Yaumil Husna *et al*, International Journal of Pharmaceutical Sciences and Medicine (IJPSM), Vol.9 Issue. 3, March- 2024, pg. 1-6

ISSN: 2519-9889
Impact Factor: 5.9

QUALITATIVE EVALUATION OF ANTIBIOTIC USE IN THE NICU ROOM (NEONATE INTENSIVE CARE UNIT) IN HOSPITAL X CITY OF PADANG YEAR 2022

Yaumil Husna[1]; Prof. Dr. Apt. Almahdy A., MS[1]; Apt. Dedy Almasdy, M.Si, Ph.D[1*]
[1]Universitas Andalas, husnayaumil24@gmail.com
[1]Universitas Andalas, almahdy58@gmail.com
[1*]Universitas Andalas, dedyalmasdy@gmail.com

DOI: 10.47760/ijpsm.2024.v09i03.001

Abstract:
Neonates are very vulnerable to infection due to exposure to microorganisms during labor and sometime after birth. Some neonates need special care in the Neonatal Intensive Care Unit (NICU) room because of infection cases that require antibiotic therapy. This study aims to evaluate the use of antibiotics qualitatively. This study is an analytic descriptive study with cross sectional design, using retrospective data. Evaluation of antibiotic use qualitatively with the Gyssens method. While the relationship between the rationality of antibiotic use with the description of demographic and clinical characteristics of patients was analyzed by chi square. The source of data was the medical records of patients admitted to the NICU room of Hospital X in Padang City who were admitted from January 1, 2022 to December 31, 2022. Descriptive analysis was performed to determine the description of demographic and clinical characteristics of patients and evaluation of antibiotic use. From this study, the results of qualitative evaluation obtained category 0 (rational) 180 (71.14%), category IIa as many as 14 (5.53%), category IIb as many as 9 (3.56%), category IIIa as many as 21 (8.30%) and category IIIb as many as 28 (11.07%).The relationship between the accuracy of antibiotic use with the description of demographic characteristics and NICU discharge conditions obtained the results there is a difference in the level of accuracy of antibiotic use with the birth process (p=0.000) and there is a difference in the level of accuracy of antibiotic use with NICU discharge conditions (p=0.000).
***Keywords**:* Antibiotic Evaluation, NICU, Gyssens, Qualitative

1. Introduction
Hospitals are health care institutions that organize comprehensive individual health services that provide inpatient, outpatient, and emergency services, where hospitals provide services, pay attention to quality and patient safety. Quality health services are services that are characterized as safe, timely, efficient, effective, patient-oriented, and integrated. Fulfilment of service quality in hospitals can be done in two ways, namely internal quality improvement and external quality improvement (Kemenkes RI, 2022). The NICU room (Neonatal Intensive Care Unit) is an intensive care room for infants who require special treatment and care, in order to prevent and treat the failure of vital organs. The NICU room is an organizational unit / place to provide health services to neonate patients with high risk conditions that require close supervision (intensive) through the use of facilities and facilities effectively and efficiently to achieve the expected goals (Indonesian Ministry of Health, 2020). According to WHO (2006), 50% of infant mortality occurs in the neonatal period and 50% occurs in the first week of life. The direct causes of mortality in neonates include sepsis, neonatal asphyxia, birth trauma, prematurity and congenital malformations. The majority of neonates deaths occur in low birth weight (LBW) infants. Long hospital stays lead to high hospital bills and increase the cost of neonatal care substantially (Sharma, 2016.). Rational drug use aims to avoid problems that can arise related to drugs (Drug Related Problems). The irrational use of drugs is often found in daily medical practice. Prescribing drugs without clear indications; determining the wrong dose, method, and duration of administration, as well as prescribing expensive drugs are some examples of irrational prescribing. The use of a drug is said to be irrational if the possibility of negative impacts received by the patient is greater than the benefits. The negative impact here can be in the form of; clinical impact (for example the occurrence of side effects and germ resistance), economic impact (unaffordable costs) (Kemenkes RI, 2011). Aslam (2003) stated that the proportion of antibiotic use

© 2024, IJPSM All Rights Reserved, www.ijpsm.com

ISSN: 2519-9889
Impact Factor: 5.9

among hospitalized patients was 84%, of which 42% had no indication for antibiotics. According to estimates, up to one third of hospitalized patients receive antibiotics, and the cost of antibiotics can reach 50% of the budget for drug use in hospitals. Inappropriate use of antibiotics can increase treatment costs and the potential for side effects. Therefore, the use of antibiotics must follow an antibiotic prescribing strategy. In a study, the accuracy of drug use can be determined based on predetermined criteria. These criteria are developed based on the Diagnostic and Therapeutic Guidelines (PDT) in the hospital and other reliable official literature (Almasdy, 2015). In this study to determine the accuracy of antibiotic use, the Gyssen method was used in accordance with the Regulation of the Ministry of Health of the Republic of Indonesia No.8 of 2015 concerning Antimicrobial Resistance Control Programs in Hospitals.

2. Methods

This study is an analytic descriptive study with a cross sectional design, using retrospective data where a qualitative approach with the Gyssens method. This study used retrospective secondary data in the form of medical records of patients admitted to the Neonatal Intensive Care Unit (NICU) room of Hospital X Padang City who were treated from January 1, 2022 to December 31, 2022. The study population was all patient medical records in the Neonatal Intensive Care Unit (NICU) ward of Hospital X Padang City during 2022. The samples taken in this study were all patient medical records in the NICU ward of Hospital X Padang City during 2022 which met the inclusion criteria, namely all medical records of patients treated in the NICU room of Hospital X Padang City during 2022 who used antibiotics and exclusion criteria, namely incomplete patient medical records, including: the absence of a list of drug administration and not filling in integrated patient development records.

3. Results

3.1 Overview of patient demographic and clinical characteristics

This study obtained initial data as many as 136 medical records of patients admitted to the NICU room of Hospital X Padang City in 2022. Data obtained from the administration of the NICU room of Hospital X Padang City. After looking at all patient medical record data, it was found that the patient's medical record data included in this study were 114 medical records, of which 12 medical records were not included in this study because the patient did not use antibiotics and 10 medical records were incomplete (there was no list of drug administration and the patient's progress notes were not integrated). An overview of the demographic and clinical characteristics of patients who received antibiotics can be seen in table 1.

Table 1. Overview of demographic and clinical characteristics of patients who received antibiotics in the NICU room of Hospital X Padang City in 2022.

Characteristics	**2022**	
	Total	**%**
Gender		
- Male	62	54,39
- Female	52	45,61
Gestational age		
- < 37 weeks	47	41,23
- ≥ 37 weeks	67	58,77
Birth process		
- Sectio Caesarea	78	68,42
- Spotan	36	31,58
Birth Weight		
- < 2500 grams	44	38,66

© 2024, IJPSM All Rights Reserved, www.ijpsm.com

ISSN: 2519-9889
Impact Factor: 5.9

- ≥ 2500 grams	70	61,34
Length of stay		
- < 7 days	56	49,12
- 7 – 13 days	42	36,84
- 14 - 20 days	8	7,02
- 21 – 27 days	4	3,51
- > 28 days	4	3,51
Diagnosis		
- Without comorbidities	83	72,81
- With comorbidities	31	27,19
NICU discharge condition		
- Improvement	101	88,59
- Death	13	11,41

3.2 Qualitative evaluation of antibiotic use

Based on data from 114 neonate patients, there were 247 antibiotic uses with 253 Gyssen category checklists, after being evaluated, it can be grouped into 6 Gyssens categories from 11 categories of quality assessment of existing antibiotic use. Each category is category 0 (appropriate), category II a (inappropriate use of dose), category II b (inappropriate use of administration interval), category III a (too long use), category III b (too short use), category IV c (cheaper alternative), for data display can be seen in Table 2. Inappropriate use of antibiotics can cause failure in therapy and increase the risk of antibiotic resistance.

Table 2. Appropriateness of antibiotic use based on the Gyssens method in the NICU of Hospital X Padang City in 2022.

No	Gyssen Score	Evaluation		Total	(%)
1	0	Appropriate/rational use of antibiotics		180	71,14 %
2	I	Antibiotic use is not timely		-	-
3	IIA	Use of antibiotics not in the right dose		14	5,53 %
4	IIB	Antibiotic use is not appropriate interval of administration		9	3,56 %
5	IIC	Antibiotic use is not appropriate route / way of administration		-	-
6	IIIA	Antibiotic use too long		21	8.30 %
7	IIIB	Antibiotic use is too short		28	11.07 %
8	IVA	There are other antibiotics that are more effective		-	-
9	IVB	There are other antibiotics that are less toxic/safer		-	-
10	IVC	Cheaper alternative		1	0.40 %
11	IVD	There are other antibiotics with a narrower spectrum		-	-
12	V	No indication of antibiotic use		-	-
13	VI	Medical record data is incomplete and cannot be studied		-	-
				253	100 %

© 2024, IJPSM All Rights Reserved, www.ijpsm.com

ISSN: 2519-9889
Impact Factor: 5.9

3.3 Relationship between the accuracy of antibiotic use and the demographic and clinical characteristics of patients

Seeing the correlation between the accuracy of antibiotic use and the description of patient demographic characteristics, the chi square test was carried out where the data obtained in the table.

Table 3. The relationship between the accuracy of antibiotic use with the demographic and clinical characteristics of patients

Overview of patient demographic and clinical characteristics	**Appropriateness**		***p***
Gender	Appropriate	Inappropriate	
- Male	98	41	0,342
- Female	82	26	
Gestational age	Appropriate	Inappropriate	
- < 37 Weeks	96	43	0,127
- ≥ 37 Weeks	84	24	
Birth Process	Appropriate	Inappropriate	
- Sectio Caesarea	135	30	0,000
- Spontan	45	37	
Birth Weight	Appropriate	Inappropriate	
- < 2500 gram	67	22	0,523
- ≥ 2500 gram	113	45	
Diagnosis	Appropriate	Inappropriate	
- Without comorbidities	141	49	0,389
- With comorbidities	39	18	
NICU discharge condition	Appropriate	Inappropriate	
- Improvement	174	44	0,000
- Died	6	23	

4. Discussion

Based on gender, the number of male patients (54.39%) is more than female patients (45.61%). The same results were obtained by Juwita (2023) in her study, it was found that patients with male gender (55.36%) were more than patients with female gender (44.64%). Similar research was also conducted by Hendiyani et al (2021) in their research which focused on neonate patients with a diagnosis of sepsis, stating that of the 67 neonate sepsis patients, the most numerous were male gender as many as 37 (55.2%) patients and female gender as many as 30 patients (44.8%). Judging from gestational age, 42.23% of babies were born at < 37 weeks of gestation and 58.77% were born at ≥ 37 weeks of gestation. The results of this study are different from Jaya et al's research (2019) where research conducted on neonate patients with a diagnosis of sepsis showed that patients with gestational age were born prematurely, namely 14 samples (28%), 6 samples (12%) were not premature. This difference may be due to patients who seek routine treatment at the obstetrics clinic of Hospital X Padang City will control their pregnancy every month until the birth process in the 36th week, so that many neonates who are treated at Hospital X Padang City meet the gestational age which is ≥ 36 weeks. Based on the type of birth of patients admitted to the NICU room of Hospital X Padang City during the period January to December 2022, more patients were born by section caesarea, namely 78 patients (68.42%) compared to spontaneous birth of 36 patients (31.58%). The process of birth by section caesarea is very necessary in pregnant patients with comorbidities and complications where research in Japan shows that the survival rate of premature babies with a gestational age of 24-31 weeks who are born by cesarean section is higher than those born spontaneously (Ogawa et al., 2013).Judging from the birth weight, 61.34% of babies are born with normal weight, which is greater than 2500 grams and low birth weight less than 2500 grams is 38.66%. Hartiningrum (2019) argues that babies born with low body weight are at higher risk of mortality and morbidity than babies born with normal or

© 2024, IJPSM All Rights Reserved, www.ijpsm.com

ISSN: 2519-9889
Impact Factor: 5.9

sufficient body weight. Based on disease diagnosis data, the results of diagnoses without comorbidities were 83 patients (72.81%) and diagnoses with comorbidities 31 patients (27.19%). The diagnosis of the disease of patients admitted to the NICU of Hospital X Padang City is respiratory tract disease, one of which is respiratory distress. The statement is different from the research of Mufarrihah (2016), where the most common diagnosis is neonatal jaundice experienced by 177 patients and complications that often occur include neonatal jaundice, sepsis, hypoglycemia, and respiratory distress syndrome. Data on NICU discharge conditions obtained by patients with improved conditions as many as 101 patients (88.59%) and 13 patients (11.41%) died. In this study, the highest percentage category was category 0 (appropriate / rational use of antibiotics) as many as 180 (71.14%) this is because in Hospital X Padang City already has Standard Operating Procedures (SOP) so that the therapy given is adjusted to the existing SOP. In category II a (Use of antibiotics inappropriate dose) as many as 14 (5.53%) where there is the use of doses that are not in accordance with hospital SOPs. Category II b (Inappropriate use of antibiotic administration interval) as many as 9 (3.56%) where there were more frequent administration intervals that were not in accordance with existing standards. Category III a (Antibiotic use too long) as many as 21 (8.30%) and category III b (Antibiotic use too short) as many as 28 (11.07%) according to the Antibiotic Use Guidelines in 2021 where for empirical antibiotic administration is 3-5 days. In category IVc (Cheaper alternative), namely 1 patient with direct treatment with the 3rd line, namely meropenem antibiotics. Similar research was also conducted by Nastiti et al (2023) in their research entitled evaluation of patterns and rationality of antibiotic use in neonate patients in the NICU and perinatal rooms of Banjarnegara Hospital, obtained results for the rationality of antibiotic use carried out by the Gyssens method on 131 medical record data for neonate patients in the NICU and Perinatal rooms of Banjanegara Hospital during November 2020 to January 2021, 263 neonate patients were obtained who used antibiotics, After the evaluation, 4 groups of Gyssens categories were obtained from 11 categories of assessing the rationality of antibiotic use, where each category was category 0 (rational) as many as 227 (85.66%), category II a (inappropriate use of dose) as many as 23 (8.68%), category II b (inappropriate use of administration interval) as many as 5 (1.89%), category III b (too short use) as many as 10 (3.77%). Another study was also conducted by Karyanti (2022) evaluating the use of antibiotics qualitatively with the Gyssens method in pediatric inpatient rooms obtained the selection of appropriate antibiotics by 68.1%, and inappropriate as much as 31.9% where errors are often found in the use of antibiotics caused by the unavailability of antibiotics in hospitals when prescribed so as not to achieve optimal treatment accuracy. From the chi square test that has been done to determine the relationship between the accuracy of antibiotic use with a description of the demographic and clinical characteristics of patients shows the results on differences in gender, gestational age, birth weight and diagnosis obtained p values greater than 0.05, based on these values it can be interpreted that there is no difference in the level of accuracy of antibiotic use with groups of gender, gestational age, birth weight and diagnosis. As for the relationship between the accuracy of antibiotic use with the birth process and NICU discharge conditions, the p value is smaller than 0.05, based on this value it can be interpreted that there is a difference in the level of accuracy of antibiotic use with the birth process and the condition of the patient leaving the NICU. Different results were obtained in a study conducted by Nastiti et al (2023) on evaluating the pattern and accuracy of antibiotic use in neonate patients in the NICU and Perinatal room of Banjarnegara Hospital where to determine the relationship between the accuracy of antibiotic use with clinical outcomes showed the results of $p = 0.138$ ($p > 0.05$), based on this value it can be interpreted that there is no relationship or correlation between the accuracy of antibiotic use with the patient's clinical outcome. This is because in Hospital X Padang City for the right number of antibiotics with the condition of discharge NICU repair has the highest number of 174.

5. Conclusion

Based on qualitative evaluation with the Gyssens method, antibiotic administration in the NICU room of Hospital X Padang City is not fully appropriate (Category 0) where out of 253 categories recorded, 180 are appropriate (appropriate) and 73 are inappropriate (inappropriate). To see the relationship between the accuracy of antibiotic use with the characteristics and clinical picture of patients with chi square test, the results showed that there was a relationship between the accuracy of antibiotic use with the birth process and NICU discharge conditions where the p value of both was $p = 0.000$ ($p < 0.05$). It is recommended for further research to conduct qualitative evaluation using prospective data.

© 2024, IJPSM All Rights Reserved, www.ijpsm.com

ISSN: 2519-9889
Impact Factor: 5.9

References

[1]. Almasdy, D., Sari, D. P., Suhatri, S., Darwin, D., & Kurniasih, N. (2015). Evaluation of antidiabetic drug use in patients with type-2 diabetes mellitus in a government hospital in Padang-West Sumatra. Journal of Pharmaceutical & Clinical Science, 2(1), 104-110.

[2]. Aslam, M., Tan, C.K., Prayitno, A. (2003). Clinical Pharmacy: Toward Rational Medicine and Patient Respect, 321, PT ElexMedia Komputindo, Gramedia group, Jakarta.

[3]. Gyssens, I. C. (2005). Audits for monitoring the quality of antimicrobial prescriptions. In Antibiotic Policies: Theory and Practice (pp. 197-226). Boston, MA: Springer US.

[4]. Hendiyani, R., Arozal, W., & Ramadaniati, H. U. (2021). Evaluation of antibiotic use in neonate sepsis patients at Hospital X Purwakarta. Indonesian Journal of Pharmacy and Pharmaceutical Sciences, 8(3), 217.

[5]. Hartiningrum, I., & Fitriyah, N. (2019). Low Birth Weight Infants (LBW) in East Java Province in 2012-2016. Journal of Biometrics and Population, 7(2), 97.

[6]. Juwita, D. R., Indrawati, D. H., Soleha, F. N., & Putri, I. N. (2023). Evaluation of antibiotic use in neonates in the NICU of Banyumas regional government-owned general hospital. Sasambo Journal of Pharmacy, 4(2), 63-68

[7]. Jaya, I. G., Bikin Suryawan, I. W., & Pramitha Rahayu, P. (2019). The relationship between prematurity and the incidence of neonatal sepsis treated in the perinatology room and neonatal intensive care unit (NICU) of Wangaya Hospital, Denpasar city. Medical Science Digest, 10(1).

[8]. Karyanti, M. R., & Faisha, K. (2022). Evaluation of Antibiotic Use with the Gyssens Method in Infectious Diseases and Bacterial Sensitivity Patterns in the Pediatric Inpatient Room of Cipto Mangunkusumo Hospital. Sari Pediatri, 23(6), 374-82.

[9]. Ministry of Health of the Republic of Indonesia. Regulation of the Minister of Health of the Republic of Indonesia No. 7 of 2022 concerning Hospital Accreditation Standards.

[10]. Ministry of Health of the Republic of Indonesia. Regulation of the Minister of Health of the Republic of Indonesia No. 7 of 2011 concerning Rational Drug Use Module.

[11]. Ministry of Health of the Republic of Indonesia. Regulation of the Minister of Health of the Republic of Indonesia No. 28 of 2021 concerning Guidelines for the Use of Antibiotics.

[12]. Indonesian Ministry of Health. 2020. Guidelines for Pregnant Women, Postpartum Women, and Newborns During Social Distancing. Jakarta: Indonesian Ministry of Health

[13]. Mufarrihah, M., Andayani, T. M., & Suparniati, E. (2016). Cost of Neonatal Patient Care Jkn Hospitalization at the Central General Hospital. Journal of Management and Pharmacy Practice, 6(2), 101-114.

[14]. Nastiti, N. S., Puspitasari, I., & Nurulita, N. A. (2023). Evaluation of the Pattern and Rationality of Antibiotic Use in Neonate Patients in the NICU and Perinatal Room of Banjarnegara Regional Hospital. Indonesian Journal of Pharmacy, 12-19.

[15]. Ogawa, M., Matsuda, Y., Kanda, E., Konno, J., Mitani, M., Makino, Y., dkk., 2013. Survival Rate of Extremely Low Birth Weight Infants and Its Risk Factors: Case-Control Study in Japan. ISRN Obstetrics and Gynecology, 2013: 1-6.

[16]. Sharma, D., & Murki, S. (2021). Making neonatal intensive care: cost effective. The Journal of Maternal-Fetal & Neonatal Medicine, 34(14), 2375-2383.

[17]. WHO. (2006). Neonatal and perinatal mortality: country, regional and global estimates. Geneva Switzerland, World Health Organization. h.1- 27.

© 2024, IJPSM All Rights Reserved, www.ijpsm.com