Treatment patterns of acute respiratory tract infection in children under-fives in Bogor, Indonesia

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Abstrak

Latar Belakang: *Penggunaan obat yang tidak rasional menjadi masalah dalam pelayanan kesehatan, baik di negara maju maupun negara berkembang. Pengobatan Infeksi Saluran Pernafasan Akut (ISPA) tidak hanya tergantung pada antibiotik, tetapi dengan terapi penunjang untuk kasus yang disebabkan oleh virus. Penelitian ini bertujuan untuk mengidentifikasi pola pengobatan pasien ISPA pada balita di rumah sakit di Bogor, Indonesia.*

Metode: *Penelitian ini dilakukan dengan desain potong lintang menggunakan data rekam medis pasien balita dengan ISPA periode 1 Januari hingga 31 Desember 2015 di rumah sakit pemerintah dan swasta di Bogor. Analisis dilakukan dengan menggunakan uji Chi-Square.*

Hasil: *Rekam medis yang yang dikumpulkan dari kedua rumah sakit sebanyak 105 kasus. Pola pengobatan pada pasien ISPA rawat jalan (n=32) di rumah sakit swasta adalah mukolitik (81,3%), dekongestan (56,3%), antipiretik (43,8%), dan antibiotik (6,3%). Sementara itu, rumah sakit pemerintah (n=8) menggunakan antibiotik (75%), antipiretik (50%), dan mukolitik (50%). Pola pengobatan pada rawat inap di rumah sakit swasta (n=27) adalah antibiotik (85,2%), antipiretik (63%), kortikosteroid (33,3%), dan mukolitik (25,9%), sedangkan rumah sakit pemerintah (n=38) adalah antibiotik (92,1%), antipiretik (89,5%), kortikosteroid (31,6%), dan mukolitik (71,1%). Faktor-faktor yang mempengaruhi pengobatan pada rawat jalan tidak dapat diidentifikasi karena kurangnya informasi klinis dan hasil tes laboratorium. Pemberian antibiotik pada pasien rawat inap di kedua rumah sakit tidak berhubungan dengan kadar leukosit dan suhu tubuh.*

Kesimpulan: *Penelitian ini menunjukkan bahwa penggunaan antibiotik untuk ISPA belum sesuai dengan pedoman klinis yang pemberiannya harus didahului dengan pemeriksaan klinis dan mikrobiologis. Kepatuhan terhadap pedoman klinis sangat penting untuk mencegah terjadinya resistensi antibiotik dan mengurangi terjadinya reaksi obat yang tidak diinginkan.* ***(Health Science Journal of Indonesia 2020;11(1):9-14)***

Kata kunci**:** *Anak, antibiotik, infeksi saluran pernafasan akut, pengobatan*

Abstract

Background: Irrational use of medicines has become a problem in health services, both in developed and developing countries. Treatment of Acute Respiratory Tract Infections (ARTIs) is not only dependent on antibiotics, but only with supportive treatment for cases caused by viruses. This study aimed to determine treatment patterns for children under-fives with ARTIs in hospitals in Bogor, Indonesia.

Methods: A cross-sectional study was conducted using medical records of patients under-fives with ARTIs in a government and a private hospital in Bogor from January 1st to December 31st, 2015. The analysis was performed using Chi-square test.

Results: There were 105 medical records collected from both hospitals. The pattern of ARTIs' outpatient treatments (n= 32) at private hospital were mucolytic (81.3%), decongestants (56.3%), antipyretic (43.8%), and antibiotics (6.3%). Meanwhile, the government hospital (n=8) used antibiotics (75%), antipyretics (50%) and mucolytic (50%). The pattern of ARTIs inpatient treatments in private hospitals (n=27) were antibiotics (85.2%), antipyretic (63%), corticosteroids (33.3%), and mucolytics (25.9%). Otherwise, the government hospital (n=38) used antibiotics (92.1%), antipyretic (89.5%), corticosteroids (31.6%) and mucolytics (71.1%). Factors affected outpatient treatment could not be traced because it lacked clinical information and laboratory test results. Meanwhile, antibiotic use for inpatients in both hospitals was not related to blood leukocytes level and body temperature.

Conclusion: This study showed that antibiotics prescribing for ARTIs is still not in accordance with the clinical guidelines that must be preceded by various clinical examinations and microbiological. Adherence to clinical guidelines is important to prevent antibiotic resistance and to decrease adverse effects. ***(Health Science Journal of Indonesia 2020;11(1):9-14)***

Keywords: Acute respiratory tract infections, antibiotics, children, treatment

Acute respiratory tract infections (ARTIs) is a common disease that becomes a problem in developing countries.[1] ARTIs was defined as acute respiratory infections caused by an infectious agent which is transmitted from human to human.[2] Lower respiratory infections was the third leading cause of under-fives mortality worldwide and second leading cause of disability-adjusted-life-years.[2] Based on National Basic Health Reseach in 2018, ARTIs prevalence was higher in age group of under-fives children (7.8%). West Java has higher prevalence of ARTIs in under-fives children than national prevalence average (8.2%). Population characteristics with highest ARTIs were occurred in under-fives children (25.8%).[4]

There are several factors related to acute respiratory infections include nourished children, inadequate breast feeding, poor immunization status, attendance to daycare centers, large family size, poor parental educational status, parental smoking, living in the urban area and use of biofuels.[5]

Kinds of ARTIs that need antibiotics are bacterial pharyngitis caused by *Streptococcus pyogenes*, pneumonia and acute sinusitis caused by *Streptococcus pneumoniae.*[6] Some cases of ARTIs are caused by viruses, approximately, 35-87 percent of children with ARTIs are caused by viral infections and viral co-infections occurred in 4-33 percent of children hospitalized with ARTIs.[7,8] ARTIs that caused by viruses do not require antibiotics, but only supportive treatment.[9] It reduces symptoms and improves patient performance[10]. On the other hand, prescribing antibiotics for ARTIs is still become a common behavior among physician.[11]

In Indonesia, antibiotics prescribing for viral infection is still a lot. Irrational use of antibiotics rising bacterial resistance to antibiotics and drugs side effect.[12] Based on a study in Indonesia, 3.3 percent of pediatric patients were given antibiotics without indication.[13] This study aimed to determine treatment patterns for children under-fives with ARTIs in hospitals in Bogor, Indonesia, especially in private and government hospitals.

METHODS

This cross-sectional was conducted from March to October 2016 in a private hospital and a government hospital in Bogor, Indonesia. Data were collected from medical records among patients under-fives with ARTIs only (without other diagnoses) in those hospitals from January to December 2015. Sample calculation for this study used total sampling which met inclusion and exclusion criteria.

Inclusion criteria for the study were children aged 0-5 years old, had symptoms of pain including fever, cough, and also sore throat, runny nose, shortness of breath, or difficulty breathing, patients without other infection or underlying diseases.

Exclusion criteria for the study were incomplete medical records e.g. no medicines were recorded, immune deficiency, chronic disease e.g. liver, patient referral from other hospitals. The data which are taken for this study were sex, age, doctor in charge, funding source, diagnosis, leucocyte level, body temperature, and medicines.

Sex was divided into male and female. Children's age was divided into five categories: 0-12; 13-24; 25-36; 37-48; 49-60 months. Doctor in charge was categorized into three categories: pediatrician, ENT specialist, and general practitioner. Funding source was categorized into out of pocket, National Health Security (NHS), private insurance, company, and data not available (NA). Diagnosis was classified into Upper Respiratory Tract Infection (URTI), and Lower Respiratory Tract Infection (LRTI) according to the involved anatomic localization. These diagnoses were defined by professional health workers. Leucocyte count was categorized into three categories: high (>10,000 cell/µl blood), normal (4,000-10,000cell/µl blood), and no data available. Body temperature was divided into febrile, normal, and no data available.

Patient characteristics and other variables were analyzed using descriptive statistics. Chi-square test was used to determine selected factors related to antibiotic prescribing. The data were analyzed using Statistical Package for Social Sciences version 16 (SPSS).

Ethical approval for this study was obtained from Ethics Comittee of National Institute of Health Research and Development, Ministry of Health Republic of Indonesia number LB.02.01/5.2/ KE.138/2016. Permission from relevant authorities in connection with this study was sought before conducting the study.

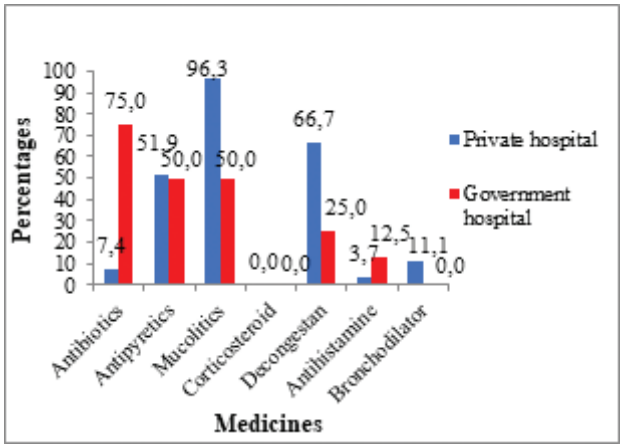
RESULTS

The total number of patients (Table 1) was 105 patients including 40 outpatients and 65 inpatients from both hospitals. The government hospital had 46 cases whereas the private hospital had 59 cases that met inclusion and exclusion criteria. About 65 percent of outpatients were male and 47.5 percent of children were 0-12 months old. Most outpatients were treated by pediatricians (95%), 10.8 percent of funding source was derived from out of pocket or personal expenses, most of them were diagnosed as URTI.

There were 60 percent of inpatients were male, and most of them were children 0-12 months old. Pediatricians were the main doctor who treated inpatients. About 58.5 percent of funding source of inpatients were NHS. Most the inpatients were diagnosed as URTI.

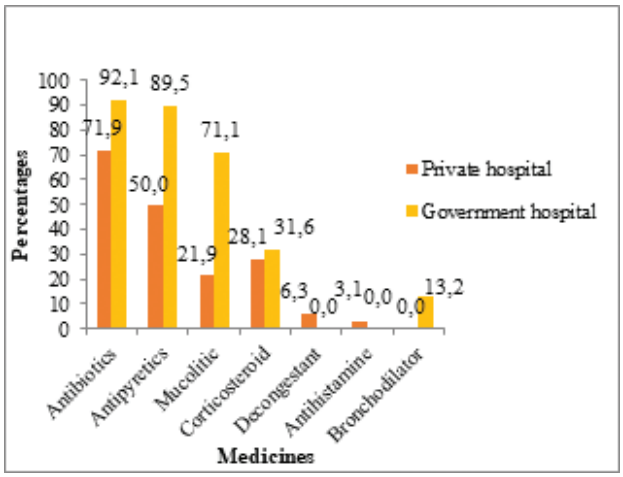
Table 1. Characteristics of Subjects with ARTIs (n=105)

	Inpatients			
	n	%	n	%
Hospital				
Government	8	20.0	38	58.5
Private	32	80.0	27	41.5
Sex				
Male	26	65.0	39	60.0
Female	14	35.0	26	40.0
Age (months)				
0-12	19	47.5	18	27.7
13-24	11	27.5	15	23.1
25-36	4	10.0	12	18.5
37-48	5	12.5	11	16.9
49-60	1	2.5	9	13.8
Doctor in charge				
Pediatrician	38	95.0	60	92.3
ENT specialist	0	0.0	2	3.1
General Practitioner	2	5.0	3	4.6
Funding source				
Out of pocket	4	10.8	20	30.8
NHS	3	8.1	38	58.5
Private insurance	0	0.0	3	4.6
Company	0	0.0	2	3.1
NA	33	89.2	2	3.1
Diagnosis				
URTI	40	100.0	35	74.5
LRTI	0	0.0	12	18.5
Leucocytes count				
High	1	3.0	45	71.4
Normal	2	6.1	17	27.0
NA	30	90.9	1	1.6
Body temperature				
Febrile	4	11.8	36	55.4
Normal	2	5.9	26	40.0
NA	28	82.4	3	4.6



Graph 1. Treatment Pattern of Outpatients with ARTIs

Graph 1. figured treatment patterns for outpatient. It showed that the private hospital prescribed more mucolitics than government hospital for outpatients. Nevertheless, government hospital prescribed more antibiotics than private hospital for outpatients.



Graph 2. Treatment Pattern of Inpatients with ARTIs

Graph 2 figured that government hospitals prescribed more antibiotics, antipyretics, and mucolitics than private hospitals. Antibiotics were the first in rank of inpatient prescribing, while antypiretics were the second in rank of inpatient prescribing.

Table 2 showed that type of hospital, patients' sex, type of doctors, funding sources, leucocytes level, and body temperature were not related to antibiotics prescribing for inpatients. Chi-square test showed that p-values for all variables are more than 0.05, which means there were no different proportions between each groups. So, the table showed there was no association between those variables with antibiotic prescribing.

Table 2. Several Factors of Inpatients Who Received Antibiotics

	Antibiotic				p value
	No (n=7)		Yes (n=58)		
	n	%	n	%	
Hospital					
Government	3	7.9	35	92.1	
Private	4	14.8	23	85.2	0.437
Sex					
Male	5	12.8	34	87.2	
Female	2	7.7	24	92.3	0.693
Doctor in charge					
General practitioner	0	0.0	3	100.0	
Pediatrician	7	11.7	53	88.3	
ENT Specialist	0	0.0	2	100.0	0.552
Funding source					
Out of pocket	2	10.0	18	90.0	
Private insurance	1	33.3	2	66.7	
NHS	3	7.9	35	92.1	
NA	0	0.0	2	100.0	0.429
Leucocytes level					
High	4	8.9	41	91.1	
Normal	3	17.6	14	82.4	
NA	0	0.0	1	100.0	0.573
Body temperature					
High	3	8.3	33	91.7	
Normal	4	15.4	22	84.6	
NA	0	0.0	3	100.0	0.487

DISCUSSION

Most of the patients in both hospitals were male. This finding was similar from the study in India and Bangladesh that ARTIs are often found in male than female.[1,14] ARTIs is more severe and lead to higher mortality in males than females. Females have higher incidence of URTIs than males. Otherwise, males have higher chance of developing LRTIs than females. Various differences between male and female such as anatomic, immune response, lifestyle, behavioral, and socioeconomics may affect this findings.[15–17]

The age group affected most was 0-12 and 13-24 months. This is similar to the study in Southeast Nigeria. This can be caused by exposure to some risk factors, such as decreasing breast feeding that can reduce passive maternal immunity.[5]

This study showed that antibiotics were still prescribed for outpatient and inpatients. Study in Saudi Arabia also showed that antibiotics were still prescribed for outpatient. This can be occurred by severity of infections such as high fever and congested throat or due to doctor's consideration that it can relief disease symptoms in the initial clinical features.[18]

In this study, antibiotics use was relatively higher in government hospital than private hospital. This may be occurred due to government hospital got more severe patients than private hospital. Study in Malaysia showed that doctors in public clinics faced more chronic and complex illness than in private clinics.[19] Study in Nigeria showed that over-prescription of antibiotics for under-fives children was occurred among Nigerian pediatric prescribers.[20] Study in Malaysia also showed that 31.8% of URTI prescriptions contained antibiotics. It also described that there was an association between different prescribers and diagnoses and there was a suggestion that medicine specialist are more competent in antibiotic prescribing.[21] Unnecessary use of antibiotics should be minimized to increase patient's benefit.[18] Although medical records data used in this study did not explain the type of cough, all patients with cough symptoms were given mucolytics. Mucolytic such as ambroxol, bromhexine, carbocycteine, and erdosteine, were used to relieve cough symptoms by reducing mucus elimination.[22]

This study showed that there is no association between body temperature and antibiotic prescribing. A similar study showed that the higher temperature, the more severe the throat congestion, and the presence of exudates on pharynx, the higher the likelihood to prescribe antibiotic.[18] The difference was probably due to different characteristics of subjects and setting area.

In Indonesia, the proportion of antibiotic use in hospitals was 84 percent including high inappropriate use of antibiotics. Overprescribed antibiotics are found in respiratory infections especially acute URTIs, although most are caused by viruses. It may be happened because of the over expectation of clinicians on antibiotics to prevent secondary infection caused by bacteria. Before starting therapy with antibiotics, it is very important to be sure whether the infection exists. This is due to several conditions that can provide symptoms similar to infection. Antibiotic prescribing must be proceeded by a clinical examination of Ear, Nose, and Throat (ENT), microbiological examination (bacterial culture), and other support examination.[10]

Overused of antibiotic may lead to increased prevalence of antibiotic resistance, cost, and incidence of adverse effect.[23,24] Indonesia's program to contain antimicrobial resistance (AMR) is in the early phase of implementation. National support such as funding is still needed to strengthen it.[25] Prescriber's compliance with

clinical guideline is also needed to prevent irrational use of antibiotics[26]. There are several advice for clinicians: do not use antibiotic therapy for bronchitis without suspect pneumonia; patient with streptococcal pharyngitis should be treated with antibiotics; patients with persistent symptoms of acute rhinosinusitis should be treated with antibiotics for more than 10 days; patients with common cold should not be given antibiotics.[27] Antimicrobial stewardship programs must also be implemented to improve antibiotic use in hospitals.

This study had several limitations that should be considered. The data was a retrospective data derived from medical records from two hospitals in Bogor that may raise potential biases and error. The results can not be applied generally in population. Factors affected outpatient treatment could not be traced because it lacked clinical information and laboratory test results including bacterial cultures. The small number of patients in this study could be because most patients with ARTIs went to primary health cares according to the national health insurance policy.

In conclusion, antibiotics prescribing for ARTIs is still not in accordance with the clinical guidelines that must be preceded by various clinical examinations and microbiological. Adherence to the clinical guidelines is important to prevent antibiotic resistance and to decrease the adverse effects.

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