the contingency coefficient test. **Results:** This study shows that physical workload has a very weak relationship with work fatigue in nurses (correlation coefficient 0.198) while the mental workload has a strong enough relationship with work fatigue in nurses (correlation coefficient 0.535). **Conclusion:** Physical workload has a weak relationship with fatigue in Emergency Room nurses at Surabaya Haji General Hospital, while mental workload has a strong enough relationship.

**Keywords:** fatigue, mental workload, physical workload, nurse

### Corresponding Author:

Indah Budi Lestari

Email: indah.budi.lestari-2017@fkm.unair.ac.id

Telephone: +6282123505040

### INTRODUCTION

The hospital is an organization that is extremely helpful in giving wellbeing administrations to the local area. Each health worker who works in a hospital should work by proficient principles, medical clinic administration guidelines, proper standard working strategies, proficient morals, take care of patient rights, and focus on quiet security. These health workers are clinical help staff, nursing personnel, pharmaceutical workers, hospital management personnel, and non-health workers, Law No. 44, articles 12-13 (Wirdah and Yusuf, 2016).

The implementation of health service activities in hospitals has very complex characteristics and organizations. Various health professionals with

various scientific focuses interact with one another. The nurse is a health professional who has an important role in a hospital. It is because nurses are health professionals who must be at the patient's side for 24 hours. One of the problems that often arise in a hospital is the unbalanced workload of nurses, which then impacts the occurrence of work fatigue in the nurse workforce (Perwitasari and Tualeka, 2018).

Fatigue is a condition that can be felt by a person which can be characterized by a decrease in body resistance, decreased concentration levels, decreased appetite, and can cause the body to become weak. Fatigue at work is a subjective feeling accompanied by decreased efficiency and a need for work (Verawati, 2016). Tarwaka (2015) stated work fatigue is a condition accompanied by decreased efficiency, decreased work capacity, and body endurance. Fatigue cannot be ignored in human activities, because humans, who are essentially workers, have limitations in doing work, such as feeling tired.

**Cite this as:** Lestari, I. B., Jingga, N. A and Wahyudiono, Y. D. A. (2023) 'The Relationship Between Physical and Mental Workload with Fatigue on Nurses', *The Indonesian Journal of Occupational Safety and Health*, 12(1), pp. 10-18.

Several cases of work fatigue in nurses that occur in several hospitals in Indonesia, in a study conducted by Sabaruddin and Abdillah (2020) showed that the majority of nurses at Kenari Graha Medika Hospital, Cileungsi, Bogor Regency have a high level of work fatigue, namely 22 people (62.9%). Pratiwi and Setyawan's (2017) research shows that most of the nurses in the intensive care room of RSUD K.R.M.T. Wongsonegoro and Tugurejo Semarang experienced fatigue in the moderate category as many as 51 (63.0%) respondents. The moderate category of work fatigue experienced by intensive care room nurses is caused by monotonous activities in the intensive care room.

Surabaya Haji General Hospital is a hospital provincial referral and includes type B hospitals education. As a hospital that accepts referrals and a type B education hospital, the number of patient visits to this hospital is quite a lot. Based on data on patient visits at the Surabaya Haji General Hospital, especially in the Emergency Room, it was noted that the highest visits reached 4,143 patients in March 2019. Nurses on duty in the Emergency Room (ER) have many tasks. Examples of the duty are providing first aid, carrying out the process of recording cases, and taking actions. The nurse also needs to transfer patients to an inpatient ward if the patient requires intensive care and hospitalization. Nurses in the ER are required to be available at all times because patients or people who need services can come at any time (Mulyadi and Hamel, 2018).

Preliminary studies show that the number of nurses who provide care for the Emergency Room patients of the Surabaya Haji General Hospital each shift is only four to six people. The morning and afternoon shifts are six nurses and the night shifts are four to five nurses. An interview with the Head of the Emergency Room, the number of nurses in each work shift was not balanced with the number of patient visits. Tiring shift schedules become a burden for nurses so that the potential for nurses to experience fatigue is quite large.

The existence of a high workload that is not proportional to the number of nurses in the Emergency Room of Surabaya Haji General Hospital can cause various symptoms of fatigue, including decreased thinking power, lack of concentration, easy forgetting to something, not enthusiasm at work, tired all over the body, difficulty sleeping, feeling lethargic, dizzy and sleepy. Based on Mulyadi and Hamel research (2018), it is known

that some nurses serve patients with less enthusiasm, are less friendly to patients, sometimes angry and impatient with patients. These conditions are signs or symptoms if a person feels tired.

According to Gaol *et al.* (2018) One of the occupational health and safety issues that can trigger work mishaps is fatigue. Work fatigue is a state of diminishing one's effectiveness and strength at work. Meanwhile, Maharja (2015) stated that the impact of work fatigue includes decreased work performance, body feeling uncomfortable, decreased morale, and decreased work productivity. Nurses' work fatigue can also have a direct impact on patients, such as poor patient safety by nurses. The following research conducted by Retnaningsih and Fatmawati (2016) also shows that the workload of nurses at Tugurejo Hospital is in the high category (5.7%) and patient safety is not safe (60.6%).

Each person experiences work fatigue due to various factors. These factors will encourage each individual to feel tired. The workload is a factor that has a big influence on work fatigue. Workload determines how long a person can work according to their work capacity. Work fatigue occurs because someone works with a heavy workload and is not proportional to their work capacity. According to research by Boy *et al.* (2020) there is a significant relationship between workload and work fatigue of nurses in the General Hospital in Medan in 2019. Research by Pongantung, Kapantouw and Kawatu (2019) also states that the workload and work fatigue of nurses at the GMIM Kalooran Amurang Hospital have a strong relationship. In Mulfiyanti's (2020) research, it is also known that the workload and fatigue of nurses at the Class B Tenriawaru Hospital, Bone Regency in 2018 have a relationship.

The workload in each job can be in the form of physical workload and mental workload. Several studies have shown that work fatigue associated with the physical workload is often experienced by nurses. This is supported by research by Sabaruddin and Abdillah (2020). The results of this study prove that there is a significant relationship between work fatigue and physical workload on nurses. The high physical workload of nurses in this study is due to the many and varied work activities of nurses. Among other things, namely providing direct care services, carrying out treatment actions and evaluating according to patient problems, implementing medical programs. Retnosari and Dwiyaniti's research (2017) shows that the workload most experienced by outpatient nurses

at RSI Jemursari is moderate so that many nurses experience complaints of work fatigue with the tired category. Physical workload and work fatigue have a strong relationship with the highest percentage obtained, meaning that physical workload is directly proportional to the increase in work fatigue, namely the increasing load. physical work, then work fatigue has also increased.

Several studies state that mental workload can cause work fatigue, especially in nurses, including Wang's (2019) study that subjective fatigue increases due to high cognitive workloads, and work involved with mental workloads can be positively associated. The results of the group comparison show that a higher mental workload contributes to exposure to Coronavirus Disease of 2019 (COVID-19). Based on the research of Motamedzade *et al.* (2017) it was concluded that mental workload correlates with fatigue in nurses in the operating room. Therefore, reducing mental workload can reduce fatigue in nurses.

Nurses in the Emergency Room have a great potential to experience work fatigue as a result of the workload they bear. Based on research by Yudiah, Yudianto and Prawesti (2018) work fatigue occurs in the nurses' Emergency Room at Hasan Sadikin Bandung Hospital with the highest average value is physical activity fatigue (4.34%). Rahman's (2017) research showed that ten nurses were less tired, fourteen nurses were tired, and one nurse was very tired.

Therefore, the researcher wants to analyze the relationship between physical workload and mental workload with fatigue in nurses in the Emergency Room of Surabaya Haji General Hospital.

## METHODS

This study was an observational study with a cross-sectional design. The object of this study is the entire population, namely 30 nurses, of the Surabaya Haji General Hospital. The research was conducted at the Surabaya Haji General Hospital from September 2019 - February 2020. This study used individual characteristics, two independent variables and one dependent variable. The dependent variable in this study is work fatigue, while the independent variables in this study are physical workload and mental workload. Individual characteristic data were collected from filling out the questionnaire. Physical workload data were collected through a direct measurement instrument

in the form of a pulse oxymeter that was attached to the respondent's finger and measured after two times of providing services to the patient. Mental workload data were collected by measuring mental workload on a questionnaire instrument in the form of NASA-TLX mental workload measurement. Respondents were asked directly related to the six dimensions of mental workload: mental demand, physical demand, temporal demand, performance, effort and frustration level. Measurement was filled in on the questionnaire sheet according to the respondent's answer. Work fatigue data were collected through the direct filling of respondents on the work fatigue questionnaire instrument, namely IRFC. Data analysis was done by using the Spearman correlation test with  $\alpha$  of 0.05. This study has obtained ethical permission from the Ethics Committee in the Faculty of Public Health of Universitas Airlangga No.03/EA/KEPK/2019.

## RESULTS

### Individual Characteristics

Table 1 shows that the majority of nurses who are working in the Emergency Room of the Surabaya Haji General Hospital in 2020 are 19 male with a percentage of 63.3%, while 11 female nurses with a percentage of 36.7%. The age distribution of the Emergency Room nurses at Surabaya Haji General Hospital in 2020 is  $\leq 30$  years as many as 13 people with a percentage of 43.4%, 31-40 years as many as 10 people with a percentage of 33.3%, and 41-50 years as many as seven people with a percentage of 23.3%.

### Physical Workload on Nurses

The physical workload of nurses was measured using a digital pulse measuring device, namely the

**Table 1.** Frequency Distribution of Gender and Age of Emergency Room Nurses at Surabaya Haji General Hospital in 2020

Variable	Frequency	Percentage (%)
<b>Gender</b>		
Female	11	36.70
Male	19	63.30
<b>Age</b>		
$\leq 30$ years old	13	43.4
31 – 40 years old	10	33.3
41 – 50 years old	7	23.3

fingertip pulse oxymeter with the measurement results classified as mild, moderate, heavy, very heavy, extremely heavy. Twenty three nurses had a mild physical workload (76.6%) and seven nurses with a moderate physical workload (23.3%). Table 2 shows that the majority of nurses in the Emergency Room at Surabaya Haji General Hospital had a mild physical workload (75 - 100), namely 76.7%.

**Mental Workload on Nurses**

The workload assessment of 30 Emergency Room nurses at General Hospital Haji Surabaya was carried out using the Nasa TLX questionnaire. The measurement results are classified as low, mild, moderate, heavy, very heavy. One nurse had a mild mental workload (3.30%), eight nurses had a moderate mental workload (26.70%), thirteen nurses

had a high mental workload (43.30%), eight nurses had a very high mental workload (26.70%)

Table 3 shows the mental workload data for Emergency Room in Surabaya Haji General Hospital. Most of the respondents had a heavy mental workload (61-80), namely 43.3%.

**Work Fatigue**

Measurement of the level of fatigue in Emergency Room nurses at Surabaya Haji General Hospital was carried out using a work fatigue questionnaire, namely the IRFC. Fatigue is classified as mild, moderately high, and very high. seven nurses had mild work fatigue (23.4%), 21 e nurses had moderate work burnout (70%), one nurse had high work fatigue (3.3%), one nurse had very high work burnout (3.3%).

Based on Table 4, the results of the frequency distribution of work fatigue data on workers in the Emergency Room Surabaya Haji General Hospital show that the majority of respondents experience moderate work fatigue, namely 70%.

**Table 2.** Identification of the Physical Workload of the Emergency Room Nurses at Surabaya Haji General Hospital in 2020

Variable	Frequency	Percentage (%)	
Physical Workload	75 - 100 (Mild)	23	76.70
	100 - 125 (Moderate)	7	23.30
<b>Total</b>		30	100.00

**Table 3.** Identification of the Mental Workload of the Emergency Room Nurses at Surabaya Haji General Hospital in 2020

Variable	Frequency	Percentage (%)	
Mental Workload on Nurses	21-40 (Mild)	1	3.30
	41-60 (Moderate)	8	26.70
	61-80 (Heavy)	13	43.30
	81-100 (Very Heavy)	8	26.70
<b>Total</b>		30	100.00

**Analysis of the Relationship between Physical Workload and Fatigue**

Table 5 is the result of cross-tabulation between physical workload variables and work fatigue variables for nurses in the Emergency Room

**Table 4.** Identification of Fatigue at the Emergency Room Nurses at the Surabaya Haji General Hospital in 2020

Variable	Frequency	Percentage (%)	
Work Fatigue	0-21 (mild)	7	23.4
	22-44 (moderate)	21	70.00
	45-67 (high)	1	3.3
	68-90 (very high)	1	3.3
<b>Total</b>		30	100.00

**Table 5.** Analysis of the Relationship between Physical Workload and Work Fatigue at Nurses in the Emergency Room Surabaya Haji General Hospital in 2020

Physical Workload	Work fatigue								Correlation
	Mild		Moderate		High		Very high		
	n	%	n	%	n	%	n	%	
Mild	7	23.3	14	46.6	1	3.3	1	4.3	0.198
Moderate	0	0	7	23.4	0	0	0	0	
<b>Total</b>	7	23.3	21	70	1	3.3	1	3.3	



Surabaya Haji General Hospital. Based on Table 5, it is known that the most work fatigue experienced by nurses is fatigue in the moderate category, namely as many as 21 people (70%). Nurses with a mild physical workload experienced more fatigue in the moderate category, namely 14 people (46.6%). Meanwhile, seven nurses had moderate physical workload and moderate fatigue (23.4%). The results of the Spearman correlation test showed that the correlation coefficient value between the variable working period and the work fatigue variable was 0.198, so it could be interpreted that physical workload variables and working variables have a very weak relationship with a positive relationship direction. This shows that the physical workload factor of the nurses has very little to do with the fatigue experienced by the Emergency Room nurses in Surabaya Haji General Hospital.

### Analysis of the Relationship between Physical Workload and Fatigue

Table 6 is the result of cross-tabulation between mental workload variables and work fatigue variables for nurses in the Emergency Room Surabaya Haji General Hospital. Table 6 shows that the fatigue that is mostly experienced by nurses is fatigue in the moderate category, namely 21 people (70%). Nurses who experience fatigue in the moderate category are nurses who have a moderate mental workload of three people (10%). Then, nurses who have a heavy mental workload are 10 people (33.4%). Last, nurses with the heaviest mental workloads are eight people (26.6%). The Spearman correlation test shows the coefficient value of the workload variable with the working variable is 0.535. It could show that the workload variable and the work fatigue variable have a strong enough relationship with the direction of the positive relationship. This study shows that the mental workload experienced by nurses has

a strong relationship in causing work fatigue for nurses in the Emergency Room of the Surabaya Haji General Hospital. Nurses who experience moderate work fatigue are nurses who have moderate to the heaviest mental workloads and the higher the mental workload experienced by nurses, the higher the level of work fatigue.

## DISCUSSION

### Individual Characteristics

#### Gender

This study show that emergency room at Surabaya Haji general hospital consists of male and female nurses. In the research of Arini and Dwiyanti (2017) severe fatigue is most experienced by men. This is due to the habit of men who like to stay up late so that lack of rest time is an important factor to prevent fatigue, because rest is needed for the energy used during work. Not being used to exercise can also make male workers' immune systems weaker and more prone to fatigue. Meanwhile, Pourmovahed (2017) found that female nurses who work in hospital clinical wards experience considerable fatigue. This is influenced by factors such as older age, marriage, formal or permanent employment, and lack of husband's support. In Herlina and Kondi's (2019) research, the nurses who experienced the most work fatigue who said they were tired of the female sex were 24 people (53.3%), and 21 people said they were less tired (46.7%). While the male respondents who said they were tired were seven people (46.7%) and eight people said they were less tired (53.3%), with a p-value of 0.769 ( $> 0.05$ ) which means there is no significant relationship between gender with job burnout in nurses.

**Table 6.** Analysis of the Relationship between Mental Workload and Work Fatigue at Nurses in the Emergency Room Surabaya Haji General Hospital in 2020

M e n t a l workload	Work fatigue								Correlation
	Mild		Moderate		High		Very high		
	n	%	n	%	n	%	n	%	
Mild	1	3.35	0	0	0	0	0	0	0.535
Moderate	5	16.7	3	10	0	0	0	0	
Heavy	1	3.35	10	33.4	1	3.3	1	3.3	
Very Heavy	0	0	8	26.6	0	0	0	0	
<b>Total</b>	<b>7</b>	<b>23.4</b>	<b>21</b>	<b>70</b>	<b>1</b>	<b>3.3</b>	<b>1</b>	<b>3.3</b>	

## Age

This study shows that the majority of workers are 30 years old. According to Rachmawati and Paskarini (2021), age is one of the factors associated with work fatigue. The older the workers, the higher the level of fatigue they feel. A person's age is directly proportional to physical capacity until a certain period and reaches a peak at the age of 25 to 35 years. After reaching the age of 25-35 years, a person will experience a decrease in physical capacity due to changes in vision, hearing, speed to distinguish things, ability to make decisions and remember in the short term, cardiovascular system, and hormonal (Tarwaka, 2015). Oksandi and Karbito's research (2020) stated that there is an age factor with work fatigue in nurses at the dr. H. BOB Bazar Kalianda Hospital, South Lampung Regency in 2018 with a PR value of 3.86, which means that respondents who have an unproductive age have a chance of 3.86 times being more likely to experience fatigue than those of productive age.

## Physical Workload

The majority of nurses in the Emergency Room at Surabaya Haji General Hospital have a low physical workload. The workload of nurses which is included in the light category in this study is because nurses have a habit of working together and helping each other in dealing with patients. The physical workload on nurses is lifting patients, installing infusions, observing vital signs, and installing oxygen (Yudi, Tangka and Wowiling, 2019).

According to Allo *et al.* (2020) physical workload has a strong relationship with work fatigue in nurses. The heavier the workload received, the shorter the working time without fatigue (Tarwaka, 2015). The physical workload on nurses during the COVID-19 pandemic has increased drastically. This is because the number of existing health workers is not proportional to the number of patients treated. It is feared that the high physical workload will lead to work fatigue for nurses. The results of Musta'in, *et al.* (2021) research showed that there were at least two nurses who claimed to be in a severe level of fatigue and there were 11 nurses who were at a moderate level of fatigue. There are also nurses who are at the level of light work fatigue as many as 12 people.

## Mental Workload

Job dissatisfaction, mental disorders, lack of sleep and workload are fatigue risk factors in the

job (Motamedzade *et al.*, 2017). Table 3 shows that most of the respondents had a heavy mental workload (61-80). This is because emergency room nurses must handle and serve the patients quickly, precisely, and responsively. The mental workload on nurses is in the form of work complexity, mentally and spiritually preparing patients and families, especially those who will carry out surgery or in critical conditions, work in special skills in caring for patients, and must establish good communication with patients and families (Yudi, Tangka and Wowiling, 2019).

According to Retnaningsih and Fatmawati (2016), a high mental workload will trigger fatigue in nurses and can endanger patients, which is related to patient safety. Izzati's research (2021) shows that 54.3% of nurses experience a heavy mental workload during the COVID-19 pandemic. Research by Kusumaningsih *et al.* (2020) shows that excessive workload on nurses can trigger stress and fatigue. Nurses who experience stress and fatigue allow them to be unable to perform effectively and efficiently because their physical and cognitive abilities are reduced, which may occur due to the balance between the number of patients and the number of nurses working in the hospital, so that nurses get a higher workload, more than the maximum ability of the nurse so that nurses experience mental workloads and cause unsafe actions (Purba, 2015).

## Work Fatigue

Fatigue in nurses can affect their performance, work-life balance, willingness to move and may have an impact on providing direct care which, in turn, has an impact on patient care outcomes (Steege *et al.*, 2017). Table 4 shows that the majority of respondents experience moderate work fatigue. The level of work fatigue experienced by the nurses in this study was the moderate category of work fatigue. This result is in accordance with the research conducted by Herlina and Kondi (2019) at Awal Bross Hospital Bekasi which found that more nurses felt tired, as many as 51% (31 nurses). According to Musta'in, *et al.* (2021), fatigue can be caused physically or mentally. The fatigue experienced by nurses often occurs because nurses have many and varied work activities. Apart from having to do the main task, namely providing care services to patients, nurses in the emergency room are also required to do jobs that should not be done by nurses, such as doing administrative and management tasks, and sterilizing medical devices which cause nurses to experience fatigue (Mulyadi and Hamel, 2018).

Besides that, during a pandemic like now nurses are tired of nursing because they see COVID-19 patients who have been given maximum nursing care still dying. Worries from within nurses also arise because of contracting COVID-19 because hospitals are places that are prone to transmission of the COVID-19 pandemic at this time (Musta'in *et al*, 2021).

### **Analysis of the Relationship Between Physical Workload and Work Fatigue**

Work activities carried out by workers will become a burden, which is commonly referred to as workload. The workload consists of physical workload and mental workload. According to Rizqiansyah (2017) physical workload tends to lead to the load received by an employee in a job related to their physiological conditions, such as noise, vibration, and tidiness.

The physical workload in this study is included in the mild category. Washing hands and drinking immediately after handling patients can reduce the physical workload experienced by the Emergency Room nurses in the Surabaya Haji General Hospital. This research is supported by Astuti, Ekawati and Wahyuni (2017) research that the physical workload of nurses at RSJD Dr. Amino Gondohutomo Semarang is included in the mild category physical workload.

The significant correlation coefficient value has a very weak relationship between the physical workload variable and the work fatigue variable. The level of a weak relationship between physical workload variables and work fatigue variables in this study is not in line with the research conducted by Allo *et al*. (2020) related to the factors that have a relationship with the work office of nurses at Hasanuddin University Hospital Makassar. In this study, the results of the test between the variables of physical workload and work fatigue obtained  $p\text{-value} = 0.000$  ( $p < 0.05$ ) It could show that physical workload has a strong enough relationship with work fatigue in nurses at Hasanuddin University Hospital Makassar. This is supported by research by Maharja (2015) which shows that physical workload and work fatigue have a strong and unidirectional relationship. Nurses who have a physical workload are experiencing moderate fatigue.

### **Analysis of the Relationship Between Mental Workload and Work Fatigue**

This study shows that the mental workload and work fatigue of nurses in the ER of the Surabaya

Haji General Hospital has a strong relationship. In this study, nurses who had moderate, heavy, and heaviest mental loads experienced moderate work fatigue. This shows that the higher the mental workload in nurses, the more nurses experience work fatigue in the moderate category. Several other studies that are in line with this research are by Ardiyanti, Wahyuni and Jayanti (2017) which states that mental workload and nursing staff with midwives at Mlati II Puskesmas have a relationship. Mirzaei's research (2015) shows that mental workload affects nurses in three hospitals in Shiraz.

The mental workload of the Emergency Room nurses in the Surabaya Haji General Hospital is in the heavy category of as many as 13 people. Based on the dimensions of measuring mental workload using NASA-TLX in this study, it is known that we do not know who knows the server (effort) and time records (temporary requests) at work.

This result is following Astuti, Ekawati and Wahyuni (2017) research which shows that the nurses at RSJD Dr. Amino Gondohutomo Semarang also have a very high and very high mental workload. Nurse at RSJD Dr. Amino Gondohutomo Semarang stated that the mental workload they experience is often caused by tasks, supervisors or room heads, and other senior nurses who are assigned duties as nursing to junior nurses. According to Malekpour *et al*. (2014) a high workload can cause negative impacts such as long-term illness due to stress, mental stupidity, and work fatigue, besides that excessive mental workload is also the main cause of work fatigue. Therefore, the workload must be balanced by the good physical and mental abilities of the workers so that workers do not feel fatigued, which can interfere with their work.

## **CONCLUSION**

Based on the results of this study, it can be concluded that physical workload and mental workload are factors related to work fatigue of nurses in the ER of the Surabaya Haji General Hospital. The results of the Spearman correlation test showed that the correlation coefficient value between physical workload and work fatigue was 0.198, so it means that there is a very weak relationship between physical workload variables and work fatigue variables with a positive relationship direction. The results of the Spearman correlation test show the correlation coefficient between mental workload and work fatigue is 0.535, so it means that there is a



strong enough relationship between mental workload variables and work fatigue variables with a positive relationship direction.

## ACKNOWLEDGMENT

Thanks are given to the Surabaya Haji General Hospital, both management and nurses as respondents who have helped in the implementation of the research, to the supervisor who supervised and provided directly from the beginning of the research process to the end and all parties involved in making this research.

## REFERENCES

- Allo, A. A. *et al.* (2020) 'Work Fatigue Determination of Nurses in Hospital of Hasanuddin University', *Journal of Asian Multicultural Research for Medical and Health Science Study*, 1(2). pp 33-41
- Ardiyanti, N., Wahyuni, I. and Jayanti, S. (2017) 'Hubungan Beban Kerja Mental dengan Kelelahan Kerja pada Tenaga Keperawatan dan Tenaga Kebidanan di Puskesmas Mlati II Sleman Yogyakarta', *Jurnal Kesehatan Masyarakat (e-Journal)*, 5(5), pp. 264–272.
- Arini, S. Y. and Dwiyaniti, E. (2017) 'Analisis Faktor yang Berhubungan dengan Terjadinya Kelelahan Kerja pada Pengumpul Tol di Perusahaan Pengembang Jalan Tol Surabaya', *The Indonesian Journal of Occupational Safety and Health*, 4(2), pp. 113-122.
- Astuti, F. W., Ekawati, E. and Wahyuni, I. (2017) 'Hubungan antara Faktor Individu, Beban Kerja dan Shift Kerja dengan Kelelahan Kerja pada Perawat di RSJD Dr. Amino Gondohutomo Semarang', *Jurnal Kesehatan Masyarakat (e-Journal)*, 5(5), pp. 163–172.
- Boy, P. *et al.* (2020) 'Hubungan Beban Kerja dengan Kelelahan Kerja pada Perawat di Gedung Instalasi Rawat Inap Terpadu', *Jurnal Kesmas Prima Indonesia*, 2(8), pp. 46–50.
- Bunga, S. *et al* (2021) 'Faktor Yang Mempengaruhi Kelelahan Kerja Pada Tenaga Kesehatan Lapangan Dompot Dhuafa Pada Masa Pandemi Covid 19', *Health Publica: Jurnal Kesehatan Masyarakat*, 2(1), pp. 40–51.
- Gaol, M. J. L., Camelia, A. and Rahmiwati, A. (2018) 'Analisis Faktor Risiko Kelelahan Kerja pada Karyawan Bagian Produksi PT. Arwana Anugrah Keramik, Tbk', *Jurnal Ilmu Kesehatan Masyarakat*, 9(1), pp. 53–63.
- Kondi, A. E. and Herlina (2019) 'Faktor-Faktor yang Berhubungan dengan Kelelahan Kerja pada Perawat di Rumah Sakit Awal Bross Bekasi', *Jurnal Persada Husada Indonesia*, 6(20), pp. 1-9
- Izzati, F. E. (2021) 'Hubungan Beban Kerja Fisik dan Mental Dengan RSUD Kota Padang Panjang di Masa Pandemi Covid 19'. Undergraduate Thesis. Faculty of Public Health Universitas Andalas.
- Kusumaningsih, D. *et al.* (2020) 'Hubungan Beban Kerja Fisik Dan Mental Perawat Dengan Penerapan Pasien Safety Pada Masa Pandemi Covid 19 Di UPT Puskesmas Rawat Inap Kabupaten Pesawaran', *Indonesian Journal of Health Development*, 2(2), pp. 108–118.
- Maharja, R. (2015) 'Analisis Tingkat Kelelahan Kerja Berdasarkan Beban Kerja Fisik Perawat di Instalasi Rawat Inap RSUD Haji Surabaya', *The Indonesian Journal of Occupational Safety and Health*, 4(1), pp. 93-102.
- Malekpour, F., *et al* (2014) 'Assessment Of Mental Workload in Nursing by Using NASATLX', *Nursing and Midwifery Journal*, 11(11), pp. 892–899.
- Mirzaei, S., Zamanian, Z., and Zade, H. J. (2015) 'Effects of Work Shifts and Mental Workload on Chronic Fatigue among Female Nurses in Intensive Care Units', *Journal of Health Sciences & Surveillance System*, 3(3), pp. 113–118.
- Motamedzade, M. *et al.* (2017) 'Mental Workload and its Association with Fatigue in Operating Room Personnel of Hamadan Hospitals, Iran, 2016', *Journal of Occupational Health and Epidemiology*, 6(2), pp. 98–105.
- Mulfiyanti, D. (2020) 'Hubungan Beban Kerja Dengan Kelelahan Kerja Pada Perawat Di RSUD Tenriawaru Kelas B Kabupaten Bone Tahun 2018', *Jurnal Ilmiah Keperawatan*, 6(2), pp 205-210.
- Mulyadi and Hamel, R. S. (2018) 'Perbedaan Tingkat Kelelahan Kerja Perawat di Unit Gawat Darurat dan Poliklinik Rumah Sakit Umum GMIM Pancaran Kasih Manado', *Jurnal Keperawatan*, 6(2), pp. 1-7.
- Musta'in *et al.* (2021) 'Hubungan Antara Stres Kerja Dengan Kelelahan Kerja Pada Perawat Di Masa Pandemi Covid-19 Di Unit Pelayanan Kesehatan Daerah Surakarta', *Jurnal Keperawatan*, 13(1), pp. 213–226.



- Oksandi, H. R. and Karbito, A. (2020) 'Faktor-Faktor yang Berhubungan Dengan Kelelahan Kerja Pada Perawat Di RSUD dr.H.BOB Bazar Kalianda Kabupaten Lampung Selatan Hendro', *Jurnal Ilmi Kesehatan Indonesia (JIKSI)*, 1(1), pp. 1-7.
- Perwitasari, D. and Tualeka, A. R. (2018) 'Faktor yang Berhubungan dengan Kelelahan Kerja Subyektif pada Perawat Di RSUD Dr. Mohamad Soewandhie Surabaya', *The Indonesian Journal of Occupational Safety and Health*, 6(3), pp. 362-370.
- Pongantung, M., Kapantouw, N. H. and Kawatu, P. A. T (2018) 'Hubungan antara Beban Kerja dan Stres Kerja dengan Kelelahan Kerja pada Perawat Rumah Sakit GMIM Kalooran Amurang', *Kemas*, 7(5), pp. 1-7.
- Pourmovahed, Z. (2017) 'Perception of Fatigue in Female Nurses Employed in Hospitals', *Women's Health*, 3(1), pp. 1-7.
- Purba, Y. S. (2015) 'Hubungan Beban Kerja Mental Dan Peerilaku Perawat Pelaksana Dengan Keselamatan Pasien', *Jurnal Impuls Universitas Binawan*, 1(2), 59-65.
- Pratiwi, D. A. D. and Setyawan, D. (2017) 'Gambaran Tingkat Kelelahan Kerja Perawat di Ruang Perawatan Intenif', *Jurnal Jurusan Keperawatan*, pp. 1-8.
- Rahman, N. H. (2017) 'Analisis Tingkat Kelelahan Kerja Perawat Di Ruang UGD RSP Unhas dan RSUP Dr. Wahidin Sudirohusodo Makassar'. Undergraduate Thesis. Makassar: Faculty of Medicine and Health Science Universitas Islam Negeri Alauddin Makassar
- Rachmawati, D. and Paskarini, I. (2021) 'Correlation between Individual Characteristics and Rest Break with Work-related Fatigue on Telecommunication Network Service Workers', *The Indonesian Journal Of Occupational Safety and Health*, 10(1), pp. 25-33.
- Retnaningsih, D. and Fatmawati, D. F. (2016) 'Beban Kerja Perawat terhadap Implementasi Patient safety di Ruang Rawat Inap', *Jurnal Keperawatan Soedirman*, 11(1), pp. 44-52.
- Retnosari, D. F. and Dwiyaniti, E. (2017) 'Hubungan antara Beban Kerja dan Status Gizi dengan Keluhan Kelelahan Kerja Pada Perawat Instalasi Rawat Jalan di RSI Jemursari', *Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing)*, 3(1), pp. 8-17.
- Rizqiansyah, M. Z. A. (2017) 'Hubungan antara Beban Kerja Fisik dan Beban Kerja Mental Berbasis Ergonomi terhadap Tingkat Kejenuhan Kerja pada Karyawan PT Jasa Marga (Persero) Tbk Surabaya Branch Gempol', *Jurnal Sains Psikologi*, 6(1), pp. 37-42.
- Sabaruddin, E. E. and Abdillah, Z. (2020) 'Hubungan Asupan Energi, Beban Kerja Fisik, dan Faktor lain dengan Kelelahan Kerja Perawat', *Jurnal Kesehatan*, 10(2), pp. 107-117.
- Steege, L. M. *et al.* (2017) 'Exploring Nurse Leader Fatigue: A Mixed Methods Study', *Journal of Nursing Management*, 25(4), pp. 276-286.
- Tarwaka (2015) *Ergonomi Industri: Dasar-Dasar Pengetahuan Ergonomi dan Aplikasi di Tempat Kerja*. Revisi Edisi II. Surakarta: Harapan Press.
- Verawati, L. (2016) "Hubungan Tingkat Kelelahan Subjektif dengan Produktivitas pada Tenaga Kerja Bagian Pengemasan di CV Sumber Barokah", *The Indonesian Journal of Occupational Safet and Health.*, 5(1), pp. 51-60.
- Wang, X. (2019) 'Subtypes of Nurses ' Mental Workload and Interaction Patterns with Fatigue and Work Engagement During Coronavirus Disease 2019 ( COVID-19 ) Outbreak : A Latent Class Analysis Shanghai University of Traditional Chinese Medicine Shanghai University of Tradi', 2019, pp. 1-18.
- Wirdah, H. and Yusuf, M. (2016) 'Penerapan Asuhan Keperawatan oleh Perawat Pelaksana di Rumah Sakit Banda Aceh', *PSIK Unsyiah*, 1(1), pp. 1-6.
- Yudiah, W., Yudianto, K. and Prawesti, A. (2018) 'Fatigue and Work Satisfaction of Emergency Nurses in Bandung, West Java, Indonesia', *Belitung Nursing Journal*, 4(6), pp. 602-611.
- Yudi, D., Tangka, J. W. and Wowiling, F. (2019). 'Hubungan Beban Kerja Fisik Dan Mental Perawat Dengan Penerapan Patient Safety Di IGD Dan ICU RSU Gmim Pancaran Kasih Manado', *Jurnal Keperawatan*, 7(1), pp. 1-9.