Antibiotic prescription practices in six primary health centers in South Sumatra

Sjamsuir Munaf

Abstrak

*Telah dilakukan studi penggunaan obat secara rasional, khususnya penggunaan antibiotika pada pasien-pasien infeksi saluran nafas akut dan diare akut di 6 Puskesmas (PKM) di daerah-daerah perkotaan, pinggir kota dan pedusunan di Propinsi Sumatra Selatan. Sampel diambil secara acak sebanyak 15% dan proporsional dengan jumlah pasien berobat jalan di tiap PKM, selama periode 3 bulan (Januari s/d Maret 1997). Karakteristik pasien, diagnosis, dan jumlah serta tipe obat (termasuk obat suntik) dicatat dalam coding sheet" untuk selanjutnya dilakukan analisis. Didapatkan 1781 kasus, dengan jumlah rata-rata obat per resep 2.7; persentase kasus yang diberi suntikan adalah 47%; dan persentase pasien yang mendapat antibiotika adalah 49%. Enam puluh empat persen dari 1277 kasus infeksi saluran nafas atas akut, dan 79% dari 140 kasus diare akut diberi antibiotika. Studi ini menunjukkan bahwa terdapat penggunaan obat yang tidak rasional (berlebihan) yang jelas terlihat pada kasus-kasus infeksi saluran nafas atas akut dan pada kasus-kasus diare akut. (**Med J Indones 2004; 14: 44-9**)*

Abstract

*Drug utilization study, especially antibiotic usage in therapy of mild acute upper respiratory infections and acute diarrheas has been conducted in six Primary Health Center (PHC) in urban, suburban and rural area in the Province of South Sumatra. We conducted systematic random sampling during which 15% of patients in each PHC were taken. We collected information about drug utilization from medical record of out patient in each PHC for three months period (January to March 1997). We recorded the characteristics of patients, the diagnosis, the number and type of drug (including injection) used. The number of cases studied was 1781, with the average number of drug per prescription being 2.7; the percentage of cases receiving an injection was 43%, and the percentage of cases receiving antibiotic was 48%. Sixty-four percent of 1277 acute respiratory tract infections (common cold), and 79% of 140 cases of acute diarrhea received antibiotic. This study showed that there is overuse or inappropriate use of drugs, especially antibiotic for acute nonspecific diarrhea and mild acute respiratory tract infections. (**Med J Indones 2004; 14: 44-9**)*

Keywords: drug utilization study, antibiotic use, acute upper respiratory infection, acute diarrhea.

In both the developed and the developing countries, medical inappropriateness, inefficacy and economically inefficiency use of pharmaceuticals is commonly observed in health care facilities.[1-7] Problems of irrational used of drugs, especially antibiotics, have been widely recognized,[5,6] and there should be efforts for improvement.[2] Drug use is said to be irrational if it is employed when there is little likelihood that it will have a beneficial effect or when the anticipated benefit is not worth the potential harm or cost of the drug.[1] Basic contention of this article is that drugs are routinely overused in the practice of medicine.[5,6] This article presents an evaluation of drug utilization in daily practice in three areas of the Primary Health Center (PHC) in South Sumatra.

The objective of the study is to determine the pattern of drug use especially antibiotics in the therapy of acute upper respiratory infection and in acute diarrheal diseases. The pattern of antibiotics usage, can be use to determine the seriousness of irrational drug usage in health centers,[5] and as a basic data for future drugs utilization study. The results of this study will be benefit to inform policy makers in the health service in effort towards more rational use of drugs especially in health centers.

METHODS

This study was conducted in six PHC in three areas of South Sumatra, urban, suburban and rural. In each

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Department of Pharmacology, Faculty of Medicine, University of Sriwijaya, Palembang, Indonesia

area, 2 PHC had been selected. The selected PHC in urban area were located in main busy high ways with large amount of patients (80-120 per day). In Rural area, we selected PHC located at least 15 Km outside the regency capital. In this area no other health center or dispensary within a distance of 5 Km, so that the community demands on drugs only depended on prescription in the health center. This could represent most of regency in South Sumatra, with the small number of patient (20-40 per day). In Suburban area, the selected PHC were located between urban and rural area with the number of patient 40-80 per day.

We performed this study for three months period (January 2 to March 31, 1997). The sample size was estimated based on the number of patient in each PHC. *Systematic random sampling* ("*ordinal samples*") was applied to take 15% from all of patients. The pattern of utilization was obtained from "medical record" of outpatient using "coding sheet" form. Data recorded include name, age, sex, clinical diagnostic, sign and symptoms of diseases, and all of drugs and injection used.

Data were descriptively analyzed and presented in tabulation. The number of cases receiving antibiotics for acute diarrhea and mild acute upper respiratory infections ("common cold" or "cough and flue") were determined. The use of contraceptives drug and topical antibiotic is not included in this study.

Prescribing indicators

In this study, a number of indicators were used. The operational definitions of study variables (as indicator for rational drug use in this study) are:[8]

1. *Average number of Drugs Prescribed.* Total number of drugs divided by the number of encounters surveyed. A combination drug was counted as one. The purpose of this indicator is to describe the pattern of poly pharmacy, where more than one drugs are prescribe (often unnecessary) for a condition. Based on that definition, the rational used of drug is mono-therapy.

2. *Percent of patients receiving antibiotics.* Calculated by dividing the number of patient receiving antibiotic by the total number of patient surveyed, multiplied by 100. All the drug products containing penicillin and other antibacterial agents (including anti-infective dermatological and ophthalmologic agents) are included to be count as antibiotic.[8]

Use of antibiotics and injections are the important prescribing indicators. Purpose of these indicators is to measure the overall level of use of drugs. The rationality of these indicators depends on the appropriate diagnosis of disease. Rational used of antibiotics can be said if we can diagnosis an infectious disease. Examples of irrationals prescribed of antibiotics are: overuse of antibiotics for non-specific childhood diarrhea, and excessive use of antibiotics for treating mild acute respiratory infection.

3. *Percent of patients receiving injections.* The number of patient receiving injection divided by the total number of patient surveyed, multiplied by 100. Immunizations are not to be count as injections. Purpose of this indicator is to measure the level of used of drugs. Injection is an important prescribing indicator. Its commonly overused and costly forms of drug therapy. Examples of irrationals of prescribe of injection is indiscriminate uses of injection, e.g. in malaria treatment. The rational used of injections are: for immunizations, for acute situations (life saving), and for drug with no route of administration other than injections.

4. *Percentage of antibiotic used in acute upper respiratory infection.* The number of antibiotic prescribe divided by the total number of patients with upper respiratory infection, multiplied by 100.

5. *Percentage of antibiotic used in acute diarrhea.* The number of antibiotic prescribes divided by the total number of patients with diarrhea, multiplied by 100. The drug treatment of acute diarrhea is an interesting subject to study. The rationale used of antibiotics in acute diarrhea must be less than 10-15% of cases.[9]

RESULTS

During the study, 1781 cases were recorded from six Primary Health Centers in South Sumatra, and 4768 drugs are prescribed. The average number of drugs prescriptions per patient, percentage of injection, percentage of antimicrobial prescription, prevalence of antibiotic used in acute respiratory infection and in diarrhea diseases is presented in Table 1. Table 2 shows the types of antibiotics used in six PHC in South Sumatra. The most frequent anti-microbial used are group of penicillin, sulfonamide (consist of trisulfa, cotrimoxazole, sulfa guanidine), and tetracycline.

Table 3 present the prescribing pattern for acute diarrhea in adult and children. Sixty four percent of children under 8 years old were treated with injectable tetracycline, and 5% with oral tetracycline. Table 4 present anti-microbial used and average number of anti-microbial per case. Most of the cases have been prescribed with more than one anti-microbial.

The most prevalent disease in the six health centers are common cold (72%), followed by diseases of skin and sub-dermal tissue (47%), lower respiratory infections (14%), acute non-specific diarrheas (8%), oral cavity and teeth diseases (6%), and ear and mastoid diseases 4% (Table 5).

Table 1. Drug Utilization Study in Six Health Centers divided in Urban, Suburban and Rural Areas in South Sumatra

Items	Urban	Suburban	Rural	Total
Number of encounters	801	535	445	1781
Number of drug prescriptions	2163	1177	1380	4768
Average number of drugs per encounter	2.7	2.2	3.1	2.7
Number of Case receive injection	512	50	209	771
Percent of Cases receive injection	64 %	9 %	47 %	43 %
Number Cases receive antibiotics	342	220	296	858
Percent of Cases receive antibiotics	43 %	41%	67 %	48 %
Number of Cases of Mild ARI	606	390	728	1277
Number of Cases received antibiotics	465	174	181	820
Percent of Cases Receive Antibiotics	77 %	45 %	25 %	64 %
Number of Cases of Acute Diarrhea	63	29	48	140
Number of Cases Receive antibiotics	63	15	32	110
Percent of Cases Receive Antibiotics	100 %	52 %	67 %	79 %

Table 2.   Type of Antibiotic Use in 6 PHC

Types of Antibacterial	Number of Antibacterial Drug	Percent
Pen/Ampicillin Inj.	270	15 %
Ampicillin Oral	572	31 %
Chloramphinecol	83	5 %
Tetracycline Oral	223	12 %
Oxytetracycline Inj.	240	13 %
Sulfonamide	353	20 %
OSPEN*	35	2 %
Total	1776	100 %

*   Only found in pharmacy (not in PHC)

Table 3. Prescribing Pattern for Acute Diarrhea in Adult and Children ≥ 8 years Divided by Children < 8years old

Drug	Total Cases (n=140)	Percent	Adult and children ≥ 8 years	Children (<8 yrs)
Ampicillin Oral	9	7 %	3 %	4 %
Tetracycline oral	26	19 %	14 %	5 %
Oxytetracycline Injection	55	40 %	33 %	64 %
Sulfa Guanidine	11	8 %	2 %	0 %
Cotrimoxazole	15	11 %	0 %	7 %
TRISULFA	7	5 %	1 %	4 %
Oralit	102	75 %	28 %	45 %
Papaverin	17	13 %	13 %	0 %
Vitamin B6+Bc	39	28 %	16 %	12 %
CTM	22	16 %	14 %	2 %

Note: n = Number of acute diarrhea diseases

Table 4. Anti-microbial use in Acute Mild Acute Respiratory Infections (ARI) in 6 PHC divided by Urban, Suburban and Rural areas

PHC Case	Mild ARI Cases	Mild ARI with AB® (%)	Number AB®	AB® per patient
Urban	606	465 (77%)	533	1.1
Suburban	390	174 (45 %)	226	1.3
Rural	281	181 (64 %)	239	1.3
Total	1277	820 (59 %)	998	1.2

Table 5. Type of diseases were record in six PHC in South Sumatra

Type of diseases	Number of Cases	Percent
Common cold	1277	72 %
Lower Respiratory infection	248	14 %
Acute diarrhea	140	8 %
Diseases of skin & sub-dermal tissue	838	47 %
Infection of gastrointestinal tract	65	4 %
Ear & Mastoid	73	4 %
Oral cavity & Teeth	110	6 %

DISCUSSION

The average number of drug per encounter

The number of drugs per patient consultation is to describe the pattern of poly-pharmacy, where more than one drugs are prescribed for a condition. From this study, the occurrence of poly-pharmacy or multiple prescribing was obvious, where the average number of drugs per patients was 2.7. The pattern of drug use in health center proved that there are poly pharmacy prescriptions with the number of drug per case more than two (Table 1). The value for this indicator in health centers in Indonesia patients are 3.3 drugs per consultation.[9]

Percentage of encounters with an injection prescribed

In this study, the frequency of injection (43 %) was smaller than the study by Ministry of Health (about 70 % of outpatients of Primary Health Centers received injection).[7] The high frequency of injections may be caused by inadequate information about the used of drug and benefit-risk of injection.

Percentage of encounters with an anti-microbial prescription

Antibiotic use is a common indicator of drug use. Excessive antibiotic use leads to the problem of resistancy. In this study, 44 % of patients received one antibiotic. There is no much difference from other countries by the range from 27 % (Ecuador) to 63 % (Sudan).[9]

Percentage of antibiotic used in acute upper respiratory infection

This study show that the antibiotic used account for inappropriate used or overuse.
Ampicilin represents the most frequent antibiotic used, especially in acute respiratory infection and in acute diarrhea diseases, in spite the fact that almost mild acute upper respiratory infection is caused by virus where the antibiotics is not effective.

Percentage of antibiotic used in acute nonspecific diarrhea

Percentage of antibiotics used in acute nonspecific diarrheal diseases in six health centers is 78.6%, and varies 100%, 52 % and 67 % in Urban, Suburban and Rural areas, respectively.
According to the study of prescription habit in ten PHC in Java in 1985, it is evident that only 0.8% of acute nonspecific diarrhea caused by *Vibrio cholerae*, which really need antibiotic therapy.[7]

The rationale therapy of acute diarrhea is ORS (oral re-hydration solution). Antibiotics should only be used in 10-15% of episodes.[9] However, in many countries a quite different pattern of drug use occurs.

In this study, 5 % of acute diarrhea, in children lower than 8 years old were given tetracycline, but as we know tetracycline are contraindicated in children lower than 8 years old. It seem that there are over used or irrational used of antibiotics in the cases of acute diarrhea diseases.

Antimicrobial resistance is natural consequence of antimicrobial use, which kills the sensitive organisms leaving the resistant ones to survive and multiply (selection of resistance). Overuse and misuse of antimicrobials do not help patients, they merely add the problem of resistance and waste resources.[10]

To minimize the problem of resistancy and wasting of resources, the drug (especially antibiotics) must be use rationally, save and effective. However, Conference of Experts on the Rational Use of Drugs, convened by the World Health Organization in Nairobi in 1985 defined that "Rational use of drugs requires that patients receive medication appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and the lowest cost to them and their community".

In ideal condition, this requirement will be fulfilled if the "physiological" process of prescribing is appropriately followed. This will include steps in defining patient's problems (or diagnosis), in defining effective and safe treatments (drugs and non-drugs), selecting appropriate drugs, dosage and duration, in writing prescription, in giving patient information and planning to evaluate treatment responses. In the cases of infection determination of appropriate "bacterial diagnostic" and "resistancy test" is needed.

There is a wide variation in the prescription of antimicrobials and other drugs. In primary health cares in some country in Africa, Asia and Latin America, 30-60% of patients receive antibiotics, perhaps twice what is clinically needed.[10] Misuse is common and may take the form of incorrect dosage or inappropriate prescription. In Tanzania, 91% of antibiotics prescribed with incorrect dosage,[11] and in India over 90% of prescriptions did not have dose specifications.[12] Some studies reported that inappropriate prescription of antibiotics for viral respiratory tract infections occur in 97% of cases in China[13] and 81% of cases in Ghana.[14] Inappropriate prescription of antibiotics for childhood diarrhea commonly occurs, as reported in Pakistan. Here, private general practitioners is found to prescribe significantly more antibiotics (41% of pediatrics cases) than pediatricians (36% of pediatrics cases) in the public hospitals.[15]

To anticipate above problems some approaches are need: (1) the advanced studies about the reasons and the factors which influence the drug used, especially antibiotic usage, and (2) promoting communication, information and education, on more rational used of drug, especially for the doctors and nurses as leaders of public care services.

From this study it is concluded that the pattern of drugs usage in Primary Health Centers, especially the used of antibiotics in therapy of cases of acute diarrhea and common cold can be grouped as overused or inappropriate used of antibiotics.

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