



RESEARCH ARTICLE

Analysis of Nursing Service Quality on Patient Loyalty in Patients with Infusions at Labuang Baji Hospital, South Sulawesi

Andi Mappanganro¹, Ariyanti Saleh^{2*}, Mochammad Hatta³, Kusrini S Kadar⁴, Nursalam⁵, Agussalim Bukhari⁶, Saldy Yusuf⁷, Kidri Alwi⁸, Abdul Thalib⁹

¹Doctoral Student of Medical Sciences, Doctoral Study Program in Medical Sciences, Faculty of Medicine, Hasanuddin University, Indonesia

^{1,8}Nursing Department, Faculty of Public Health, Universitas Muslim Indonesia, Makassar, Indonesia

^{2,4,7} Faculty of Nursing, Hasanuddin University, Makassar, Indonesia

^{3,6} Faculty of Medicine, Hasanuddin University, Makassar, Indonesia

⁵ Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia

⁹ Departement of Nursing, Pasapua Ambon College of Health Sciences, Ambon, Indonesia.

ARTICLE INFO	ABSTRACT
Received: May 22, 2024	Introduction: Internal hospitals are health service institutions that provide health services related to the healing and preventing diseases in the community. Service quality starts with customer needs and ends with patient loyalty. Method: Cross-sectional comparative research carried out by the hospital. Labuang Baji from January to July 2023. The number of participants was 45 people. Results: The quality of nursing services is based on five elements of patient loyalty, namely Empathy ($p=0.002$), Reability ($p=0.004$), Assurance ($p=0.004$), Tangible ($p=0.008$) and Responsiveness ($p=0.038$). Conclusion: The quality of nursing services affects patient loyalty, and empathy has a strong relationship with this patient loyalty.
Accepted: Jul 15, 2024	
<p>Keywords</p> <p>Nursing Service Quality</p> <p>Patient Loyalty</p> <p>Intravenous Infusion</p>	

***Corresponding Author:**

ariyantisaleh@unhas.ac.id

INTRODUCTION

Internal hospitals (Kiswara et al., 2020) are health service institutions that provide health services related to the healing and prevention of diseases in the community. Hospitals also have advantages and disadvantages, especially in terms of service quality, and for that, hospitals need to have better service quality. Everyone has the right to access quality, safe, and affordable health services. The community assesses various aspects of health services, especially regarding care services, because in hospitals, most human resources who interact directly with patients are nurses, so the quality of services carried out by nurses can be assessed as an indicator of whether the quality of services in hospitals is good or bad (Alamri et al., 2015).

Service quality starts with customer needs and ends with patient loyalty. A researcher said that patient satisfaction affects the level of loyalty by mediating patient trust. Patient trust is an important variable in obtaining patient loyalty, both patient trust in the health system and in health workers

(Widodo, Rizky, Prayoga, & Diansanto, 2022). Patient satisfaction will certainly impact patients who will stay in a hospital because they are satisfied or not and choose to look for another hospital.

Meanwhile, the service quality dimension includes five things: Reliability, Assurance, Tangibility, Empathy, and Responsiveness, abbreviated as RATER (Fatima et al., 2019). Patient satisfaction depends on the quality of the services provided. Hospital service users, in this case, patients, demand quality services regarding the recovery from physical illness or improving their health status, satisfaction with attitudes, adequate facilities and infrastructure, and a physical environment that can provide comfort. Nurses are always required to be able to carry out all forms of nursing actions based on the knowledge obtained, including invasive actions such as the installation of intravenous therapy (IV).

According to Langingi et al. (2022), this therapy developed from an extreme measure, only used in critical conditions; intravenous therapy is required in almost 90% of patients undergoing hospitalization. Intravenous therapy is useful for correcting or preventing fluid and electrolyte imbalances in the human body. Intravenous therapy must be continuously regulated due to changes in the patient's expected fluid and electrolyte balance.

The observations showed that some nurses had not installed infusions according to applicable standards. This can lead to the risk of experiencing local complications of infection (phlebitis). Infection for patients can have real impacts, namely patient discomfort, changing to a new catheter, increasing the length of hospital stay and even causing death. So, from the description above, researchers are interested in researching the relationship between the quality of nursing services and the loyalty of patients who have IVs installed at Labuang Baji Regional Hospital.

METHOD

This cross-sectional comparative study was conducted at Ibnu Sina Hospital and Labuang Baji Hospital from January to July 2023. The study population includes patients in the treatment room. The study sample was selected from populations that met the inclusion and exclusion criteria, with a total of 45 patients.

The inclusion criteria in this study involved early to late adult patients (26–45 years) who were fully conscious, willing to be respondents, had an infusion with crystalloid fluid therapy that had a limit on fluid/drug osmolarity (<900mmol), were sleeping on their backs, and had an infusion attached to the metacarpal area. Exclusion criteria in this study include patients with decreased consciousness (anxiety), patients with disease complications, patients with diabetes mellitus, hypertensive patients, patients undergoing chemotherapy, immunocompromised (leukemia, HIV), patients with blood clotting conditions, and patients with active infections.

Permission from the Ethics Committee of the Faculty of Medicine, Hasanuddin University, was obtained with ethics number 76/UN4.64.5.31/PP36/2023. Statistical analysis using SPSS software version 22.0 for Windows. Descriptive statistics are calculated by calculating the proportions for categorical/binary variables and mean, median, and standard deviation for continuous variables. The Mann-Whitney test evaluates the relationship between the means of different variables.

RESULT

Table 1: Demographic data

Responsive Features	N	Percentage (%)
Age:		
Late Teenagers (17-25 Years)	21	46,7
Early Adulthood (26-35 Years)	8	17,8
Late Adulthood (36-45 Years)	16	35,6
Gender:		
Man	24	53,3

Woman	21	46,7
Installation Time		
0-24 hours	9	20
24-48 hours	17	37,8
48-72 hours	14	31,1
>72 hours	5	11,1
Fixation Techniques		
Film transparency	18	40
Conventional	27	60
Installation Location		
Metacarpal Vein	42	93,3
Inspired by Soda	2	4,4
Dorsalpedis Vein	1	2,2
IV Catheter Size		
18	5	11,1
20	20	68,9
22	9	20
Liquid Type		
Isotonik	41	91,1
Hypotonic	4	8,9

In table 1. Showing the distribution of demographic data of respondents with the age of late adolescence (17-25 years), 21 respondents (46.7%), which is the most male sex more than female, namely 24 respondents (53.3%), most of the installation time is 24-48 hours, 17 respondents (37.8%), with the most conventional fixation techniques, 27 respondents (60%), the location of installation in the metacarpal vein as many as 42 respondents (93.3%), with IV catheter size 20 as many as 31 respondents (68.9%) who received isotonic fluid as many as 41 respondents (91.1%)

Analysis of nursing service quality against patient loyalty

Table 2: Service quality analysis from 5 elements to the incidence of Plebitis

Quality of service Nursing		Loyalty		N	%	P value
		Loyal	Disloyal			
Reliability	Good	33	3	36	80	0.004*
	Less	4	5	9	20	
Assurance	Good	29	6	35	77,7	0.004*
	Less	3	7	10	22,3	
Tangible	Good	14	12	26	57,8	0.008*
	Less	18	1	19	42,2	
Empathy	Good	34	3	37	82,2	0.002*
	Less	3	5	8	17,8	
Responsiveness	Good	32	2	34	75,5	0.038*
	Less	7	4	11	24,5	

Chi-Square Test*

Table 2. shows that three elements had a strong relationship with patient loyalty, namely Empathy (p=0.002) and Reliability and Assurance (p=0.004), while the other two elements also had a statistically significant relationship, namely Tangible (p=0.008) and Responsiveness (p=0.038)

DISCUSSION

The quality of health services is based on reliability, which includes patient examination services by doctors, nursing and medication services, and the smoothness of service procedures. At the same time, they are being treated in the hospital. The research results on the reliability of staff found that more than half of the 33 patients at Labuang Baji Regional Hospital stated that the reliability of nurses at Labuang Baji Regional Hospital was good. This means there are still nine respondents stating that the timeliness of service, time to process registration, time to start treatment, time to end treatment, and the match between expectations and actual patient time is not good. Service reliability is the ability to accurately and correctly provide the type of service promised to consumers or customers. A patient's experience with health services influences his decision to choose or use these services in the future. The relationship between reliability and patient loyalty at Labuang Baji Regional Hospital can be seen in the nurses who are skilled and agile in installing infusions and caring for hands that are installed infusions as well as being punctual and patient in serving patients so that the patients feel satisfied with the service they receive and want to Return to treatment at this hospital without thinking about costs because health and safety are very valuable. This research shows a relationship between reliability and loyalty with a value of $p = 0.005$ ($p < \alpha$ (0.05)).

Thus, it is said that there is a relationship between reliability and the quality of patient service at Labuang Baji Regional Hospital. The results of this research state that service quality is also related to the ability and skills of health services to provide services to patients by existing procedures. The reliability table results were good: 33 patients were loyal, and three were disloyal. Then, four patients said it was not good: 4 patients were loyal, and five were disloyal.

This shows that nurses' reliability in carrying out nursing actions will impact patient loyalty even though some are still disloyal. This could happen, for example, when nurses are reliable but do not show a good attitude when serving, so the patient is not loyal. Thus, poor reliability, but some say they remain loyal, can occur if nurses are less reliable but serve wholeheartedly and have a good attitude when caring for patients.

Guarantees are the main means of getting more loyal or devoted patients. Loyal patients will use them again, and loyal patients will even invite others to use the same health services. Suppose the patient already has a sense of belonging and a good emotional bond with the hospital. In that case, the person will usually not move to another hospital for treatment or care despite price changes. Someone already feels comfortable, trusts and sympathizes with the hospital. Promoting the hospital and positively impacting the Labuang Baji Regional General Hospital will be easy. Having good guarantees for patients will increase patient satisfaction in using services. Some patients dissatisfied with health service guarantees still hope for better service guarantees. They still complain about the nurses' knowledge in handling their problems/complaints. This requires special attention from the hospital by increasing the human resources of all nurses, both in quality and quantity, through additional staff as needed. This is in line with research conducted by Iga Trimurthi (2008) at the Pandanaran Community Health Center, Semarang City, which stated that there was a relationship between patient perceptions of service guarantees and interest in reusing inpatient services. This study's results show a relationship between guarantees and patient loyalty with a value of $p = 0.000$. This means that the higher the quality of health services regarding guarantees, the higher the level of patient loyalty at Labuang Baji Regional Hospital. Based on the results of the relationship analysis carried out using the chi-square test, a value of 0.004 ($p < 0.05$) was obtained so that the null hypothesis was rejected, and there was a relationship between the level of assurance/certainty and the level of loyalty of inpatients at Labuang Baji Regional Hospital. Based on the results of the guaranteed table, 29 patients stated they were loyal, and there were still six less loyal patients, three patients who stated they were loyal but were not loyal, and seven other patients stated they were not loyal. This indicates that the guarantee or certainty of nurses in treating patients has a big impact on

patient loyalty, even though some of them are still disloyal. This is likely to happen if the nurse's certainty in serving is still not enough to make the patient loyal; for this reason, the nurse must convince the patient more about the guarantee of the actions the patient will take.

The physical appearance in this study is the patient's assessment of the hospital's capabilities related to its equipment, the availability of medical personnel, existing medical and non-medical support, comfortable consultation rooms, adequate facilities, and comfort. Nurses show a friendly attitude and politeness when serving patients in the hospital. Because the nurse's friendly attitude and politeness toward the patient will increase the patient's level of satisfaction when the treatment is given, the completeness of the equipment in the hospital and the nursing actions provided according to the SOP will increase the patient's desire to return for treatment at the hospital; they will come back to this hospital if they are sick or will tell their family or close relatives about the facilities they get at home. This pain. The definition of physical evidence in service quality is a form of real physical actualization that can be seen or used according to its use and utilization, which can be felt to help the service received by people who want the service so that they are satisfied with the service they feel, which also shows their work performance for the service provided. Given. Patient dissatisfaction with the direct evidence/physical appearance of services felt by patients in the inpatient unit occurs because of the discomfort of the hospital environment. The results of this study indicate that direct evidence/physical appearance has a relationship with patient loyalty. This research also illustrates that the quality of service to patients greatly influences patient loyalty. The research results state that direct evidence influences the quality of health services and patient loyalty. In contrast, direct evidence includes patient comfort in this hospital, which will also influence the quality of health services. Based on the research results, it can be seen that of the 36 respondents with good Tangible (direct evidence) perceptions, there are 33 respondents (100%) are loyal, three are not loyal, and of the nine respondents with unfavorable Tangible (direct evidence) perceptions, there are four who are loyal and five who are not loyal to Labuang Baji Regional Hospital. The results of statistical tests using the chi-square test obtained a p-value of $0.002 < 0.05$, meaning there is a significant relationship between physical appearance (tangible) and loyalty at Labuang Baji Hospital 2022.

In the physical appearance of infusion installation, there is the fluid used. Intravenous fluids are adjusted to the client's fluid loss condition and how much body fluid is lost. Giving intravenous fluids is one of the intravenous procedures. An isotonic fluid is a fluid that is physiologically compatible with body fluids and is used to replace and maintain body fluids. The fluid's osmolarity (level of density) is close to serum (the liquid part of the blood component), so it remains in the blood vessels. Useful in patients experiencing hypovolemia. Giving intravenous fluids is one of the invasive procedures health workers carry out. An isotonic solution is a solution that has a total osmolarity of 280–310 mOsm/L; a solution that has an osmolarity less than that is called hypotonic, while one that exceeds it is called a hypertonic solution (INS, 2006). Imam Subekti states peripheral veins can receive solution osmolarity up to 900 mOsm/L. The higher the osmolarity (the more hypertonic), the easier it is to damage the peripheral vein walls, such as phlebitis, thrombophlebitis and thromboembolism. Long-term administration must be given through the central vein because the solution is hypertonic with an osmolality > 900 mOsm/L; through the central vein, the blood flow is fast, so it does not damage the walls. When a crystalloid contains the same amount of plasma electrolytes, it has the same concentration and is called "isotonic" (iso, equal; tonic, concentration). When administering isotonic crystalloid, there is no significant movement between intravascular fluid and cells. Thus, there is almost no or minimal osmosis. The advantages of crystalloid fluids are that they are cheap, easy to obtain, easy to store, reaction-free, can be used immediately to overcome circulating volume deficits, reduce blood viscosity, and can be used as a fluid challenge test. Side effects that need to be considered are the occurrence of peripheral and pulmonary edema in large amounts administered. Examples of isotonic crystalloid solutions: Ringer's Lactate, Normal Saline (NaCl 0.9%), and Dextrose 5% in $\frac{1}{4}$ NS.2,3 - Hypertonic If the crystalloid contains more electrolytes

from body plasma, it is more concentrated and is referred to as “hypertonic” (hyper, high, tonic, concentration). Administration of hypertonic crystalloid causes the fluid to draw fluid from cells into the intravascular space. Another effect of hypertonic saline solution is to increase cardiac output not only due to improvements in preload but also the increase in cardiac output may be secondary to the positive inotropic effect on the myocardium and a decrease in afterload secondary to the vasodilating effect of visceral capillaries. Both of these conditions can improve blood flow to vital organs. Side effects of administering hypertonic saline solutions are hypernatremia and hyperchloremia. Examples of hypertonic crystalloid solutions: Dextrose 5% in $\frac{1}{2}$ Normal Saline, Dextrose 5% in Normal Saline, Saline 3%, Saline 5%, and Dextrose 5% in RL.

Empathy is giving sincere individual or personal attention to patients by understanding the patient's wishes, including ease of relationships, good communication, meeting patient needs, and listening to patient complaints. Empathy has a relationship with inpatients. This is because some patients stated that they had received sincere attention from nurses; for example, nurses were able to comfort patients if the patient were anxious and could accept patient complaints well, not discriminating against social status; only some people received special attention and extra service when in take care. The results of this study show that empathy has a relationship with patient loyalty. This research also illustrates that the quality of service to patients greatly influences patient loyalty. This is in line with research on the influence of health services on the level of satisfaction of inpatients at Cliff Tinggi Hospital in 2014.

Based on the chi-square test carried out on the empathy variable by the researcher, the results were obtained ($p=0.008$), which showed a relationship between empathy and patient loyalty at Labuang Baji Regional Hospital. Even though most respondents were satisfied with the empathy of health workers, in practice, there were still patients who were not satisfied. This is possible due to health workers' lack of ability and skills in serving patients. The higher the education and ability of a health worker, the faster they will be able to serve patients. So health workers will be better able to help patients overcome their health problems. The results of the empathy table show that 14 patients stated their empathy was good and loyal, while 12 other people stated they were not loyal even though the nurse's empathy was good. This shows that some patients judge their loyalty not based on the nurse's empathetic attitude but on other factors, such as the nurse's lack of reliability or the physical evidence that the nurse has not yet convinced the patient to remain loyal to the nurse's service or the hospital.

The good responsiveness received by patients will also improve the quality of service from nurses and the hospital. Based on the results of the relationship analysis carried out using the chi-square test, a value of 0.038 ($p<0.05$) was obtained, so there is a relationship between responsiveness and the level of loyalty of inpatients at Labuang Baji Hospital. This will also make patients more loyal and interested in returning for treatment at the hospital if the patient needs health services again in the future. From the table's results, the nurses' responsiveness was good; 12 patients were loyal, and two were not loyal. Then, the responsiveness of the nurses was less, but there were seven loyal patients and four disloyal patients. It can be concluded that a positive and significant relationship exists between responsiveness and patient loyalty through nurse responsiveness. The better the patient's perception of responsiveness, the higher the level of loyalty; if the patient's perception of responsiveness is poor, the patient's loyalty will be lower.

This can happen because the quality of service patients feel when using Islamic Hospital services is good so that patient hopes can be realized. This then creates a positive impression in the patient that they will continue using the Labuang Baji Regional General Hospital services when needed. This positive impression can also create a strong commitment within the patient to ignore other hospitals. This commitment that emerges from within the patient is called loyalty. The relationship between service quality and patient loyalty has also been proven by the results of research by Jeanasis (2012)

conducted at BMC Padang Hospital, which showed that service quality that is continuously maintained or consistent will certainly create trust and a positive impression of the service provider, which will then create customer commitment to continue using the same service in the future. The same results were also shown by Gunawan's (2011) research at the Singaraja City Private General Hospital, Bali, that simultaneously, there was a positive and significant influence between the dimensions of service quality and patient loyalty. The consistency of service quality that can be maintained continuously by a service company will encourage the formation of commitment among customers to continue using the same service.

REFERENCES

- Mohiuddin AK. Framework for Patient Safety. *Inov Pharm.* 2019;10(1).
- Nursalam. *Manajemen keperawatan: Aplikasi dalam praktik keperawatan profesional.* 4th ed. Jakarta: Salemba Medika; 2014.
- Cernuda Martínez JA, Suárez Mier MB, Martínez Ortega MDC, Casas Rodríguez R, Villafranca Renes C, Del Río Pisabarro C. Risk factors and incidence of peripheral venous catheters-related phlebitis between 2017 and 2021: A multicentre study (Flebitis Zero Project). *J Vasc Access.* 2023 Jul;11297298231189964.
- Cho Y-H, Yen L-L, Yu K-L, Chang C-C, Chen H-L. Reducing the Incidence of Phlebitis Related to Intravenous Injection in Pediatric Patients. *Hu Li Za Zhi.* 2015 Jun;62(3 Suppl):49-57.
- García-Expósito J, Reguant M, Canet-Vélez O, Ruiz Mata F, Botigué T, Roca J. Evidence of learning on the insertion and care of peripheral venous catheters in nursing students: A mixed study. *Nurse Educ Today.* 2021;107.
- Wijayanti R, Nuraini N. Peningkatan Mutu Pelayanan Rawat Inap melalui Penanggulangan Phlebitis di Klinik Dr. M. Suherman Jember. *Prosiding.* 2018;3(0):156-60.
- Ray-Barruel G, Chopra V, Fulbrook P, Lovegrove J, Mihala G, Wishart M, et al. The impact of a structured assessment and decision tool (I-DECIDED®) on improving care of peripheral intravenous catheters: A multicenter, interrupted time-series study. *Int J Nurs Stud.* 2023;148.
- Lv L, Zhang J. The incidence and risk of infusion phlebitis with peripheral intravenous catheters: A meta-analysis. *J Vasc Access.* 2020;21(3):342-9.
- Maragani EJ, Marethalia F, Margareth L, Eka NGA, Manihuruk GAM. Faktor Risiko Eksternal Kejadian Phlebitis Pada Pemasangan Kateter Intravena Perifer: Studi Dokumentasi. *J Muara Sains, Teknol Kedokt dan Ilmu Kesehatan.* 2021;5(2):467.
- Fadhilah N, Wulandari H. Hubungan osmolaritas cairan infus dengan kejadian flebitis pada pasien neonatus di rs mitra husada pringsewu. *Healthc Nurs J.* 2021;3(2):102-6.
- Munandar F. Aspek Klinis dan Tatalaksana Hipernatremia Pada Anak. *J Implementa Husada.* 2021;2(4):13-9.
- Amaliah, N., Pebrianti, N. A., & Hikmah, N. (2023). Lama Hari Pemasangan Infus Berpengaruh Terhadap Kejadian Flebitis Di Ruang Rawat Inap Di Rumah Sakit Di Banjarmasin. *Jurnal Kedokteran Dan Kesehatan : Publikasi Ilmiah Fakultas Kedokteran Universitas Sriwijaya,* 10(1), 67 -72. <https://doi.org/10.32539/JKK.V10I1.19804>
- Alamri, A. M., Rumayar, A. A., & Kolibu, F. K. (2015). Hubungan Antara Mutu Pelayanan Perawat Dan Tingkat Pendidikan Dengan Kepuasan Pasien Peserta Badan Penyelenggara Jaminan Sosial (Bpjs) Kesehatan Di Ruang Rawat Inap Rumah Sakit Islam (Rsi) Sitti Maryam Kota Manado. *Pharmacon,* 4(4), 241-251. <https://doi.org/10.35799/pha.4.2015.10213>
- Demur, D. R. D. N. (2021). Lama Pemasangan Infus Dengan Kejadian Plebitis Pada Pasien Di Ruang Cempaka I Rsud Dr. Adnaan Wd. *Jurnal Cakrawala Ilmiah,* 1(4), 715-724.
- Kiswara, R. M., Mifbakhuddin, M., & Prasetio, D. B. (2020). Penggunaan Alat Pelindung Diri pada Perawat Rawat Jalan dan Rawat Inap. *Jurnal Kesehatan Masyarakat Indonesia,* 15(2),47. <https://doi.org/10.26714/jkmi.15.2.2020.47-51>
- Fatima, I., Humayun, A., Iqbal, U., & Shafiq, M. (2019). Dimensions of service quality in healthcare: A

- systematic review of the literature. *International Journal for Quality in Health Care*, 31(1), 11–29. <https://doi.org/10.1093/intqhc/mzy125>
- Ilhamsyah, & Mulyani, A. (2019). Analisis Faktor-Faktor Kualitas Pelayanan Terhadap Loyalitas Pasien Di RS. Kusta Dr. Rivai Abdullah Kabupaten Banyuasin Provinsi Sumatera Selatan. *Jurnal Media Wahana Ekonomika*, 15(4), 33. <https://doi.org/10.31851/jmwe.v15i4.3054>
- Kesehatan Masyarakat (Vol. 11, Issue 2). Langingi, A. R. C., Watung, G. I. V., Sibua, S., & Tumiwa, F. F. (2022). Hubungan Lokasi Pemasangan Dengan Kejadian Flebitis Pada Pasien Yang Terpasang Infus Di Ruang Rawat Inap Rumah Sakit Umum X Manado. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, 8(2), 1367–1376. <https://doi.org/10.37905/aksara.8.2.1367-1376.2022>
- Kijima, T., Matsushita, A., Akai, K., Hamano, T., Takahashi, S., Fujiwara, K., ... Kumakura, S. (2021). Patient satisfaction and loyalty in Japanese primary care: a cross-sectional study. *BMC Health Services Research*, 21(1), 1–12. <https://doi.org/10.1186/s12913-021-06276-9>
- Sari, S. M. (2021). Pengaruh Kualitas Pelayanan Dan Kepuasan Pasien Terhadap Loyalitas Pasien (Studi Pada Rumah Sakit Bhayangkara TK II Sartika Asih Bandung). *Jurnal Economix*, 9 (1), 61–72.
- Septiani, Y., Aribbe, E., & Diansyah, R. (2020). Analisis Kualitas Layanan Sistem Informasi Akademik Universitas Abdurrah Terhadap Kepuasan Pengguna Menggunakan Metode Sevqual (Studi Kasus: Mahasiswa Universitas Abdurrah Pekanbaru). *Jurnal Teknologi Dan OpenSource*, 3(1), 131–143. <https://doi.org/10.36378/jtos.v3i1.560>
- Siagian, R. H. (2019). Hubungan Lama Pemasangan Infus Dengan Kejadian Flebitis.