

EMPLOYMENT FATIGATION IN PHARMACEUTICAL INSTALLATION WORKERS IN BOGOR PMI HOSPITAL

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ABSTRACT

Fatigue is the body's protection mechanism so that the body is protected from further damage resulting in post-rest recovery, this study was conducted to determine the description of work fatigue in Pharmacy Installation workers at the Bogor PMI Hospital in 2019. The design of this study uses quantitative with a Cross-Sectional approach. This research was conducted at the Bogor Red Cross Hospital with a population and sample of 69 respondents, sampling with a total sampling technique. Based on the results of the research showed that the highest Activity Fatigue (50,7%) low fatigue, the highest Motivation Fatigue (52,2%) low fatigue, the highest Physical fatigue (56,5%) high fatigue. It is expected that Pharmacy Installation workers at PMI Bogor Hospital in 2019 can maintain the policy that has been made and given special attention by the management to existing problems or be given training on the hazard of work fatigue.

Key Words : Work Fatigue, Pharmacy Installation, of PMI Bogor Hospital

PRELIMINARY

The hospital, as one of the health service facilities, has the duty to carry out individual health services in a complete manner by providing inpatient, outpatient and emergency services. In carrying out its duties, the hospital has the functions of providing medical treatment and recovery services, maintaining and improving individual health, organizing education and training in human resources, and conducting research and development of technology in the health sector. One of the obligations of the hospital is to provide safe, quality and effective health services by prioritizing the interests of patients in accordance with hospital service standards (Kemenkes, 2009).

Hospital Pharmacy Installation (IFRS) is a unit or facility in a hospital where all pharmacy activities are intended for the hospital itself. This is made clear in the Decree of the Minister of Health No. 1333 / Menkes / SK / XII / 1999 regarding Hospital service standards, which states that hospital pharmacy services are an inseparable part of the hospital health care system which is oriented towards patient services, provision of drugs quality, including clinical pharmacy services, which are affordable to all levels of society (Minister of Health of the Republic of Indonesia, 2004).

Every human being has a different activity or work in everyday life. Everyone has felt tired when working on or completing their activities. According to Sudirman & Suma'mur (2014) fatigue is defined as a pattern that arises in a situation that generally occurs in every individual who is no longer able to carry out his activities. Fatigue is one of the common problems felt by workers.

Data from the International Labor Organization (ILO) states that almost two million workers die every year due to work accidents caused by work fatigue. The study stated that of 58,115 samples, 32.8% or around 18,828 samples suffered from work fatigue (ILO, 2013). Data on work accidents published by the Indonesian National Police in Indonesia in Indonesia every day on average 847 work accidents occur, 36% due to fatigue is quite high. Accident data is released by the National Occupational Safety and Health Board.

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Work fatigue in workers can also be caused by the work shift system. workers who have experienced work fatigue can be seen from the performance that will not be maximized and will reduce productivity at work. The application of the shift system in work can lead to work fatigue. Work shift as a pattern of working time applied by hospitals to workers, has a huge impact on workers' health. Work shift is a pattern of work time that is given to workers to do something by the company and is usually divided into work morning, evening and night (Suma'mur 2010).

According to Tarwaka (2014), the impact on workers who experience work fatigue is decreased attention, slowing and perception barriers, slow and hard thinking, decreased motivation to work, decreased alertness, decreased concentration and accuracy, low work performance, low work quality, and decreased work reaction speed.

Research conducted by Handayani et al., (2018), shows that there is a relationship between work shift risk factors, and work fatigue in pharmacy officers at Pambalah Batung Amuntai Public Hospital. Research conducted by aini (2018), shows that there is a relationship between work shifts with fatigue in nurses in inpatient installations in field-hospitalized hospitals. Research conducted by Maulana et al., (2009) shows that there is a significant relationship between work shifts and work fatigue in nurses in Bukit Asam Hospital.

Bogor PMI Hospital is a type B hospital located on Jalan Pajajaran No.08 Bogor City, West Java. Bogor PMI Hospital has a service unit and health facilities provided, and one of them is a pharmaceutical installation unit where all pharmaceutical activities are carried out which are intended for the hospital itself, which we can find out the main task of the Hospital Pharmacy Installation is management starting from planning, procurement, storage, preparation, compounding, direct service to patients up to the control of all pharmaceutical supplies in circulation and used in hospitals, both for inpatients, outpatients and for all units including hospital polyclinics (Siregar and Amalia, 2004). Based on data from the head of the pharmacy installation unit at the Bogor PMI hospital, installation workers have three shifts including morning shifts starting at 07.30 - 14.30, afternoon shifts 14.00 - 21.00, night shifts 20.00 - 17.30. And it does not cover the possibility that workers in pharmaceutical installations will get a double shift in 1 day.

Based on the background description it can be learned that work fatigue is one of the problems for workers. Based on the results of preliminary observations conducted by researchers by distributing 20 questionnaires to pharmaceutical installation workers at the Bogor PMI Hospital, it was found that 65% or (13 workers) experienced mild fatigue, 35% or (7 workers) experienced moderate fatigue. The impact of this fatigue workers at the Pharmacy Installation at the Bogor PMI Hospital experienced decreased work productivity, that is, they had written the wrong dosage of medication, and gave the patient wrong medication. This can be detrimental to workers because they get complaints from patients and patients will feel disadvantaged if the drugs they take are wrong. Based on the results of interviews with the head of the installation at the Bogor PMI hospital, no action has been taken if such an impact occurs.

Based on the above background, no research has been done on fatigue in workers at the Pharmacy Installation at the Bogor PMI Hospital, therefore researchers were interested in conducting research on the description of fatigue in the installation workers at the 2019 PMI Bogor Hospital.

RESEARCH METHODS

This type of research uses a quantitative approach that is descriptive. The design used was cross sectional, where all the observed variables were measured at the same time as the study took place, which aimed to find a picture of fatigue in pharmaceutical installation workers at the PMI Bogor Hospital. this research was conducted at Bogor PMI Hospital. And this research was conducted from October 2019 until January 2020. Types of data collected in this study are primary and secondary data: Primary Data: obtained based on observations, using a questionnaire containing several questions and symptoms of fatigue including weakening of activities, weakening motivation and physical weakness that originated from the Industrial Fatigue Research Committee (IFRC). Secondary Data: data obtained indirectly. Secondary data in this study were obtained from hospitals such as, the number of pharmaceutical installation workers at the Bogor Red Cross Hospital. The population and sample in this study were all workers in the Pharmacy installation at the Bogor PMI Hospital. The amount is 69 respondents.

RESEARCH RESULT

1. WEAKNESS ACTIVITIES

Based on the results of the deployment using the Industrial Fatigue Research Committee questionnaire to respondents, the variable activity weakening is categorized into two namely weakening high activity if kegiatan 10.84 and weakening low activity if <10.84.

Table 4.1

Picture of Weakness Activities in Pharmaceutical Installation workers Bogor Red Cross Hospital

Weakening of Activities	Frekuensi (n)	Presentase (%)
High	34	49,3
Low	35	50,7
Amount	69	100

Based on the results of research from the highest proportion of weakening activities, namely the weakening of low activity by 35 respondents (50.7%) and the proportion of weakening of low activity, namely the weakening of high activity, namely 34 respondents (49.3%).

1. Based on the results of the spread of the Industrial Fatigue Research Committee questionnaire to respondents, the variable of motivation weakening is categorized into two, namely the weakening of high motivation if ≥ 9.57 and the weakening of low motivation if <9.57

Table 4.2

Description of Motivational Weakening in Pharmaceutical Installation workers Bogor Red Cross Hospital

Weakening of Motivation	Frekuensi (n)	Presentase (%)
High	33	47,8
Low	36	52,2
Amount	69	100

Based on the results of the study from table 4.1 the highest proportion of motivation weakening is low motivation by 36 respondents (52.2%) and the proportion of motivation weakening is low motivation is 33 respondents (47.8%).

1. Based on the results of the spread of the Industrial Fatigue Research Committee questionnaire to respondents, the physical impairment variable is categorized into two, namely the weakening of high motivation if ≥ 9.00 and weakening of low motivation if <9.00 .

Table 4.3

Description of Physical Weakening in Pharmaceutical Installation workers Bogor Red Cross Hospital

Physical Weakening	Frekuensi (n)	Presentase (%)
High	39	56,5
Low	30	43,5
Amount	69	100

Based on the results of the study the highest proportion of physical impairment is high physical impairment by 39 respondents (56.5%) and the lowest proportion of physical impairment is low physical impairment is 30 respondents (43.5%).

DISCUSSION

1. WEAKNESS ACTIVITIES

Based on the results of the study it was found that the highest proportion of activity attenuation in pharmaceutical installation workers was the attenuation of low activity by 35 respondents (50.7%). This is in line with the results of research conducted by Wangga (2018), based on the results obtained 32 workers experiencing high fatigue with a percentage of (64%), followed by low fatigue (36%), with complaints of weakening the highest activities one of them felt sleepy (78%).

This is in accordance with the theory according to Budiono et al., (2003) working period is the year a person starts working until now. Years of service can have both positive and negative effects on workers. The positive influence of someone who has worked for a long time will be more experienced in doing his work, while the negative effect of the longer a person works will cause fatigue and boredom while doing his work. According Ranupendoyo et al., (2005) in general, workers who have a lot of work experience do not need guidance compared to workers with little experience because the longer a person works, the more experienced the person is so that his work skills are better and able to find out the factors that can cause an accident.

This can be made possible because pharmaceutical installation workers already know the duties and responsibilities at work, because the majority of pharmaceutical installation workers have a long enough working period and no longer need to need adjustments so that for obstacles experienced by pharmaceutical installation workers can be resolved immediately .

2. WEAKNOTING MOTIVATION

Based on the results of the study it was found that the highest proportion of motivation impairment in pharmaceutical installation workers was low motivation motivation, 36 respondents (52.2%). This is in line with research conducted by Wangga (2018). Based on the results, 21 respondents experienced high Motivation Weakness (42%), followed by a low Motivation Weakness with a percentage (58%), with complaints of the highest motivation weakening, one of which felt that they were not persevering at work (20%).

Complaints of weak motivation are high, namely the question of self-confidence decreases with the proportion of feeling (20.3%) very often (2.9%), difficult to control attitude with the proportion of feeling (21.7%), very often (1.4%), feeling nervous with the proportion often feeling (15.9%) very often (2.9%). This is in line with theory (Ravianto, in Setyawati, 2010) Work spirit is often called work morale or work ethic and is interpreted as character or way of behaving in work relationships, which is rooted in the system of values, customs and community habits. Sutrisno (2009) stated that work spirit is a mental characteristic that is very closely related to job satisfaction, work peace, and the desire to enhance work results. Someone is said to have high morale when that person has an interest in carrying out a large task and devotes all his efforts and feels happy in his work. work. Work spirit has four aspects, namely: team spirit, staying quality, enthusiasm and resistance to frustration. The spirit of work can be described as follows:

- 1) There is a willingness to help each other to help, someone's success is felt as a mutual success, relationships with colleagues and with good leaders, feel a sense of belonging and responsibility and are proud of the company.
- 2) The state of workers who never stop trying to achieve company goals.
- 3) Able to carry out positive things as his coworkers do.
- 4) The existence of several attitudes such as being tough to face failure, not easily discouraged, able to act perfectly despite rarely complaining (Setyawati, 2010).

This can be made possible because pharmaceutical installations provide opportunities for promotions to employees who provide good performance by evaluating the head of the installation of the Bogor PMI Hospital, and also the existence of overtime pay if the employee works more than the specified deadline so that it can make them motivated to work more actively and eagerly with a long duration because they expect something like overtime money.

3. PHYSICAL WEAKNESSES

Based on the results of the study it was found that the highest proportion of physical impairment in pharmaceutical installation workers was 39 respondents (56.5%). This is in line with Wangga's research, (2018), the results obtained that the data of Respondents 28 workers experiencing high Physical Fatigue (56%), followed by 22 respondents experiencing low physical fatigue (44%), with the highest physical weakening complaints one of them felt thirsty in work (80%).

Complaints of high physical impairment are in the question of feeling thirsty with the proportion of feeling (33.3%), very often (5.8%), pain in the back with the proportion of feeling (18.8%), very often (1.4 %), feels hoarse with the proportion of feeling (21.7%), very often (1.4%). This is in accordance with the theory According to Tarwaka, (2014) which says the workload (workload) is a difference between the capacity or ability of workers with the demands of workers that must be faced by Tarwaka, (2014), Workload is influenced by several factors as follows: External factors and internal factors Workloads Internal factors are workloads originating from within the body itself as a result of the response of external workloads. Internal factors include: a) Somatic factors. Includes gender, age, body size, health conditions, nutritional status, b) Psychological factors include motivation, perception, beliefs, desires, satisfaction, etc. This can be made possible because the visit of patients who come to the pharmaceutical installation is very crowded every day and must serve patients from inpatient and outpatient care, not to mention when the pharmacy installation worker has to call the patient's family requiring enough sound in a high tone to be heard by the patient's family maybe that's what can cause workers to feel hoarse and feel thirsty, given that there is no drinking water provided by the Hospital in the installation room. And the position at the time of calling the patient slightly bent to adjust to the hole or glass in the pharmacy and this is done repeatedly at a certain time, so it is possible this is the cause of complaints of pain in the back.

Did not rule out the possibility of pharmaceutical installation workers have to do other work such as taking stock of drugs in the warehouse if there are no couriers who deliver and distribute to each inpatient room and it adds to their workload. And it can be related to the theory which says External factor workloads are workloads originating from outside the worker's body, such as:

- a) the task itself (task) that is physical: includes work stations, work space layout, work tools and facilities, working conditions or terrain, work attitude, how to lift or transport.
- b) work organizations that can affect workloads such as: length of work time, rest periods, shift work, night work, remuneration systems, work systems, delegation of tasks, organizational structure models, responsibilities and authority.
- c) Work environment.

CONCLUSION

Based on the results and discussion of this study, researchers can conclude the following:

1. The description of the weakening of activities in pharmaceutical installation workers at the Bogor PMI Hospital in 2019 is the highest proportion of weakening activities, namely the weakening of low activities, and the proportion of weakening of low activities, namely on weakening of high activities.
2. The depreciation depiction of motivation in pharmaceutical installation workers at the Bogor PMI Hospital in 2019 is the proportion of the highest attenuation of motivation that is at low motivation, and the proportion of low motivation that is at low motivation.
3. The description of physical impairment in pharmaceutical installation workers at the Bogor PMI Hospital in 2019 is the highest proportion of physical impairment, namely in high physical impairment, and the proportion of physical impairment is low, namely in low physical impairment.

SUGGESTION

1. Pharmacy Installation of PMI Bogor Hospital should be Suggestions for weakening activities, pharmaceutical plant workers should maintain activities that are in accordance with their duties and responsibilities, so that the number of activities weakening continues to decline and has no potential to rise.
2. Pharmacy Installation of PMI Bogor Hospital should be Suggestions for physical weakening of workers should the management still maintain the policy made regarding opportunities for promotion and overtime pay so that workers are more motivated and eager to continue doing their work.
3. Pharmacy Installation of PMI Bogor Hospital Suggestions should be required for workers to bring drinking bottles at work or provide drinking water for workers in the pharmaceutical installation room, so that when workers feel thirsty and hoarse no longer have to go out of the room to pick up or just buy a drink, and be given a loudspeaker facility and programs should be made where after working four hours workers are required to five minutes stretch or stretch their bodies in order to improve posture or avoid injury, created an ergonomic workplace design. And it should be added to the number of pharmaceutical installation workers in order to ease their workload

REFERENCE

- Adi, S. *Et al.*, (2013). *Hubungan Antara Iklim Kerja, Asupan Gizi Sebelum Bekerja dan Beban Kerja Terhadap Tingkat Kelelahan Pada Shift Pagi Bagian Packing PT.X, Kabuapten Kendal*. Jurnal Kesehatan Masyarakat 2013, volume 2, Nomor 2 April 2013. UNDIP
- Aini, Nur. (2018). *Hubungan Shift Kerja Dengan Kelelahan Kerja Pada Perawat Di Instalasi Rawat Inap Di Rumah Sakit Herna Medan*.
- A.M.Sugeng Budiono, dkk, 2003, *Bunga Rampai Hiperkes dan Keselamatan Kerja*, Semarang: Badan Penerbit Universitas Diponegoro
- Arini, S. Y., & Dwiyanti, E. (2013). Analisis Faktor Yang Berhubungan Dengan Terjadinya Kelelahan Kerja Pada Pengumpul Tol di Perusahaan Pengembang Jalan Tol Surabaya, 113–122.
- Budiono, A. M. S., Jusuf, R. M., & Pusparini, A. (2003). *Hiperkes dan Kesehatan Kerja. Bunga Rampai Hiperkes dan Keselamatan Kerja Edisi Kedua*. Semarang: Universitas Diponegoro.
- Budiono, A.M.S (2004). *Hiperkes dan Keselamatan Kerja*. PT.Tri Tunggal Tata Fajar, Surakarta.
- Departemen Tenaga Kerja RI., (2003). *Tentang Ketenagakerjaan*
- Departemen Tenaga Kerja & Transmigrasi., (2004). *Tentang Waktu Kerja Lembur*.

- Departemen Kesehatan RI., (1999). *Standar Pelayanan Rumah Sakit*. Departemen Kesehatan RI, Jakarta.
- Departemen Kesehatan RI., (2003). *Modul Pelatihan bagi fasilitator Kesehatan Kerja*, Jakarta
- Departemen Kesehatan RI., (2004). *Standar Pelayanan Farmasi di Rumah Sakit*. Departemen Kesehatan RI, Jakarta.
- Departemen Kesehatan RI., (2009). *Keputusan Menteri Kesehatan RI Nomor 44 Tentang Rumah Sakit (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 153, Tambahan Lembaran Negara Republik Indonesia Nomor 5072)*;
- Depkes RI. 2009. *Pedoman Kecukupan Gizi Pekerja Selama Bekerja*. Direktorat Bina Kesehatan Kerja: Jakarta.
- DPR RI. (1974). *Undang-Undang RI No. 1 Tentang Perkawinan*. Jakarta: Dewan Perwakilan Rakyat Republik Indonesia
- Dita Perwitasari, Abdul Rohim Tualeka. (2014). *Faktor yang berhubungan dengan kelelahan kerja subyektif pada perawat di RSUD DR Mohamad Soewandhie*. Surabaya. Universitas AirLangga
- Eraliesa, Fandrik. 2009. *Hubungan Faktor Individu dengan Kelelahan Kerja Pada Tenaga Kerja Bongkar Muat di Pelabuhan Tapak Tuan Kecamatan Tapak Tuan Kabupaten Aceh Selatan Tahun 2008*. Skripsi. FKM USU.
- Fakih, M. (2003). *Menggeser Konsepsi Gender dan Transformasi Sosial*. Yogyakarta: Pustaka Pelajar.
- Fitria Nur H., (2012). *Hubungan Tingkat Kebisingan Dengan Kelelahan Kerja Pada Pekerja Di Bagian Ringframe di PT.Kusumaputra Santosa Karang Anyar*.
- Fitriana. (2013). *Faktor yang berhubungan dengan kelelahan kerja pada karyawan bagian produksi Pt. Eastern Pearl Flour Mills (EpFM)*. Skripsi : Fakultas Ilmu Kesehatan, UIN Alauddin Makassar
- Gallup, A., & Omar, E. (2013). *The Thermoregulatory Theory Of Yawning : What We Know From Over Of Research*. Jurnal Kesehatan. Bringhamton University, USA.
- Ganong, W. F. (1999). *Buku Ajar Fisiologi Kedokteran*. Jakarta: EGC.
- Goyal, Nishi. (2010). *Industrial Psychology*. Khrisna Prakashan Media (P) Ltd: Khrisna House, 11, Shivaji Road, Meerut-250 001 (U.P), India.
- Handayani Eka ., Meliya Farika indah., Muhammad ferdi fahdila., (2018). *Faktor Risiko Kelelahan Kerja Petugas Instalasi Farmasi Rumah Sakit Umum Pambalah Batung Amuntai*.
- Harry Cahya. Et al., (2009). *Hubungan Shift Kerja Dengan Kelelahan Kerja Dan Perubahan Tekanan Darah Pada Perawat Unit Rawat Inap Rumah Sakit Bukit Asam Tanjungenim*.
- Herliani, F. (2012). *Hubungan Status Gizi dengan Kelelahan Kerja pada Pekerja Industri Pembuatan Gamelan di Daerah Wirun Sukoharjo*. Skripsi. Surakarta : Fakultas Kedokteran Universitas Sebelas Maret.
- Kemendikbud. (2003). *Undang-Undang RI No. 20 Tentang Sistem Pendidikan Nasional*. (K.P. dan Budaya, Ed.). Jakarta.
- Kemenakertrans., (2003). *Ketenagakerjaan*. Jakarta. Kementrian Ketenagakerjaan.
- Kemenakertrans., (2011). *Ketenagakerjaan*. Jakarta. Kementrian Ketenagakerjaan. *Nilai Ambang Batas Faktor Fisika Dan Faktor Kimia Di Tempat Kerja*
- Kepolisian RI., (2012). *Dewan Keselamatan dan Kesehatan Kerja Nasional*.
- Kuswana, S. W. (2014). *Ergonomi dan K3 (Kesehatan dan Keselamatan Kerja)*. Bandung: PT Remaja Rosdakarya.
- Lukitasari, S., Surajji, C., & Sumini, S. (2013). *Faktor-Faktor Yang Berhubungan Dengan Kelelahan Kerja Pada Pekerja Unit Spinning*, (2), 65–78.
- Mario yessualdius W. (2018)., *Gambaran Kelelahan Kerja Pada Pekerja PT.VSL Indonesia Proyek LRT Tahun 2018*.
- Mentari, A., Kalsum., & Salmah, U. (2012). *Hubungan Karakteristik Pekerja dan Cara Kerja Dengan Kelelahan Kerja pada Pemanen Kelapa Sawit di PT. Perkebunan Nusantara IV (Persero) Unit Usaha Adolin*.
- Munandar, A. S. (2001). *Psikologi Industri dan Organisasi*. Jakarta: Universitas Indonesia (UI-Press).
- Prof. Dr. Soekidjo Notoatmodjo. (2013). *Metodologi Penelitian Kesehatan*. Jakarta : Rieneka Cipta
- Oentoro, S, 2004. *Kampanye Atasi Kelelahan Mental dan Fisik*. Jakarta: UI Press
- Russeng, Syamsiar. S. 2011. *Kelelahan Kerja dan Kecelakaan Lalu Lintas*. Ombak, Yogyakarta.
- Organization, ILO. (2013). *Keselamatan dan Kesehatan Kerja di Tempat Kerja*, Jakarta, International Labour Office.
- Pemerintah Republik Indonesia, 2003. *Undang Undang Republik Indonesia Nomor 20 tahun 2003 tentang Sistem Pendidikan Nasional (SISDIKNAS)*. Jakarta.
- Santoso, S. (2004). *Kesehatan dan Gizi*. Jakarta: PT. Asdi Mahasatya.
- Setyawati, L. K. . (2010). *Selintas Tentang Kelelahan Kerja*. Yogyakarta: Amara Books.
- Suma'mur, P. K. (1999). *Hygiene Perusahaan dan Kesehatan Kerja*. Jakarta: Toko Gunung Agung.
- Suma'mur, P. K. (1996). *Higene Perusahaan dan Kesehatan Kerja*, Jakarta: PT Toko Gunung Agung
- Suma'mur, P. K. (2009a). *Higiene Perusahaan dan Kesehatan Kerja (HIPERKES)*. Jakarta: PT Toko Gunung Agung.

- Suma'mur, P. K. (2009b). *Higiene Perusahaan dan Keselamatan Kerja*. Jakarta: CV Mas Agung.
- Suma'mur, P. K. (2010). *Higiene Perusahaan dan Keselamatan Kerja*. Jakarta: CV Sagung Seto.
- Soedirman., & Suma'mur, P. K. (2014). *Kesehatan Kerja Dalam Perspektif Hiperkes dan Keselamatan Kerja*. Jakarta: Erlangga.
- Staal Ma. (2004). *Stress, Cognition, and Human Performance: A literaure review and conceptual framework. National Aeronautics and Space Administration*.
- Silastuti, A. (2006). *Hubungan Antara Kelelahan Dengan Produktivitas Tenaga Kerja Bagian Penjahitan PT. Bengawan Solo Garment Indonesia*.
- Tarwaka, Bakri. S., Sudiadjeng, L. (2004). *Ergonomi Untuk Keselamatan, Kesehatan Kerja dan Produktivitas*. Surakarta: Uniba Press.
- Tarwaka, 2010. *Ergonomi Industri*. Surakarta : HARAPAN PRESS.
- Tarwaka. (2014). *Dasar-Dasar Keselamatan Kerja Serta Pencegahan Kecelakaan di Tempat Kerja*. Surakarta: Harapan Press.
- Tarwaka. (2014). *Ergonomi Industri Dasar-Dasar Pengetahuan Ergonomi dan Aplikasi di Tempat Kerja*. Surakarta: Harapan Press.
- Tarwaka. (2015). *Ergonomi Industri : Dasar-Dasar Pengetahuan Ergonomi dan Aplikasi di Tempat Kerja*. Surakarta: Harapan Press.
- Triana, E., Ekawati., & Wahyuni, I. (2017). *Hubungan Status Gizi, Lama Tidur, Masa Kerja dan Beban Kerja dengan Kelelahan Kerja Pada Mekanik di PT X Plant Jakarta*, 5, 146– 155.
- Wignjosoebroto, S. (2006). *Ergonomi, Studi Gerak dan Waktu : Teknik Analisis Untuk Peningkatan Produktivitas Kerja*. Surabaya: Guna Widya.
- Wignjosoebroto, S. (2000). *Ergonomi, Studi Gerak dan Waktu Teknik Analisis untuk Peningkatan Produktivitas*. Penerbit : Guna widya, Surabaya.