THE QUALITY OF ANTIBIOTIC USE AMONG PATIENTS FROM INTERNAL MEDICINE AND SURGICAL SERVICE

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ABSTRACT

It is well-known that hospitals are health facility with the widely use of antibiotics. It is about 13-37% from the total hospitalized patients in developed countries use antibiotic, even in developing countries can reach 30-80%. There is identified correlation between antibiotic use and the development of bacterial resistance. Even though the resistance cannot be eliminated, but its development can be suppressed by the increasing of prudent use of antibiotics. The aim of this study was to determine the quality of antibiotic use on internal medicine and surgical patients in Aisiyah Hospital Bojonegoro. The study was a prospective cross sectional observational analytical study of among patients of internal and surgical who received antibiotic therapy in the period of August - September 2017. The total 50 samples were collected in this study which consists of 33 internal medicine and 17 surgical patients. From 50 samples, there were 16 types of antibiotics with the total use of 81 of antibiotic use. As the result, in internal medicine patients there were 22 (40%) of appropriate use of antibiotics, 4 (7.27%) of inappropriate use and 29 (52.73%) use of antibiotics without indication. In surgical patients, there were 12 (46.15%) of appropriate use of antibiotics, 2 (7.69%) of inappropriate use and 12 (46.15%) use of antibiotics without indication. This study showed that more than 50% of antibiotic use were inappropriate, and mainly antibiotic with no indication, among patients hospitalized in Aisyiyah Hospital Bojonegoro.

Keywords: ASA; qualitative antibiotic use; prudent; infection

ABSTRAK

Rumah sakit merupakan sarana kesehatan yang banyak menggunakan antibiotik. Sekitar 13-37% dari total pasien rawat inap di negara maju menggunakan antibiotik, bahkan di negara berkembang bisa mencapai 30-80%. Ada korelasi yang teridentifikasi antara penggunaan antibiotik dan perkembangan resistensi bakteri. Meskipun resistensi tidak dapat dihilangkan, namun perkembangannya dapat ditekan dengan peningkatan penggunaan antibiotik. Tujuan penelitian ini adalah untuk mengetahui kualitas penggunaan antibiotik pada pasien penyakit dalam dan bedah di RS Aisiyah Bojonegoro. Penelitian ini merupakan penelitian analitik observasional prospektif cross sectional pada pasien internal dan bedah yang mendapat terapi antibiotik pada periode Agustus - September 2017. Jumlah sampel yang dikumpulkan dalam penelitian ini sebanyak 50 orang yang terdiri dari 33 penyakit dalam dan 17 pasien bedah. Dari 50 sampel didapatkan 16 jenis antibiotik dengan total penggunaan 81 antibiotik. Hasilnya, pada pasien penyakit dalam terdapat 22 (40%) penggunaan antibiotik yang tepat, 4 (7,27%) penggunaan yang tidak tepat dan 29 (52,73%) penggunaan antibiotik tanpa indikasi. Pada pasien bedah, terdapat 12 (46,15%) penggunaan antibiotik yang tepat, 2 (7,69%) penggunaan yang tidak tepat dan 12 (46,15%) penggunaan antibiotik tanpa indikasi. Penelitian ini menunjukkan bahwa lebih dari 50% penggunaan antibiotik tidak tepat, terutama antibiotik tanpa indikasi, pada pasien yang dirawat di RS Aisyiyah Bojonegoro.

Kata kunci: penggunaan antibiotik kualitatif; bijaksana; infeksi

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INTRODUCTION

Infectious diseases are among the top ten diseases in Indonesia. The non-prudent use of antibiotics will impact the high risk resistance development of bacteria. Hospitals are health facility with the widely use of antibiotics (WHO 2012, Ministry of Health 2011). There is a correlation between antibiotic usages with bacterial resistance development which cause nosocomial infection. The resistance cannot be eliminated but its development can be suppressed by the increasing the prudent use of antibiotics. Resistance has a broad impact such as increasing the risk of morbidity, mortality, and cost (Ministry of Health 2011).

Prudent use of antibiotic rare referred from several criteria such as right indication, right patient, right drug, appropriate dose regimen andalert for drug side effects (Reksoprawiro 2009). Other terminology indicates that the prudent use of antibiotics is the use of antibiotics which suitable with infectious agents, dose regimens, optimal duration of therapy, minimum side effects, and minimum bacterial resistance effects (Gyssens 2017, Hadi et al 2008, Permenkes 2015). This study was conducted in Aisyiyah Hospital Bojonegoro. This study focuses on the analysis of the antibiotic use, measure by Gyssens method.

MATERIALS AND METHODS

This study was a prospective cross sectional observational analytical study which conducted in Aisyiyah Hospital Bojonegoro during the period of August to September 2017. The respondents were the patient hospitalized in internal medicine and surgical that received antibiotic therapy. The total 50 samples were included in this study which consists of 33 internal medicine patients and 17 surgical patients.

Observations were conducted on clinical conditions, medical records and medication records of the patients. Then, data were collected and extracted on the data record form (CRF) which included patients' demographic data (name, sex, age), clinical data and patients' laboratory data (date of get in/get out, diagnosis, WBC, temperature, pulse, complication of other co morbidities in patients) and antibiotic therapy given (date of administration, type, dose, route, interval and duration of antibiotics). In addition to the forms of data collection sheets, there is also a form used to conduct an analysis of the use of antibiotic therapy. Analysis of antibiotic therapy use was performed for all antibiotics which used during the treatment and synchronized with the we diagnosis in the medical record status. Criteria of antibiotics use assessment are using Gyssens method.

RESULTS

From 50 total samples were obtained 33 samples of internal medicine patients consisting of 16 (48.5%) male patients and 17 (51.5%) female patients, with the insured patients status who without insurance were 23 (69.7%) patients, it was more than patients with BPJS insurance were 10 (30.3%) patients. The age majority between 18-65 years old as many as 28 (84.8%) patients. Whereas from 17 respondents of surgery patients there were 10 (58.8%) male patients and 7 (41.2%) female, with the insured patients' status who without insurance were 13 (76.5%) patients more than patients who use BPJS insurance were 4 (23.5%) patients, with age mainly between 18-65 years old counted 15 (88.2%) patients.

Clinical data and laboratory data profiles were presented in the table 1. The clinical data such as: temperature, heart rate and respiratory rate. Meanwhile, laboratory data that observed were white blood cell and erythrocyte sedimentation rate (ESR). Only 31 respondents from all samples were conducted respiratory check in medical record and 17 samples were checked the ESR.

Table 1. Clinical data and laboratory data characteristics on internal medicine and surgical patients in the period of study

Checking Type	Frequency (n = 50)	Percentage
Temperature		
• ≤ 35	0	0%
• 36-38°C	46	92%
• > 38°	4	8%
Heart rate		
• 60 – 90	19	38%
• > 90	31	62%
Respiration (RR)* (n = 31)		
• ≤ 20	24	48%
• > 20	7	14%
• No Data	19	38%
WBC		
• < 4000/mm^3	0	0%
• 4000 – 12000/mm^3	28	56%
• > 12000/mm^3	22	44%
Erythrocyte Sedimentation Rate ** (n = 19)		
• Normal (male 0 – 15 mm/hour and female 0 – 20 mm/hour)	2	4%
• Abnormal (male > 15 mm/hour and female > 20 mm/hour)	17	34%
• No Data	31	62%

Table 2. The result of quality analysis on antibiotic use for internal medicine and surgical patients with Gyssens method

	Category	Ward/Health Service		
		Internal Medicine	Surgical	Total Use
VI	Incomplete data/cannot be evaluated	-	-	-
V	No indication of antibiotic use	29	12	41
IV	There are another antibiotic which is more effective/less toxic/less expensive/narrower spectrum	3	-	3
III	Antibiotic therapy duration is long/too short	1	2	3
II	Antibiotic use is in inappropriate dose/administration interval/administration route	-	-	0
I*	Antibiotic use in inappropriate time	-	-	0
0	Antibiotic use in appropriate	22	12	34
Total		55	26	81

Note: Category I: for prophylaxis, was excluded in this study

Among 50 samples, the total 16 types of antibiotic were used, which were total of 81 antibiotic were used (one patients can use of more than 1 antibiotic). The quality of antibiotic use in internal medicine patients were 29 (52.73%) of antibiotic use without indication (criteria V), 3 (5.45%) of inappropriate efficacy of antibiotic use/there were less toxic/less expensive/narrower spectrum (category IV), 1 (1.82%) of long duration of antibiotic use/short duration (category III), and 22 (40%) of appropriate antibiotic use (criteria 0). Meanwhile, in surgical patients, it were obtained 12 (46.15%) of antibiotic use without indication (criteria V), 2 (7.69%) of long duration of antibiotic use/short duration (category III) and 12 (46.15%) of appropriate antibiotic use (criteria 0) (Table 2).

From 16 antibiotic types that used in these patients, the highest appropriate use criteria was metronidazole in 9 (11.11%) and antibiotic with the highest inappropriate indication administration criteria was ceftriaxone in 17 (20.98%). In the internal medicine patients, antibiotic with the highest appropriate use criteria was metronidazole in 4 (18.18%) and antibiotic with the highest inappropriate indication administration criteria was ceftriaxone in 11 (37.93%) (Table 3).

Similarly, in the surgical patients, antibiotic with the highest appropriate use criteria was metronidazole in 4 (33.33%) and antibiotic with the highest inappropriate indication administration criteria was ceftriaxone in 6 (50%) (Table 4).

Table 3. The distribution of the quality of antibiotic use (Gyssens criteria) among patient internal medicine in Aisyiyah Hospital Bojonegoro

Antibiotic Type	Gyssens Flow							Total
	VI	V	IV*	III*	II*	I	0	
Amikacin		1						1 (1.82%)
Gentamicin								0 (0%)
Ciprofloxacin		4		1			3	8 (14.55%)
Levofloxacin		1						1 (1.82%)
Meropenem		1	2					3 (5.45%)
Cefuroxime		1						1 (1.82%)
Cefixime		2						2 (3.64%)
Cefotaxime								0 (0%)
Ceftizoxime		3						3 (5.45%)
Cebactam							1	1 (1.82%)
Ceftriaxone		11	1				4	16 (29.09%)
Cefepime		5					4	9 (16.36%)
Metronidazole							4	4 (7.27%)
Rifampicin							2	2 (3.64%)
Ethambutol							2	2 (3.64%)
Isoniazid							2	2 (3.64%)
Total	0	29 (52.73%)	3 (5.45%)	1 (1.82%)	0	0	22 (40%)	55 (100%)

Table 4. The distribution of the quality of antibiotic use (Gyssens criteria) among patient surgical in Aisyiyah Hospital Bojonegoro

Antibiotic Type	Gyssens Flow							Total
	VI	V	IV	III	II	I	0	
Amikacin		1					1	2 (7.69%)
Gentamicin		1						1 (3.85%)
Ciprofloxacin								0 (0%)
Levofloxacin							1	1 (3.85%)
Meropenem								0 (0%)
Cefuroxime								0 (0%)
Cefixime								0 (0%)
Cefotaxime		1					1	2 (7.69%)
Ceftizoxime		1						1 (3.85%)
Cebactam								0 (0%)
Ceftriaxone		6		2			3	11 (42.31%)
Cefepime		1					2	3 (11.54%)
Metronidazole		1					4	5 (19.23%)
Rifampicin								0 (0%)
Ethambutol								0 (0%)
Isoniazid								0 (0%)
Total	0	12 (46.15%)	0	2 (7.69%)	0	0	12 (46.15%)	26 (100%)

Note: Category IV was included IV[a,b,c,d]; category III was included III[a,b]; category II was included II[a,b,c]

DISCUSSION

The study indicated 16 antibiotic types with total antibiotic use in all respondents is 81 times of antibiotic use. The antibiotic use in internal medicine patients was 55 (68%), while the rest 26 (32%) was in surgical patients. Qualitative analysis on antibiotic use by using Gyssens method was confirmed with reviewers (microbiologist and physician in infection specialist). Analysis result then were grouped in 4 categories: appropriate antibiotic use (category 0), inappropriate antibiotic use (category II-IV), without indication antibiotic use (category V) and incomplete data (category VI). From all analysis results of antibiotic use, it indicated that appropriate antibiotic use was 34 (41.97%), inappropriate antibiotic use was 6 (7.41%) and without indication antibiotic use was 41 (50.62%) (Table 2).

Analysis in the internal medicine patients (Table 2) obtained 22 (40%) of appropriate antibiotic use, 4 (7.27%) of inappropriate antibiotic use and 29 (52.73%) of without indication antibiotic use. Analysis in the surgical patients (Table 3) obtained 12 (46.15%) of appropriate antibiotic use, 2 (7.69%) of inappropriate antibiotic use and 12 (46.15%) of without indication antibiotic use. It showed that the antibiotic use with no indication took place in the highest prevalence.

There were similar with the study AMRIN, the year 2000-2004 (Hadi et al 2008). AMRIN study showed that antibiotic use without indication was 55-80% in RSUD Dr Soetomo, while, 20-53% in RSUP Dr Kariadi (Hadi et al 2005). This study showed that 42% cases of antibiotic use was with no indication, 15% cases was inappropriate antibiotic use and 21% cases was appropriate antibiotic use. Analysis result on internal medicine department showed 19% of the case was antibiotic use without indication in RSUD Dr. Soetomo, on the contrary in RSUP Dr. Kariadi was 47% cases. Analysis result on surgery department known 47% use without indication in RSUD Dr. Soetomo, while in RSUP Dr. Kariadi were 45% cases (Hadi et al 2008).

The high prevalence of antibiotic use with no indication (50.62%) in this study showed that higher than the previous studies. Moreover, the case of antibiotic use no indication in internal medicine patients (in this study) was 50.2% whereas it was higher 31.2% compared to the percentage of antibiotic use with no indication in internal medicine patients medicine of RSUD Dr Soetomo (Hadi et al 2008).

Even antimicrobial resistance control program (ARCP) has been strated since 10 years ago, it was still identify the higher use of antibiotic with no indication. It would

be the program was not reach the district hospital. The efforts to prevent antibiotic resistance are prudent use of antibiotics and preventing the spread of resistant bacteria (Hadi et al 2006). The inter-professional collaboration including clinical microbiology, clinical pharmacy, pharmacy and therapeutic committee, and infection control committee, were needed for optimal program of ARCP (Hadi et al 2013).

A pharmacist should have an active role in selecting antibiotics administration for the patients. Pharmacist should also be a partner for the clinician (doctor) and willingly to provide consultations regarding the use of antibiotics (Hadi et al 2013). Policy to use antibiotics wisely is essential for the control of antibiotics resistance. The policy is generally characterized by restriction of antibiotics use for certain indications and within a certain time limit. It may be contained in antibiotics use guidelines in a hospital (Hadi et al 2006). Antibiotics use guidelines are not available in Aisyiyah Hospital Bojonegoro yet, generally the administration of antibiotics in hospitals wass based on clinical consideration of each physician who gives the treatment.

Up till now, there is no facility of microbiology laboratory in Aisyiyah Hospital Bojonegoro, whereas clinical microbiology has a role of providing services and consultation of microbiology and infection management (Hadi et al 2013). This situation to becomes handicap to determine the right type of antibiotic for each of the patient who has the infection. Additionally, there is no data related to antibiogram in this hospital which lead to no consideration for selecting the empirical antibiotics.

The results of quality analysis of antibiotic use in this study encourage the preparation and implementation of antibiotic use guidelines. The prudent use of antibiotic aims to optimize therapeutic effects, minimize the risk of resistant bacteria occurrence and maintain the value of the existence of antibiotic classes, where the application requires a restriction policy of antibiotic use.

CONCLUSION

From the result of quality analysis on antibiotic use for internal medicine patients, it obtained 29 antibiotic uses (52.73%) was without indication (criteria V), on the contrary, for surgical patients obtained 12 antibiotic uses (46.15%) was without indication (criteria V). This study will be based for the further intervention for improving the quality of antibiotic use in in Aisyiyah Hospital Bojonegoro.

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