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Research Article

FACTORS AFFECTING THE SALE OF NON-PRESCRIBED ANTIBIOTICS IN JAKARTA, INDONESIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: This study aimed to investigate the factors affecting the sale of non-prescribed antibiotics in Jakarta, Indonesia.

Methods: A cross-sectional, observational study was conducted across 190 randomly selected pharmacies in five administrative districts of Jakarta, Indonesia. Data regarding pharmacies were obtained from the Facility of Pharmaceutical Services Ministry of Health Data, in 2014, which includes all pharmacies in Jakarta. Further data were obtained using structured questionnaires.

Results: Among the 190 respondents, 15 pharmacies (9.7%) never provided antibiotics without prescription, whereas 44 (23.6%), 60 (31.6%), and 71 pharmacies (36.3%) provided antibiotic services without prescription rarely, sometimes, and always, respectively. Factors considerably associated with the increased sale of antibiotics without a prescription included the attitude and age of pharmacists, the type of pharmacy (independent or chain store), and the presence of pharmacist assistants. Attitude was the most common variable related to providing antibiotics without a prescription.

Conclusion: Antibiotics are frequently dispensed by community pharmacies in Jakarta without an appropriate prescription. These findings support the need for strict enforcement of pharmacy laws through improved inspections, and they highlight the need for evidence-based guidelines and educational interventions to improve practices regarding antibiotic provision.

Keywords: Antibiotic resistance, Non-prescription, Community pharmacy, Cross-sectional.

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INTRODUCTION

According to the World Health Organization, antibiotic resistance is a current crisis that requires urgent interventions [1]. Problems regarding antibiotic use are a serious healthcare concern worldwide because it considerably contributes toward increased antibiotic resistance [2]. Infections caused by resistant microorganisms frequently fail to respond to standard antibiotic therapies, which increases recovery time and costs, as well as the risk of death [2]. Inappropriate use of antibiotics contributes to reduced sensitivity of bacteria to antibiotics and increased bacterial resistance [3]. Besides, it may create several problems like increasing the cost of health-care system and side effect; this is a direct relation to patient knowledge and attitude in the use of antibiotics [4]. Studies in various countries have demonstrated a high rate of antibiotic use in community settings [5-8]. A few studies have reported that the high rate of antibiotic sales without a prescription in pharmacies is directly linked with increased consumption of antibiotics in the community [9-11].

The knowledge, attitude, educational background, and social demographics of pharmacists have been considered to be the most likely determinants of the quality of antibiotic services [12-15]. The shift in pharmaceutical services to patient-oriented services has underscored the importance of pharmacist's ability to communicate with other medical staffs to achieve successful therapy [16]. In some countries, appropriate use of antibiotics is encouraged through the implementation of appropriate policies and interventions. Countries such as Portugal, Spain, the UAE, and Syria have policies stating that antibiotics can only be legally dispensed by community pharmacies when a medical prescription is presented [17-21]. In Indonesia, antibiotics are legally categorized as prescription-only medicines and their sale is restricted in pharmacies. However, some antibiotics listed on the Mandatory Drug Pharmacy (Obat Wajib Apotek) can be released by pharmacists without a prescription, including topical antibiotics with restricted use for self-medication purposes [21-24]. In addition, antibiotics for continuous treatment of tuberculosis can also be given by pharmacists to patients who have previously consulted with a doctor for treatment. In practice though, antibiotics can generally be easily purchased without a prescription, and all types of antibiotics are available in the community.

Jakarta is one of the largest cities in Indonesia, with a high number of people using antibiotics without a prescription (up to 89%) [17]. Pharmacies are the main source of antibiotics for such people, serving 41.1% of the population [17]. In addition, Jakarta has the highest population density relative to other provinces in Indonesia [18]. The high number of residents in this region has led to increasing reliance on local community health services [19]. There are five main districts in Jakarta, with most pharmacies located in Jakarta Barat [20].

The main objective of this study was to examine factors affecting the non-prescribed sale of antibiotics by pharmacies located in Jakarta. We also aimed to elucidate possible correlations between antibiotic services without a prescription and the proportion of antibiotic sales, pharmacy characteristics, and behavior of pharmacy staff, including the influence of these factors on the acquisition of antibiotics in the community.

METHODS

Ethical considerations

This observational study was evaluated and approved by the Health Research Ethics Committee of the Faculty of Medicine, University of Indonesia. Ethical clearance was not required based on the Ethics

Committee statement (633/UN2.F1/ETIK/VIII/2016). Permission for this study was obtained from the Government of the Capital City of Jakarta, and this permission was recognized by the Department of Healthcare, Jakarta. Permission from the owner of each participating pharmacy was obtained.

Study design

This was a quantitative, observational, cross-sectional study performed using questionnaires. Pharmacies were randomly selected based on their type, using a cluster proportional random sampling technique.

The population investigated in this study comprised community pharmacies located in the capital city of Jakarta. The population was divided into five proportional cluster areas: North Jakarta, 333 pharmacies (15%); West Jakarta, 679 pharmacies (30%); East Jakarta, 474 pharmacies (21%); South Jakarta, 455 pharmacies (20%); and Central Jakarta, 326 pharmacies (14%). Within each cluster, the number of samples taken was divided proportionally according to ownership status: Pharmacist-owned (independent pharmacy), non-pharmacist owned (independent pharmacy), and company-owned (chain pharmacy). Samples were randomly selected with the number determined by the proportion of each type of pharmacy in each cluster.

The selected pharmacies were approached for informed consent to participate in the study. In cases where the selected pharmacy did not agree, another pharmacy in the vicinity was approached as a replacement.

Questionnaire and data collection

Using the existing literature, a questionnaire was developed to evaluate the attitude, knowledge, and sociodemographic characteristics of pharmacists. Closed-ended questions were used, and pharmacists were directly interviewed by our researchers. The questionnaire comprised four sections.

The first section comprised questions regarding the sale of antibiotics without a prescription, including how often the pharmacy had provided prescription and non-prescribed antibiotics within a period of 6 months, reasons for sale of antibiotics, the types of antibiotics sold with and without prescription, and how often information about the antibiotics was provided. Answers were marked on a Likert scale from 0 to 10, where 0 represented "never" and 10 represented "always."

The second section comprised six statements, which investigated the level of knowledge about Indonesian government regulations and antibiotic resistance. Answers were marked on a Likert scale of 0–10, where 0 represented "definitely do not know" and 10 represented "definitely know."

The third section had statements about attitude (six statements) and motivation (three statements), as well as supervision (from the pharmacist, assistant, or owner), at pharmacies regarding antibiotic sales. The answers were marked on a Likert scale of 0–10, where 0 represented "strongly disagree" and 10 represented "strongly agree."

The fourth section comprised questions regarding the type of pharmacy, the status, position, and educational background of the respondent, sex, age, and experience of those working at the pharmacy, and the presence of an assistant pharmacist at the pharmacy.

The questionnaire was assessed for statistical validity during a pilot test with 31 respondents who represented the study population, to determine the clarity of the language used and the questionnaire structure. Following this, a few words were revised on the basis of their responses and one attitude question was deleted because it was considered invalid.

Data analysis

Data were sorted and entered into a database, and then analyzed and digitally stored using the Statistical Package for the Social Sciences. Descriptive statistics were used to describe sociodemographic characteristics and patterns of antibiotic sale without prescriptions, as well as the characteristics of each variable studied (frequency distributions and proportions). Normality of the categorical data was determined with the Kolmogorov–Smirnov test. The Chi-square test was conducted to determine the relationship between antibiotic sale without a prescription and the independent variables. Multinomial regression analysis was performed to determine the dominant independent variables correlated with the antibiotic sale without a prescription. Age and sex were considered confounding factors in the analysis. Significance was indicated where p-values were <0.05 (two-tailed).

RESULTS AND DISCUSSION

Participant characteristics

After randomization, 759 pharmacies were selected and approached, of which 32 pharmacies were closed and for 26, we did not have the correct addresses. Of the 212 successfully delivered questionnaires, 190 were completed and returned (response rate, 89.62%) (0.1). Among the pharmacies that did not participate, 62 did not provide a reason for non-participation, 46 did not participate because no pharmacist or pharmacist assistant was available at the time, seven were too busy to interview, and 374 could not get permission from the pharmacy owner to participate.

The characteristics of pharmacies and pharmacists are summarized in Table 1. Among the 190 pharmacies, the proportions in each cluster district were as follows: West Jakarta Barat, n=47 (24.74%); East Jakarta, n=51 (26.84%); South Jakarta, n=48 (25.26%); North Jakarta, n=17 (9.94%); and Central Jakarta, n=27 (14.21%). There were 31 independent, pharmacist-owned pharmacies (16%), 101 non-pharmacists owned, independent pharmacies (53%), and 58 company-owned pharmacies (chain pharmacies, 31%) (Fig. 1).

There was a greater proportion of female respondents (female=165, 86.8%) than male respondents (n=25, 13.2%). Respondents were divided according to age: ≤24 years and >24 years, with equal numbers in each group (n=95, 50%). There were 107 respondents (56.3%) with ≤3 years' work experience and 84 respondents (43.7%) with >3 years' work experience. In terms of educational background, more than half of the non-pharmacists had only completed senior high school (n=122, 64.2%). The majority of pharmacies were owned by non-pharmacists (83.7%).

Antibiotic sales

Table 2 showed that only 7.9% of the responding pharmacies sold antibiotics strictly with a prescription, whereas 92.1% of the responding

Table 1: Characteristics of respondents and pharmacies

Characteristic	Frequency n=190 (%)
Sex	
Male	25 (13.2)
Female	165 (86.8)
Qualification	
Non-pharmacist	122 (64.2)
Pharmacist	68 (36.8)
Age	
≤24 years old	95 (50)
>24 years old	95 (50)
Relevant work experience	
≤3 years	107 (56.3)
>3 years	83 (43.7)
Pharmacist assistant	
Yes	98 (51.6)
No	92 (48.4)
Ownership	
Pharmacist-owned	31 (16.3)
Non-pharmacist owned	159 (83.7)
Business type	
Independent pharmacy	132 (69.5)
Chain pharmacy	58 (30.5)

Table 2: Frequency of non-prescribed sale of antibiotics

Frequency of non-prescribed antibiotic sales	Pharmacies n (%)	Mean sales of antibiotics (blister packs/day)	SD	Minimum-maximum
Never	15 (7.9)	0	0	0
Rarely	44 (23.2)	4	3.426	1–20
Seldom	60 (31.6)	8	8.196	1–40
Often	71 (37.4)	19	24.13	2–150

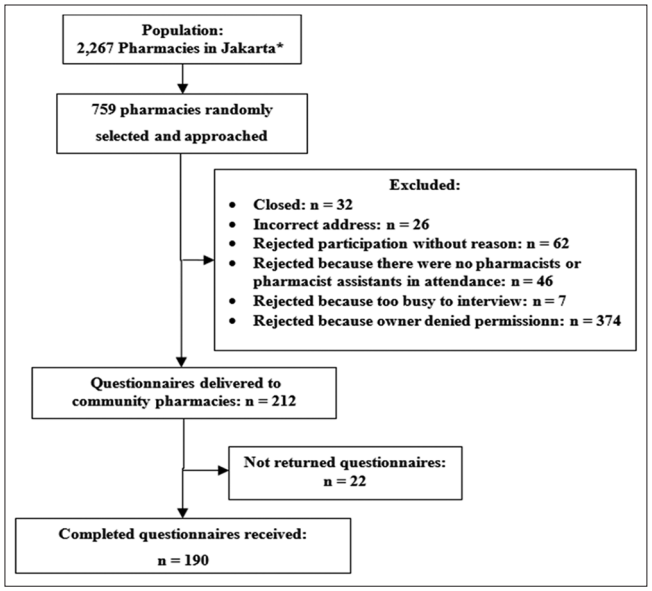

Fig. 1: Sampling of pharmacies in Jakarta. *Based on the Facility of Pharmaceutical Services Ministry of Health Data in 2014

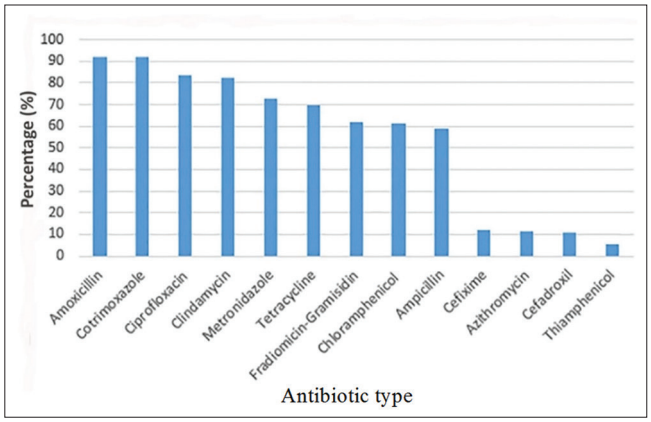

Fig. 2: Percentage of sales for each antibiotic that are non-prescription based at pharmacies in Jakarta

pharmacies sold antibiotics without a prescription within a period of 6 months. The mean rate of antibiotic sales at pharmacies frequently offering non-prescribed antibiotics was approximately 19 blister packs per day.

The most commonly sold antibiotics with a prescription were amoxicillin (181 pharmacies), cefadroxil (179 pharmacies), ciprofloxacin (178 pharmacies), cefixime (177 pharmacies), and clindamycin (177 pharmacies). The most commonly requested antibiotics by visitors without a prescription were amoxicillin (175 pharmacies), co-trimoxazole (175 pharmacies), and ciprofloxacin (159 pharmacies). Pharmacy staff indicated that amoxicillin was well known in the community as it is a broad-spectrum antibiotic that could be offered for mild conditions, such as sore throat, cough, toothache, and influenza. Co-trimoxazole was the most common choice for patients with abdominal pain who complained of diarrhea. Ciprofloxacin was the most common antibiotic given to patients with specific complaints. Percentage of sales for each antibiotic that is non-prescription based at pharmacies in Jakarta is shown in Fig. 2.

Factors associated with sale of non-prescribed antibiotics

Our analysis indicated a relationship between the frequency of antibiotic provision without prescription and various factors such as experience, training, knowledge, attitude, motivation, supervision, and educational background of pharmacy staff, and the type of pharmacy. Among the pharmacies interviewed, 79 (46.4%) indicated that a large proportion of overall sales comprised antibiotics (46.4%), whereas 111 (53.6%) indicated that a smaller proportion of sales comprised antibiotics (Table 3). The relationship between the frequency of non-prescription sales and the proportion of overall sales comprising antibiotics was statistically significant (p=0.015).

Respondents were categorized as less experienced if their relevant work experience was ≤3 years (n=107, 56.3%). The remaining respondents had a work experience of >3 years (n=83, 43.6%). The relationship between work experience and frequency of selling non-prescribed antibiotics was not statistically significant (p>0.194). In terms of training, 23 respondents had not attended a seminar on antibiotic resistance within the previous year, whereas 132 respondents had attended a seminar. The relationship between training and frequency of selling non-prescribed antibiotics was not statistically significant (p=0.584). At pharmacies that frequently sell non-prescribed antibiotics, 99 respondents (52.1%) had poor knowledge of antibiotics, whereas 91 had satisfactory knowledge (47.9%). There was no significant relationship between antibiotic knowledge and the provision of antibiotics without a prescription.

Respondents with a positive attitude (n=90, 47.4%) toward antibiotic sales (i.e., they understood the reasons why antibiotics should not be sold without a prescription) suggested that they did not serve antibiotics due to profit considerations, the imposition of patient factors, and consideration of antibiotic stocks. The remaining 100 respondents (52.6%) displayed a negative attitude toward antibiotic sales. There was a significant relationship between pharmacies that frequently sold non-prescribed antibiotics and employees' negative attitudes (p<0.0001).

Motivation was determined by combining three statements related to motivation toward selling antibiotics. Antibiotics are drugs that can cause resistance if inappropriately used. Therefore, we defined good motivation as reluctance to sell antibiotics without a prescription. Our results showed that 84 respondents (45.3%) had good motivation, whereas 104 respondents (54.7%) had poor motivation. There was no significant relationship between motivation and the sale of non-prescribed antibiotics (p>0.751).

There were significant relationships between the sale of non-prescribed antibiotics and the age of the respondents (p=0.003), pharmacy type (p=0.025), and the existence of assistant pharmacists (p=0.027), with younger age, independent pharmacies, and the presence of pharmacy assistants being correlated with increased non-prescription sales. No significant relationships were observed for the other variables tested (sex, qualifications, ownership, and supervision).

Table 3: Factors related to sale of non-prescribed antibiotics

Variable	Frequency of sales of non-prescribed antibiotics n (%)				Total	p value*
	Never	Rarely	Seldom	Often		
Proportion of overall sales						
Large	5 (6.3)	13 (18.3)	21 (26.6)	40 (50.6)	79 (100)	0.015
Small	10 (9.0)	31 (27.9)	39 (35.1)	31 (27.9)	111 (100)	
Relevant work experience						
≤3 years	8 (7.5)	21 (19.6)	31 (29.0)	47 (43.9)	107 (100)	0.194
>3 years	7 (8.4)	23 (27.7)	29 (34.9)	24 (28.9)	83 (100)	
Knowledge						
Good	6 (6.6)	21 (23.1)	32 (35.2)	32 (35.2)	91 (100)	0.725
Unsatisfactory	9 (9.1)	23 (23.2)	28 (28.3)	39 (39.4)	99 (100)	
Attitude						
Positive	14 (13.9)	36 (35.6)	29 (28.7)	22 (21.8)	101 (100)	0.000
Negative	(1.1)	8 (9.0)	31 (34.8)	49 (55.1)	89 (100)	
Training						
Never provided	4 (7.5)	13 (24.5)	13 (24.5)	13 (24.5)	23 (43.4)	0.584
Provided	11 (8.0)	31 (22.6)	47 (34.3)	48 (35.0)	137 (100)	
Motivation						
Poor	5 (6.0)	18 (21.4)	28 (33.3)	33 (39.3)	84 (100)	0.751
Satisfactory	10 (9.4)	26 (24.5)	32 (30.2)	38 (35.8)	106 (100)	
Supervision						
Poor	6 (5.8)	22 (21.2)	32 (30.8)	44 (42.3)	104 (100)	0.353
Satisfactory	9 (10.5)	22 (25.6)	28 (32.6)	27 (31.4)	84 (100)	
Qualification						
Non-pharmacist	13 (10.7)	29 (23.8)	36 (29.5)	44 (36.1)	122 (100)	0.265
Pharmacist	2 (2.9)	15 (22.1)	24 (35.3)	27 (39.7)	68 (100)	
Business type						
Independent pharmacy	7 (5.3)	31 (23.5)	37 (28.0)	57 (43.2)	132 (100)	0.025
Chain pharmacy	8 (13.8)	13 (22.4)	23 (39.7)	14 (24.1)	58 (100)	
Ownership						
Pharmacist-owned	3 (9.7)	8 (25.8)	10 (32.3)	10 (32.3)	31 (100)	0.913
Non-pharmacist owned	12 (7.5)	36 (22.6)	50 (31.4)	61 (38.4)	159 (100)	
Pharmacist assistant						
No	10 (10.2)	16 (16.3)	38 (38.8)	34 (34.7)	98 (100)	0.027
Yes	5 (5.4)	28 (30.4)	22 (23.9)	37 (40.2)	92 (100)	
Sex						
Male	2 (8.0)	6 (24.0)	5 (20.0)	12 (48.0)	25 (100)	0.551
Female	13 (7.9)	38 (23.0)	55 (33.3)	59 (35.8)	165 (100)	
Ages						
≤24 years old	10 (10.5)	14 (14.7)	26 (27.4)	45 (47.7)	95 (100)	0.003
>24 years old	5 (5.3)	30 (31.6)	34 (35.8)	26 (27.4)	95 (100)	

We conducted multinomial regression analysis to investigate the five variables showing significant correlation with non-prescribed antibiotic sales (i.e., the proportion of sale, attitude, age, the existence of a pharmacy assistant, and business type). The results showed that the attitude of the respondents was the most common variable significantly associated with the sale of antibiotics without prescription ($p<0.000$).

DISCUSSION

This study examined randomly selected pharmacies to investigate the factors influencing the frequency of sale of non-prescribed antibiotics. Questionnaires were directly distributed by researchers to encourage a high response rate and to avoid errors during completion. We achieved an 89.62% response rate in terms of the number of completed questionnaires, with the remaining pharmacies refusing to participate for various reasons. A study conducted in Syria reported a low response rate for similar reasons [12].

Antibiotics can be easily bought without prescription in Jakarta, although existing regulations include antibiotics as a category of medications that cannot be dispensed without a prescription. In this study, 9.7% of the participating pharmacies follow this regulation, claiming that they never dispense antibiotics without a prescription. Of these, two pharmacies received prescriptions for cases of non-communicable diseases, such as diabetes and heart disease, and are generally insufficiently stocked with antibiotics such that they are unable to dispense antibiotics either with or without a prescription.

One pharmacist-owned pharmacy in South Jakarta has implemented explicit rules to not sell antibiotics without prescription, and even in special cases does not allow the purchase of antibiotics without a prescription. Five chain pharmacies belonging to the same company also claimed to never sell antibiotics without a prescription due to the strict regulations of the company. Therefore, they provide limited amounts of antibiotics without a prescription. In addition, these chain pharmacies also admitted to serving more over the counter medication than prescription drugs.

A previous study in Damascus reported that 89.3% antibiotics were sold without a prescription [15], whereas a study in Egypt reported that only 23.3% of antibiotics were dispensed without prescription or pharmacist recommendation [12]. The latter study also showed that the knowledge, motivation, supervision, work experience, educational background, and training of dispensing pharmacists were not related to whether they sold non-prescribed antibiotics. Our results are not entirely consistent with these results. Nonetheless, a Syrian study reported that pharmacists' knowledge and perceptions regarding the sale of antibiotics without prescription was correlated with whether they sold non-prescribed antibiotics. Interestingly, in Vietnam, 50% of pharmacy customers in urban areas and 28% in rural areas bought antibiotics without prescription [25].

Other studies have shown that the work experience and age of pharmacists are related to non-prescribed antibiotic sales. Younger

pharmacists were more reluctant to sell antibiotics than those older than 50 years [26]. This is contrary to our results, in which younger respondents (<24 years old) were more likely to sell antibiotics without a prescription. It is possible that the lack of knowledge about antibiotic resistance and lower education play a role in this association. Elsewhere, older pharmacists may be more likely to dispense or recommend non-prescribed antibiotics because they claim to have more experience in drug services [26].

CONCLUSION

We suggest that the sale of antibiotics without a prescription in Jakarta is an unacceptable practice that should not continue. Several attitude measures were strongly associated with this practice in our sample, suggesting that factors influencing pharmacists' perceptions need to be further investigated. This practice can threaten the effective treatment of future patients, potentially resulting in treatment failure and unnecessary costs incurred by the patient. Our results could be used to design interventions to promote appropriate antibiotic use.

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CONFLICTS OF INTEREST

All authors have none to declare.

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