Factors Affecting The Response Time Of Radiology Result Reading

Juliana Gozali[1], Irza Haicha Pritama[2*], Linda Chiuman[3]

[1,2,3] Master of Public Health Study Program, Faculty of Medicine, Dentistry and Health Sciences, Universitas Prima Indonesia, Indonesia
* Corresponding Author:
Email: irzahaichapratama@gmail.com

Abstract.

Respond time is a common issue in healthcare practice. This problem also occurs in radiology services concerning the reading of radiology results to the expert interpretation process by radiologists. This study analyzes departmental and personal factors influencing the response time of radiology result readings at Murni Teguh General Hospital in Medan in 2021. This quantitative research study has a cross-sectional design and an analytical observational approach. The population includes all radiologists in the Radiology Department. Data is collected through questionnaires and documentation. Logistic regression is used for data analysis. The majority of radiology result readings have a poor response time (56.9%). Multivariate analysis reveals that departmental factors (image results and network) and personal factors (work schedule) significantly influence the response time of radiology result readings. However, there is no significant influence from departmental factors (teaching obligations) and personal factors (educational level and employment status) on the response time of radiology result readings. It is recommended that hospital management cultivate a collaborative and supportive environment among the technology and human resources working in the Radiology Department to improve the response time by the standards set by the ministry.

Keywords: *Response Time, teaching obligation and Radiology Result Reading.*

I. INTRODUCTION

The world was shocked by the Corona Virus Disease 2019 (Covid-19) pandemic, and until now we still have to be vigilant about this virus. The spread of the disease was so fast and spread to several countries that the World Health Organization (WHO) finally declared Covid-19 a pandemic on March 12, 2020. The WHO report on April 6, 2020, stated that patients with Covid-19 infection had reached 1,210,956—people in 205 countries with a mortality rate of 5.6% (WHO, 2020).Along with the rapid development of the disease caused by Covid-19, various problems have arisen, not only the issue of the availability of hospital resources which then causes limitations in providing services, but also how the hospital prepares the mentality of the health workers (N. Chen et al., 2020). In addition, health workers providing services have to go the extra mile because there are many patients to serve, so the response time for patients starting from the service from the registration area to entering the doctor's examination room until the receipt of the examination results is not completed as expected by both the patient and the service provider health.As a health service sector, radiology is a branch of medicine that uses radiation, electromagnetic, and acoustic technology to see inside the human body. This field has an important role in helping to determine disease diagnosis and other disciplines. Doctors holding this specialty are referred to as radiologists or radiologists who specialize in diagnosing and treating diseases using various medical imaging techniques such as x-rays, computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), and ultrasound (Kelly et al., 2017).

One of the duties and responsibilities of a radiologist is to read the results of diagnostic radio examinations, diagnostic imaging, and interventional radiology procedures. According to the Decree of the Minister of Health of the Republic of Indonesia, Number 129/MENKES/SK/II/2008, the person responsible for the results of radiological readings or examinations is a radiologist or doctor who has limited competence determined by the collegium of radiology specialists accompanied by a recommendation from the Indonesian Radiology Specialist Association (Kemenkes RI, 2008).In fact, according to The Royal College of Radiologists, the workload of clinical radiologists continues to increase from year to year. This puts pressure

on radiology services to improve efficiency while maintaining quality. It is recognized that up to 50% of a radiologist's time is spent on image reporting or direct clinical intervention on the patient (The Royal College of Radiologists, 2012).In 2022, the publication RCR, Clinical Radiology: a workforce in Crisis, acknowledged the expansion of the practice of consultant radiologists into more clinically interactive roles coinciding with increasing departmental workloads (of the order of 2–5% per year) and developments in subspecialties (The Royal College of Radiologists, 2022).

In connection with the pandemic era that hit the world, the workload of radiologists and their team in the Department of Radiology has clearly increased again, so the response time regarding radiology readings is not achieved according to the target. Several factors influence this condition.Several things, including the number of staff, facilities, and infrastructure, as well as the knowledge or experience of nurses, affect the response time (Shoja et al., 2020; Suwarno et al., 2020). There is also a relationship between education level and response time (Mudatsir et al., 2018). However, other studies have found no association between education and response time (Ashra & Amalia, 2018). Other studies have found a connection between nurse workload and response time (Karokaro et al., 2020; Suwarno, 2023).The quality of service in the radiology department must always be evaluated to improve the quality of radiology services. One of the things that must be considered in enhancing the quality is the waiting time (response time) (Walker et al., 2021). In a Canadian study, cancer patients experienced long waiting times, which may have negative clinical impacts such as increased risk of local recurrence or poor survival (Walker et al., 2021). Other studies have found that waiting longer can reduce patients' perceptions of doctors' abilities and reduce patients' trust in the health services provided (Bleustein et al., 2014). Patients who wait longer perceive their health services as less accessible and their waiting time as less acceptable (Xie & Or, 2017).The results of the initial survey research through observation revealed that the radiology results that had to be read by six specialist doctors in the 2020 period were 37,497 images with an average of 3,125 impressions per month. This number has increased in 2021 to 46,902 images, with an average of 3,909 images per month.The increase is related to conditions during the Covid-19 pandemic.

The results of interviews with six radiology specialists, where 3 of them work from home (WFH), obtained information that the average radiology response time was ≥ 3 hours and radiology results readings were still around 80% (Radiology Minimum Service Standards (SPM) ≤ 3 hours and 100%). This problem causes an effect on patients, namely patient dissatisfaction, towards hospitals, namely lack of service quality and potential customers, namely the emergence of distrust of hospitals.Meanwhile, the increasing number of patient visits can also affect this condition, especially in 2021. Based on the observations of researchers, it is suspected that there are two important factors related to the length of time waiting for radiology readings—namely, departmental factors and personal characteristics. Departmental factors include the increasing number of patient visits, the work team in Radiology, the distribution of radiographers' work to Radiology, image results that can be more optimal, and infrastructure such as internet networks. Meanwhile, personal factors, such as the workload of specialist doctors, have increased during the pandemic. Some senior doctors are required to work from home. Some doctors are also assigned to teach medical students about doctors' work patterns, and working status in hospitals.The author chose the place of research at Murni Teguh Memorial General Hospital Medan with the reason that there was a problem that was conspicuous in the Department of Radiology, especially about specialists, namely the task of reading radiology results (CT-Scan, MRI, USG, and X-ray) which remained high so that time wait does not meet the standard set. To the author's knowledge, research on response time in radiology readings has never been carried out regarding departmental and personal factors in North Sumatra Province.The study aimed to analyze the influence of departmental factors (photos, network, teaching obligations) and personal (work pattern, education level, work status) on the response time of reading radiology results.

II. METHODS

Research with a quantitative research approach with a cross-sectional design and analytic observational approach (Sugiyono, 2018). Location in the Radiology Section of Murni Teguh Medan Hospital. The population is all radiologists and six radiologists, all of whom are samples. The collection

method is based on primary data by distributing questionnaires consisting of characteristics. This research uses two variables. The variable is any characteristic, amount, or quantity that can be measured or counted (Suwarno & Nugroho, 2023). Independent variables (factors of majors: photos, networks, teaching, and personal obligations: work patterns, education level, work status) and dependent variables.

III. RESULT AND DISCUSSION

Respondent characteristics include age, gender, education, profession, years of service, and marital status.

Table 1. Distribution of Respondent Characteristics

Respondent Characteristics	F = 6	%
Age		
30-40 years old	1	16,7
>40 years old	5	83,3
Gender		
Male	3	50,0
Female	3	50,0
Education		
Master	5	83,3
Doctor	1	16,7
Profession		
Spesialis Radiologi (Sp.Rad.)	2	33,3
Sp.Rad., Cont.Thorax	1	16,7
Sp.Rad., Cont. Breast	1	16,7
Sp.Rad., Cont. Interventional	2	33,3
Working period		
1-5 years old	1	16,7
6-10 years old	4	66,7
>10 years old	1	16,7
Marital status		
Married	6	100

Table 1: Age distribution of the majority of respondents >40 years, five people (83.3%) and three men and women respectively (50.0%). Level 2 education, namely five people (83.3%). The profession of a radiologist is two people (33.3%), a radiologist who is also an interventional consultant with two people (33.3%), and a radiology specialist who is also a thorax and breast consultant with one person (16.7%). Most of the working period is 6-10 years; seven people (66.7%) are married (100%).

In Table 2, the distribution of departmental factors, the majority of the results of the photos are worth reading (63.9%); network supports (65.3%), and teaching and non-teaching status (50.0%). Distribution of personal factors in aspects of work patterns in the hospital and from home (WFH) (50.0%), level of educational support (66.7%), and permanent employment status (66.70%).

Table 3 explains the departmental factors of the photo results aspect and the opportunity value network (p) 0.005 and 0.033 which is less than α 0.05, but the obligation to teach the p-value 0.634 is greater α 0.05.Personal factor aspects of work pattern p-value 0.017 less than α 0.05, but the level of education and work status p-value 0.933 and 0.153 greater α 0.05. There is a relationship between the photo, network, and work pattern aspects of the response time for reading radiology results.Based on bivariate analysis, the requirements test showed that two variables, namely the obligation to teach and level of education, had an opportunity value greater than 0.25, so they were not included in the model. Then in the first stage, the four variables became a multiple logistic regression model, the results of photos, networks, and work patterns were related to the response time of reading radiology results with each value of $p < 0.05$. Work status is not associated because of the importance of $p > 0.05$. Furthermore, in the second step, three variables were obtained, namely the results of photographs, tissue, and work patterns that affect the response time of reading radiology results with a significance value of 0.009, respectively; 0.016 and 0.019 <0.05. The results of multiple logistic regression tests are presented in Table 4.

Table 2. Univariate analysis

Variable	f	%
Photo Results		
Worth reading	46	63,9
Not worthy	26	36,1
Network		
Supports	47	65,3
Not supported	25	34,7
Teaching Obligations		
Teacher	36	50,0
No Teacher	36	50,0
Work Pattern		
At Hospital	36	50,0
From home (WFH)	36	50,0
Level of education		
Supports	48	66,7
It does not help	24	33,3
Employment status		
Permanent doctor	48	66,7
Non-permanent doctor	24	33,3
Response time for reading radiology results		
Good	31	43,1
Not good	41	56,9

Table 3. Bivariate Analysis

Variabel	***Respond Time* Pembacaan Hasil Radiologi**				**Total**		**P**
	Baik		**Kurang baik**				
	f	**%**	**f**	**%**	**f**	**%**	
Photo Results	26	56,5	21	80,1	46	100	
Worth reading	26	56,5	21	80,1	46	100	0,005
Not worth it	5	19,2	21	80,8	26	100	
Network							
Support	25	53,2	22	46,8	47	100	0,033
Not very supportive	6	24,0	19	76,0	25	100	
Teaching Obligations							
Teacher	17	47,2	19	52,8	36	100	
Not Teacher	14	38,9	22	61,1	36	100	0,634
Work Pattern							
In the hospital	21	58,3	15	41,7	36	100	
From Home (WFH)	10	27,8	26	72,2	36	100	0,017
Level of education							
Support	20	41,7	28	58,3	48	100	0,933
Not very supportive	11	45,8	13	54,2	24	100	
Employment status							
Fixed doctor	24	50,0	24	50,0	48	100	
The doctor doesn't stay	7	29,2	17	70,8	24	100	0,153

In Table 4, the results of the photo coefficient value = 1.623; p = 0.009 and Exp (B) = 5.069. Respondents rated the photos as readable, with a 5.069 times greater chance of increasing the response time for reading radiology results than respondents who rated the photos as inappropriate. Network variable coefficient value = 1.501; p = 0.016 and Exp (B) = 4.484. Respondents rated the network as supportive, with a 4.484 times greater chance of increasing the response time for reading radiology results than respondents who rated the network as less supportive. Work pattern variable coefficient value = 1.335; p = 0.019 and Exp (B)= 3.798. Respondents working in a hospital pattern have a 3.798 times greater chance of increasing the response time for radiology readings than respondents working from home (WFH).

Table 4. Multivariate Analysis

Variable	*B*	*Wald*	*Df*	*Sig.*	*Exp (B)*
Photo Results	1,623	6,773	1	0,009	5,069
Network	1,501	5,824	1	0,016	4,484
Work Pattern	1,335	5,485	1	0,019	3,798
Constant	-7,549	15,511	1	0,000	0,001

Photo Results

Research findings generally result in photos worth reading (63.9%) by specialist doctors. Based on the multiple logistic regression test results, the photo results were obtained with a p-value of 0.009 <0.05, meaning that the photo results affected the response time for reading radiology results. In line with Amanah and Mustakim's research (2020) at Syarif Hidayatullah Hospital in 2018, the waiting time for radiology services did not meet the Kepmenkes Standard No.129/Menkes/SK/II/2008, namely ≤ 3 hours (Amanah & Mustakim, 2020). The standard waiting time for radiology services does not meet the requirements regarding the absence of a doctor on standby or a full-timer. In contrast, radiology services for patients are provided for 24 hours.The research results on medical record services show that waiting time is a problem that often causes patient complaints in several hospitals. Time is one aspect of quality in health services, competition in terms of speed of service to improve service quality, especially in hospitals.Quality photos as a form of radiology services which include, among others, Computed Tomography Scan (CT-Scan), Magnetic Resonance Imaging (MRI), mammography, dental, panoramic, and other services, will greatly help make it easier for radiologists to carry out readings to enforce diagnosis of the patient's disease. For that, we need radiographers who are reliable in their fields.

Network

In general, the network supports (63.9%) in carrying out the task of reading radiology results by specialist doctors. Based on the results of the multiple logistic regression test, it was obtained that the network had a p-value of 0.016 <0.05, meaning that there was an influence on the network on the response time for reading radiology results. In line with Fiqta's research (2020) in three journals which stated that to support radiologist doctors' convenience in reading radiograph results, hospitals should provide application software facilities such as PACS, where radiologists can read expert results wherever the doctor is without having to come to a radiology installation (Fiqta, 2020).The research results support the opinion of Bustani et al. (2015) that among the factors that affect response time, namely internet connection disturbances. Radiological examinations produce images of the inside of the human body for diagnostic purposes called diagnostic imaging, whose work requires an electric current and an internet network (Bustani et al., 2015).

Meanwhile, Patel explained that radiology is a medical science that is used to see parts of the human body that use emission or radiation of electromagnetic waves or mechanical waves (Patel, 2006). The main task of radiology is to produce images and reports of examination findings for diagnostic purposes, which together with other diagnostic techniques and conclusions will form the basis of patient care.The existence of electricity and internet networks greatly supports work in radiology, both when taking photos of patients by radiographers and when reading images by radiologists. The availability of a network that meets the needs helps to realize the response time for reading radiology results according to the target or established standards.

Teaching Obligations

Half of the medical specialists bear the obligation to teach or status as a teacher (50.0%). In the bivariate analysis, responsibility to lead was obtained with a p-value of 0.634 > 0.05, so it was not feasible as a candidate for multivariate analysis. This means that the obligation to teach does not affect the response time of reading radiology results.The workload of clinical radiologists continues to increase from year to year.. This puts pressure on radiology services to improve efficiency while maintaining quality. It is recognized that up to 50% of a radiologist's time is spent on image reporting or direct clinical intervention on the patient (The Royal College of Radiologists, 2012). Statements related to the doctor's workload, one of which is the obligation to teach beside the main task of a radiologist. This teaching obligation is an additional task for specialist doctors related to their profession as radiology specialists who teach doctors who are co-teaching.

Likewise, RCR publications acknowledging the expansion of the practice of consultant radiologists into a more clinically interactive role have coincided with increasing departmental workloads (of the order of 2–5% annually) and developments in subspecialties (The Royal College of Radiologists, 2012). Fiscal or mental overload of work, that is, having to do too many things, is a possible source of job stress. Elements that cause quantitative overload are working conditions, in which each task is expected to be completed as quickly and accurately as possible (Ahorsu et al., 2022). Specialist's doctors apart from specializing in radiology, several doctors apart from teaching staff also double as consultants, whose scope of work is broader and adds to the workload of doctors. This condition has impacted his main obligation as a radiologist, namely, to read the radiological images of patients sent by radiographers.

Work Pattern

The pattern of work in carrying out the task of reading radiology results by specialist doctors consists of working in a hospital and working from home (WFH) equally (50.0%). Based on the results of the multiple logistic regression test, it was obtained that the network had a p-value of 0.019 <0.05, meaning that work patterns affected the response time for reading radiology results. In line with Fiqta's research (2020) in three journals which stated that to make it easier for radiologists to read radiograph results, hospitals should provide application software facilities such as PACS, where radiologists can read expert results wherever the doctor is without having to come to a radiology installation (Fiqta, 2020).

Work patterns are used as one factor affecting the response time for radiology photo readings because they are associated with the pandemic era that has hit the world since 1999. This condition has had an impact on changing the work patterns of specialist doctors. The work pattern that used to be full-time in the hospital has become work-from-home. This work pattern is mainly applied to specialist doctors who are already advanced because they are suspected of being vulnerable to contracting the Covid-19 virus (Sun et al., 2022).

Level of education

Specialist medical education level supports (66.7%) the response time of radiology readings. In the bivariate analysis, the level of education was obtained with a p-value of 0.933 > 0.05, so it was not a candidate for a multivariate analysis model. This means that education level does not affect the response time for reading radiology results, in line with research by Ashra and Amalia (2018), who also found no relationship between education and response time (Ashra & Amalia, 2018).

Education management for health workers is no different from other education management; it's just that the material taught is adjusted to the educational goals set by the Ministry of Health. Education is needed to obtain information or things that support health to improve quality of life. The educational factor of a person greatly determines readiness to provide services; people with higher education will be better able to solve problems and play a better and more effective constructive role than those with less education.

Although in this study it was found that there was no effect of education level on the response time to reading radiology results, specialist doctors must try to increase their knowledge according to what is stipulated by the Ministry of Health, where there are various levels and specialties in radiology. Some doctors even have the status of consultants in multiple fields of specialization.

Employment status

The functional status of specialist doctors remains (66.7%) in the hospital. Bivariate analysis obtained that the working class had a p-value of 0.153 > 0.05, so it was not used as a model in multivariate analysis. This means there is no significance of work status on the response time of reading radiology results. Researchers have yet to find the results of previous research related to the topic above. Some who examine work status as an independent variable relate it to other variables, such as the specialist doctor's income variable studied by Hartono et al. (2021), who found no relationship between work status and specialist doctor's income (Hartono et al., 2021). Rejeki's research (2012) states that there is no significant relationship between employment status and a doctor's performance which affects income (Rejeki, 2012).There is no correlation between work status and response time for reading radiology results because it relates to what is regulated and determined by the government or the company. This has an impact on the absence of influence on the work status of the specialist doctor's duty to read radiology results. In principle, doctors as permanent

employees will get a basic salary, welfare benefits, and other benefits that can be a doctor's right. Meanwhile, honorary doctors receive certain fees and other welfare rights stipulated in the cooperation contract drawn up and agreed upon by the parties. In the case of this study, namely radiologists and Murni Teguh Medan Hospital.

IV. CONCLUSION

Statistically, departmental factors (photographs and tissue results) and personal factors (work patterns) affect the response time for reading radiology results. There is no influence of departmental factors (teaching obligation) and individual factors (education level and work status) on the response time for radiology readings. It is recommended for hospital management increase the response time for reading radiology results so that they can meet the standards set by the ministry through mutually supportive collaboration between technology and human resources in charge of the Radiology department. They are improving the results of photos by enhancing the skills of radiographers through internal and external training and increasing network capacity, as well as updating PACS, procuring Artificial Intelligence (Cure AI), and Voice Text to facilitate doctors' work.

V. ACKNOWLEDGMENTS

The authors thank Universitas Prima Indonesia for supporting this project, the study program heads, and the Faculty of Medicine, Dentistry, and Health Sciences. We also thank the Director of Murni Teguh Hospital and, specifically, the supervising lecturers for their valuable advice.

REFERENCES

[1] Ahorsu, D. K., Lin, C. Y., Marznaki, Z. H., & H. Pakpour, A. (2022). The association between fear of COVID-19 and mental health: The mediating roles of burnout and job stress among emergency nursing staff. *Nursing Open*, *9*(2), 1147–1154. https://doi.org/10.1002/nop2.1154

[2] Amanah, P., & Mustakim. (2020). Analisis Waktu Tunggu Pelayanan Radiologi Di Rumah Sakit Syarif Hidayatullah Tahun 2018. *Visikes*, *19*(1), 118–127.

[3] Ashra, F., & Amalia, S. (2018). Hubungan Karakteristik Perawat Dengan Waktu Tanggap Penangganan Kasus Gawat Darurat di IGD Puskesmas Kumanis Kabupaten Sijunjung Tahun 2016. ***Jurnal Kesehatan Prima Nusantara Bukittinggi,*** *9*(2), 89.

[4] Bleustein, C., Rothschild, D. B., Valen, A., Valaitis, E., Schweitzer, L., & Jones, R. (2014). Wait times, patient satisfaction scores, and the perception of care. ***American Journal of Managed Care,*** *20*(5), 393–400.

[5] Bustani, N. M., Rattu, A. J., & Saerang, J. S. M. (2015). Analisis Lama Waktu Tunggu Pelayanan Pasien Rawat Jalan Di Balai Kesehatan Mata Masyarakat Propinsi Sulawesi Utara. ***Jurnal E-Biomedik,*** *3*(3), 872–883. https://doi.org/10.35790/ebm.3.3.2015.10456

[6] Chen, J., & Li, X. (2007). Hypolipidemic effect of flavonoids from mulberry leaves in triton WR-1339 induced hyperlipidemic mice. ***Asia Pacific Journal of Clinical Nutrition,*** *16*(SUPPL.1), 290–294.

[7] Chen, N., Zhou, M., Dong, X., Qu, J., Gong, F., Han, Y., Qiu, Y., Wang, J., Liu, Y., Wei, Y., Xia, J., Yu, T., Zhang, X., & Zhang, L. (2020). Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*, *395*(January), 507–613.

[8] Fiqta, M. (2020). *Analisis Waktu Tunggu Hasil Pelayanan Foto Thorax Pasien Rawat Jalan di Instalasi Radiologi Rumah Sakit*. Universitas Widya Husada Semarang.

[9] Hartono, S., Fitriani, A. D., & Afriany, M. (2021). Faktor Individu Dan Kepuasan Kerja Dengan Pendapatan Tenaga Medis Spesialis Di Rumah Sakit Umum Daerah Sultan Sulaiman Kabupaten Serdang Bedagai. ***Jurnal Ilmiah Kesehatan,*** *11*(2), 39–46.

[10] Karokaro, T. M., Hayati, K., Sitepu, S. D. E. U., & Sitepu, A. L. (2020). Faktor – Faktor Yang Berhubungan Dengan Waktu Tanggap (Response Time) Pasien Di Instalasi Gawat Darurat Rumah Sakit Grandmed. ***Jurnal Keperawatan Dan Fisioterapi (Jkf),*** *2*(2), 172–180. https://doi.org/10.35451/jkf.v2i2.356

[11] Kelly, B. S., Govender, P., Jeffers, M., Kinsella, J., Gibney, J., Sherlock, M., & Torreggiani, W. C. (2017). Risk Stratification in Multinodular Goiter: A Retrospective Review of Sonographic Features, Histopathological Results, and Cancer Risk. ***Canadian Association of Radiologists Journal***, *68*(4), 425–430. https://doi.org/10.1016/j.carj.2017.03.002.

[12] Kemenkes RI. (2008). Peraturan Menteri Kesehatan Republik Indonesia Nomor 129/Menkes/SK/III/2008 tentang Standar Pelayanan Minimal Rumah Sakit. *Menteri Kesehatan Republik Indonesia*.

[13] Mudatsir, S., Sangkala, M. S., & Setyawati, A. (2018). Related Factors of Response Time in Handling Head Injury in Emergency Unit of Prof.Dr.H.M.Anwar Makkatutu Bantaeng General Hospital. ***Indonesian Contemporary Nursing Journal (ICON Journal),*** *2*(1), 1. https://doi.org/10.20956/icon.v2i1.3579

[14] Niu, H., Li, K., Ma, L., Gong, W., & Huang, W. (2015). Molecular Mechanism of Action for the Geranyl Flavonoid to Counter Dyslipidemia in Diabetic Milieu. ***Journal of Food and Nutrition Research,*** *3*(6), 371–378. https://doi.org/10.12691/jfnr-3-6-3

[15] Patel, P. R. (2006). *Lecture Notes Radiologi*. Jakarta: Erlangga.

[16] Rejeki, S. (2012). *Faktor yang Mempengaruhi Kinerja Dokter di Poliklinik Rawat Jalan Rumah Sakit Angkatan Laut Dr Mintohardjo Jakarta*. Universitas Indonesia.

[17] Shoja, E., Aghamohammadi, V., Bazyar, H., Moghaddam, H. R., Nasiri, K., Dashti, M., Choupani, A., Garaee, M., Aliasgharzadeh, S., & Asgari, A. (2020). Covid-19 effects on the workload of Iranian healthcare workers. *BMC Public Health*, *20*(1), 1–7. https://doi.org/10.1186/s12889-020-09743-w

[18] Sugiyono. (2018). *Metode penelitian kuantitatif, kualitatif dan kombinasi (mixed methods)* (2nd ed.). Alfabeta.

[19] Sun, J., Sarfraz, M., Khawaja, K. F., Ozturk, I., & Raza, M. A. (2022). The Perils of the Pandemic for the Tourism and Hospitality Industries: Envisaging the Combined Effect of COVID-19 Fear and Job Insecurity on Employees' Job Performance in Pakistan. *Psychology Research and Behavior Management*, *15*, 1325–1346. https://doi.org/10.2147/PRBM.S365972

[20] Suwarno, B. (2023). Analysis Head Nurses ' Leadership Styles To Staff Inpatient Nurses ' Job Performance In Hospital. ***International Journal of Science, Technology & Management,*** *4*(2), 317–326. https://doi.org/DOI: https://doi.org/10.46729/ijstm.v4i2.770

[21] Suwarno, B., Alamsyah, B., & Handiko, F. (2020). The Effect of Salary and Work Environment on Job Satisfaction on Non Civil Servant Nurses in the Hospital Medan. ***IOSR Journal of Business and Management (IOSR-JBM)***, *22*(11), 25–30. https://doi.org/10.9790/487X-2211052530

[22] Suwarno, B., & Nugroho, A. (2023). *Kumpulan Variabel-Variabel Penelitian Manajemen Pemasaran (Definisi & Artikel Publikasi)* (Ed. 1st). Bogor: Halaman Moeka Publishing.

[23] The Royal College of Radiologists. (2012). *Clinical Radiology Workload : Guidance On Radiologists ' Reporting Figures*. London: The Royal College of Radiologists.

[24] The Royal College of Radiologists. (2022). *Clinical Radiology UK Workforce Census 2022*. London: The Royal College of Radiologists. https://www.rcr.ac.uk/publication/clinical-radiology-uk-workforce-census-report-2018

[25] Walker, K., Jiarpakdee, J., Loupis, A., Tantithamthavorn, C., Joe, K., Ben-Meir, M., Akhlaghi, H., Hutton, J., Wang, W., Stephenson, M., Blecher, G., Buntine, P., Sweeny, A., & Turhan, B. (2021). Emergency medicine patient wait time multivariable prediction models: a multicentre derivation and validation study. ***Emergency Medicine Journal,*** *39*(5), 1–19.

[26] WHO. (2020). Coronavirus disease 2019 (COVID-19). In *Situation Report – 77* (Vol. 2019, Issue April). https://pers.droneemprit.id/covid19/

[27] Xie, Z., & Or, C. (2017). Associations Between Waiting Times, Service Times, and Patient Satisfaction in an Endocrinology Outpatient Department: A Time Study and Questionnaire Survey. *INQUIRY:* ***The Journal of Health Care Organization, Provision, and Financing,*** *54*, 1–10. https://doi.org/10.1177/0046958017739527.