Covering Letter

To,

The Editor

Sub: Submission of Manuscript for publication

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We intend to publish an article entitled **"Analysis of Behavior Factors that Influence Individuals in Using Antibiotics (A Study on Pharmacy Patients in East Surabaya)"** in your esteemed journal as an Original Article.

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Prior publication: nill

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Yours' sincerely,

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Corresponding contributor:

Liza Pristianty

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Manuscript Title: Analysis of Behavior Factors that Influence Individuals in Using Antibiotics (A Study on Pharmacy Patients in East Surabaya)

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Title of the article: Analysis of Behavior Factors that Influence Individuals in Using Antibiotics (A Study on Pharmacy Patients in East Surabaya)

Abstract:

Objective: The high prevalence of infection in Indonesia causes the high consumption of antibiotics. The impact of inappropriate antibiotics consumption are the occurrence of bacterial resistance and unwanted side effects. The accuracy of individuals in using antibiotics forms a behavior in the community. Behavior factor analysis was carried out in an effort to obtain an overview of the dominant factors that influence the accuracy of individuals in taking antibiotics.

Methods: This study was an observational analysis and based on cross-sectional. Samples were patients who bought antibiotic with or without prescriptions at pharmacies in East Surabaya, which were determined based on purposive sampling. A total 132 patients were obtained from 30 pharmacies. The data were analyzed descriptively, followed by factor analysis.

Findings: The results showed that antibiotics were still widely used in the community. Knowledge, attitudes, and facilities at the pharmacy related to antibiotic services and environmental conditions affect the accuracy of patients using antibiotics. The magnitude of influence was 0.332 for knowledge, 0.475 for attitude, 0.182 for facilities and infrastructure at the pharmacy, and 0.325 for environmental conditions.

Conclusions: The biggest variable that affects the accuracy of individuals in using antibiotics was the individual's attitude towards antibiotics as a drug.

Key-words: Factor analysis, accuracy of antibiotic use, L green

Introduction:

One disease with a high prevalence in Indonesia is infection.[1] The high prevalence of infection in Indonesia causes the high consumption of antibiotics. Antibiotics are frequently used in cases of infections caused by bacteria. The impact of excessive antibiotic consumption is the occurrence of bacterial resistance and an increase in unwanted side effects.[1] Various studies have found that around 40-62% of antibiotics are used inappropriately for diseases that should not require antibiotics. The high intensity of antibiotic use raises various problems and is a global threat to health.[2] Apart from having an impact on morbidity and mortality, it also has significant negative economic and social impacts. Bacterial resistance to antibiotics can occur due to non-rational use of antibiotics[3], which is characterized by excessive use or improper doses and improper consumption, prescribed antibiotics that are not suitable for diagnosis, and self-medication using prescription drugs.[4]

Several studies on antibiotics report that around 40-62% of antibiotics are used inappropriately.[1] Antibiotics are used because of sore throat (25.7%), fever (20%), and cold (20%). People get 88.6% of antibiotics without a prescription and only 11.6% by prescription.[4] The evaluation of the accuracy of antibiotic use is known to be an indication of 7.14%, and 84.8% of proper dose.[5] Inappropriate use of antibiotics will have a negative impact on patients, including failure to achieve therapeutic goals, namely the healing of infections. Individual misconceptions about antibiotics and their use have resulted in many errors in using antibiotics so that the risk of bacterial resistance due to antibiotic use increases.[6] Appropriate use of antibiotics can provide benefits for an individual, but improper use can cause new problems, especially the emergence of bacterial resistance to antibiotics.[7] Accuracy in using antibiotics, including the right medication that is appropriate between complaints and drug indications, the proper dose which is the right amount taken, the proper duration of use, time of use, and knowing what actions to take if side effects occur.[7]

Community behavior in using antibiotics is influenced by various factors. According to the theory of Lawrence Green (1980), there are three types of factors that influence correct behavior in drug use. The first are predisposing factors, which consist of knowledge, attitudes, beliefs, and values. Individual knowledge and beliefs about antibiotics and their use are factors that determine individual behavior in using antibiotics. The second are supporting factors (supporting factors), which are characteristics needed to perform certain behaviors, such as environmental resources affecting behavior like socio-economic factors, lifestyle, ease of obtaining drugs, availability of medicinal products manifested in the physical environment, ease of getting antibiotics, and the complete storage of antibiotics at the pharmacy. The third are reinforcing factors in the form of attitudes and behaviors of workers

at the pharmacy or other parties, which comprise a reference group of the behavior of the individual concerned. Other parties' interventions that influence individual behavior include information from the mass media, family, and health workers involved in a person's therapeutic processes, such as doctors or pharmacists.[8,9.10]

From this background, this study intended to analyze the factors that influence the accuracy of individuals in using antibiotics to obtain a general picture of the dominant factors that influence individual actions in the proper usage of antibiotics. By determining the dominant factors that influence the accuracy of individuals in using antibiotics, efforts to increase the rational use of antibiotics can be more focused and the risk of resistance can be reduced. This research was conducted in Surabaya City. Surabaya was chosen because it could describe a region with a heterogeneous population with various ethnic and cultural groups.

Methods:

This research was an inferential research based on cross-sectional time.[11] The data obtained from answers to questionnaires were filled out by respondents when respondents visited pharmacies in East Surabaya to redeem prescriptions containing antibiotics or buy antibiotics without a prescription. Before being used as an instrument for data collection, the questionnaire was tested for validity and reliability. Pharmaceutical samples were determined based on random sampling of groups that met the inclusion criteria.[12] The pharmacy sample size was 30, while the analysis unit comprised of 132 pharmacy patients. Pharmaceutical patients were selected through purposive sampling. The study was conducted in May-September 2018. The variables studied were Predisposing Factors consisting of the knowledge and attitudes of patients in using antibiotics, Enabling Factors consisting of facilities which are facilities at the pharmacy related to antibiotic services, and Reinforcing Factors namely environmental conditions that affect individual behavior in using antibiotics and individual accuracy in using antibiotics. The data obtained were subject to descriptive analysis and Spearman correlation analysis of non-parametric RhoCorrelation.[13]

Results:

Socio-demographic Profile of Pharmacy Patients in East Surabaya

The socio-demographic description of patients who redeem antibiotics, as well as those who buy antibiotics, in pharmacies in the East Surabaya included gender, age, education, occupation, perceived pain causing antibiotic use, the amount of antibiotics purchased, and how to get antibiotics. The number of patients who were respondents in the study were 132 people. The patients' demographic description includes age, sex, education, and occupation, which can be seen in Table 1.

Table 1: Socio-demographic Characteristics of Pharmacy Patient Respondents in East Surabaya

Sociodemography		Frequency	Percentage (%)
Gender	Male	34	25.4
	Female	98	74.6
Age	>20 years	18	13.8
	21-30 years	42	32.3
	31-40 years	27	20.7
	41-50 years	18	13.8
	51-60 years	17	12.3
	61-70 years	10	6.9
Education	Primary school	3	1.5
	Junior high school	3	1.5
	Senior High School	77	59.2
	College	49	37.7
Work	Employee	20	15.4
	Entrepreneur	36	27.7
	Student	3	2.3
	College student	19	14.6
	Retired	2	0.77
	Does not work	2	0.77
	Housewife	19	14.6
	Not giving a job description	31	23.8

From Table 1, it is known that patients who come to the pharmacy to get antibiotics are dominated by women with 74.6% (97 respondents) compared to men with 25.5% (33 respondents), and most were aged 21-30 years with 32.3% (42 respondents), and most (59.2% or 77 respondents) had High school education. Meanwhile, the symptom image is felt by the patient so that using antibiotics can be seen in Figure 1. We can see the symptoms that are felt so that someone needs antibiotics, where patients visit the pharmacy because of sore throat (28.5%), toothache (11.5%), and cough (7.7%). From Dokl's study, 2018 were the

main conditions for prescribing antibiotics due to cough (22.7%), lower respiratory tract infections (RTI) (17.9%), throat (16.7%) and upper RTI (14.5%).[14]

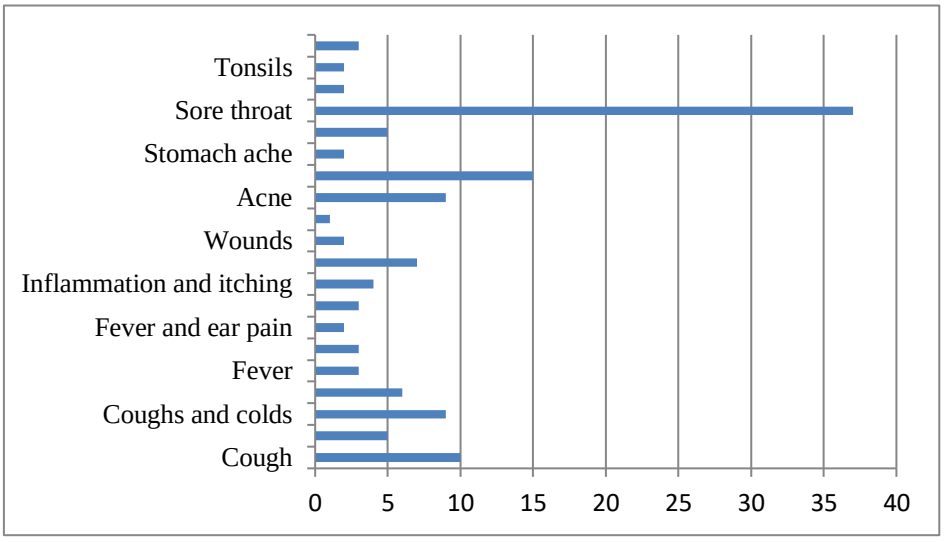

Figure 1: Symptoms felt by patients who use antibiotics

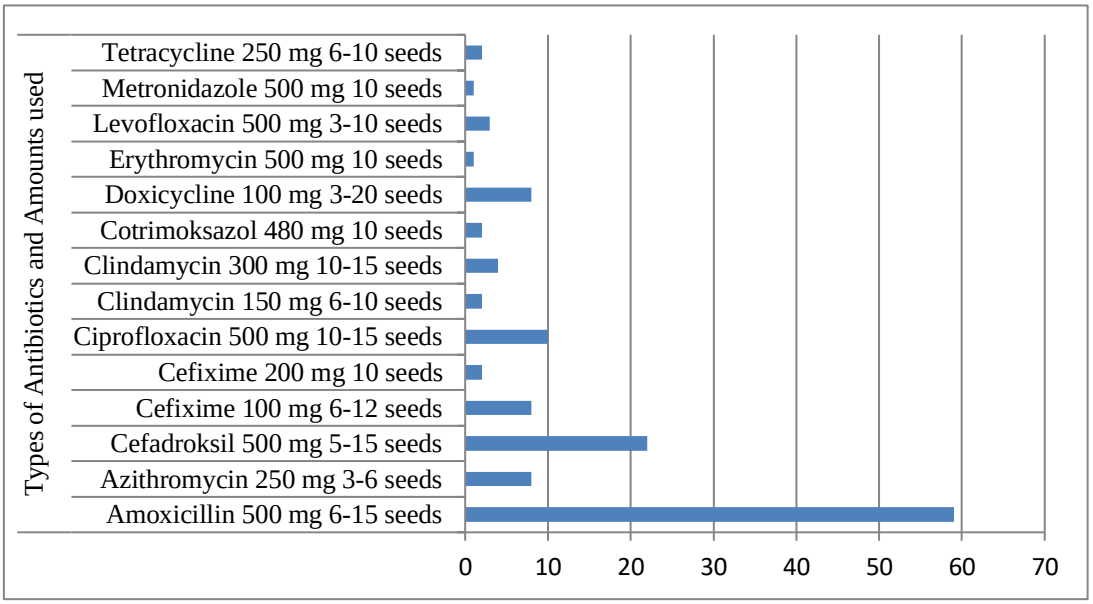

Figure 2: Description of the types of antibiotics and the amount requested

The description of the types of antibiotic and the amount requested can be seen in Figure 2. It was found that most patients requested 500 mg amoxicillin with 6-15 pills (45.4%) and 500 mg cefadroxil with 5-15 pills (16.9%). The results obtained are in line with Dolk's research, wich states that penicillins accounted for 50% of all prescriptions, followed by macrolides (13%), tetracyclines (12%) and trimethoprim (11%).[14]

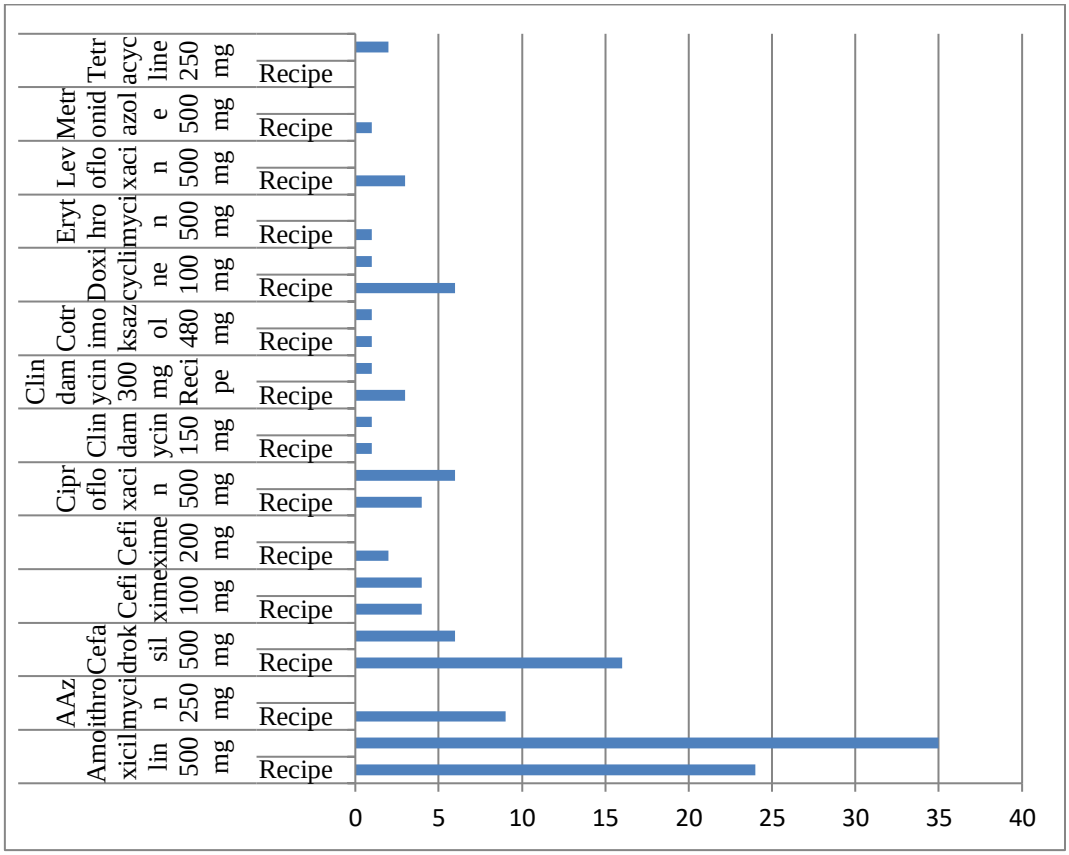

Figure 3: How patients obtain antibiotics

The ways patients get antibiotics can be seen in Figure 3. It is known that amoxicillin 500 mg is purchased more without prescription (26.9%) than with prescription (18.5%), while cefadroxil 500 mg was purchased more with prescription (12.3%) than without prescription (4. 6%). Some antibiotics can still be obtained without prescription, such as cefixime 100 mg (3%), ciprofloxacin 500 mg (4.6%), Clindamycin 150 mg and 300 mg (0.7%), and tetracycline (1.5%), while Azitromycin 250 mg, Erytromycin 500 mg, and Levofloxacin 500 mg were obtained by patients by prescription (Figure 3). This shows that there are still many antibiotics obtained by the community without prescription. This condition needs to be watched out for because of the risk of microbial resistance against antibiotics, and the role of pharmacists is very important in providing education to patients who use antibiotics so that microbial resistance against antibiotics can be avoided. The results of this study are in line with Shibani's study, which stated that in Saudi Arabia 51% of antibiotics are obtained without a prescription.[15]

Normality Test

was carried out to determine the normality of data distribution from individual knowledge variables about antibiotics and their use (predisposing), individual attitudes towards antibiotics as patient drugs for antibiotic therapy (predisposing), facilities and infrastructure in pharmacies related to antibiotic services (possible), and environmental conditions that affect the behavior of individuals in using antibiotics (reinforcing) and the accuracy of individuals in

using antibiotics. Normality test is done to determine the correct correlation test method. The normality test used is One-Sample Kolmogorov-Smirnov Test. The results of the normality test can be seen in Table 2.

Table 2: Data Normality Test Results for Each Variable

Variable	Significance value
Individual knowledge about antibiotics as a drug and its use	0.000
Individual attitudes towards antibiotics as a drug	0.000
Facilities and infrastructure at the pharmacy related to antibiotic services	0.000
Environmental conditions that influence individual behavior in using antibiotics	0.000
The accuracy of individuals in using antibiotics	.001

From Table 2, it is known that the significance value of all variables was 0.05. This shows that data from all variables are abnormally distributed. Thus, the correlation test between the variables used is the Spearman's non parametric Rho Correlation test.

Variable Correlation Test

Rho Spearman's correlation test was used to determine the correlation of each behavioral factor. Individual knowledge of antibiotics as drugs and their use, individual attitudes towards antibiotics as drugs, pharmacy facilities and infrastructure related to antibiotic services, and environmental conditions that affect individual behavior in using antibiotics for accuracy individuals in using antibiotics were analyzed, the test results of which can be seen in Table 3.

Table 3: Spearman's Rho Correlation Test

	Knowledge	Attitude	Enabler	Reinforcer	Precision

		Correlation Coefficient	1.000	0.445**	0.175*	0.159	0.332**
	knowledge	Sig. (2-tailed)	.	0.000	0.044	0.068	0.000
		N	132	132	132	132	132
		Correlation Coefficient	0.445**	1.000	0.379**	0.325**	0.475**
	Attitude	Sig. (2-tailed)	0.000	.	0.000	0.000	0.000
		N	132	132	132	132	132
		Correlation Coefficient	.175*	.379**	1.000	.411**	0.182*
Spearman's rho	**enabler**	Sig. (2-tailed)	0.044	0.000	.	0.000	0.037
		N	132	132	132	132	132
		Correlation Coefficient	0.159	0.325**	0.411**	1.000	0.325**
	reinforcer	Sig. (2-tailed)	0.068	0.000	0.000	.	0.000
		N	132	132	132	132	132
		Correlation Coefficient	0.332**	0.475**	0.182*	0.325**	1.000
	precision	Sig. (2-tailed)	0.000	0.000	0.037	0.000	.
		N	132	132	132	132	132

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

From Table 3, it can be determined that the significance value of the correlation between individual knowledge variables about antibiotics as drugs and their use in the accuracy of individuals using antibiotics were 0.00 < 0.05. This shows that there is a significant correlation between individual knowledge about antibiotics as a drug and its use on the accuracy of individuals in using antibiotics. The significance value of the correlation between individual attitudes towards antibiotics as a drug against individual accuracy in using antibiotics was 0.00 < 0.05. This shows that there is a significant correlation between individual attitudes and antibiotics as drugs for the accuracy of individuals using antibiotics. The significance value of the correlation between facilities and infrastructure variables in the pharmacy was related to antibiotic services to the accuracy of individuals using antibiotics with a value of 0.03 < 0.05. This shows that there is a significant relationship between facilities and infrastructure in pharmacies related to antibiotic services with the accuracy of individuals in using antibiotics. The significance value of the correlation between the variables of environmental conditions that affect the behavior of individuals in using antibiotics on the accuracy of individuals using antibiotics was 0.00 < 0.05. This shows that

there are significant correlations between environmental conditions that affect the behavior of individuals in using antibiotics with the accuracy of individuals in using antibiotics.

Discussion:

The results showed that pharmacy patients were sick with the most antibiotics because of sore throats, toothaches and coughs. Based on the type of antibiotic and the amount purchased the most is amoxicillin 500 mg and cefadroxil 500 mg, the most commonly used penicillin class of antibiotics in the community.[15] Some antibiotics can still be obtained without a prescription, this condition needs to be aware of the risk of microbial resistance to antibiotics. The results are in line with the research of Al-Shibani et al. which states that in Saudi Arabia, antibiotics were obtained without a prescription.[15] Education by pharmacists in providing antibiotic services is needed to increase patient knowledge in using antibiotics.

According to L Green, knowledge is a predisposing factor, individuals who have good knowledge about antibiotics as drugs and their use will increase the accuracy of individuals in using antibiotics.[16] Likewise, attitudes towards antibiotics affect the accuracy of individuals in using antibotics, positive individual attitudes towards antibiotics will be shown by the correct use of antibiotics. Facilities at the pharmacy related to antibiotic services also affect the accuracy of patients using antibiotics. Furthermore environmental conditions also affect the accuracy of individuals in using antibiotics.

From Table 3, shows that the magnitude of the effect of knowledge on the accuracy of individuals using antibiotics was 0.332. The amount of individual attitudes towards antibiotics as a drug against the accuracy of individuals using antibiotics is 0.475, The magnitude of the influence of facilities and infrastructure in the pharmacy towards the antibiotic services to the accuracy of individuals in using antibiotics amounted to 0.182 and the magnitude of the influence of environmental conditions that affect the behavior of individuals in using antibiotics on the accuracy of individuals using antibiotics was 0.325. From Table 3, it can also be seen that the biggest variable that influenced the accuracy of individuals using antibiotics was the individual's attitude towards antibiotics as a drug with an effect of 0.475. Attitudes describe an individual's attraction or disinterest in an object, namely the accuracy in using antibiotics. Attitude consists of three components, namely trust, evaluation of objects and the tendency to act. In building attitudes, knowledge, beliefs and emotions play an important role. Knowledge will encourage someone to think that involves components of emotions and beliefs, then attitudes predict behavior. Attitudes play an important role on the behavior of the accuracy of individuals in using antibiotics.[17]

Conclusion:

1. Antibiotics are still widely used in the community, mostly amoxicillin 500 mg with a total of 6-15 pills (45.4%), cefadroxil 500 mg with a total of 5-15 pills (16.9%). Amoxicillin 500 mg was obtained through a non-prescription (26.9%), while 18.5% was obtained by prescription. Meanwhile, 12.3% of cefadroxil 500 mg was obtained by prescription and 4.6% without a prescription. Some antibiotics were obtained without a doctor's prescription. Symptoms that were felt so that someone uses antibiotics include sore throat (28.5%), toothache (11.5%), and coughing (7.7%)

2. Variables in knowledge, attitudes, facilities and pharmaceutical facilities related to antibiotic services, and environmental conditions that affect individual behavior in using antibiotics significantly affect the accuracy of patients in using antibiotics.

3. The amount of influence was 0.332 for knowledge, 0.475 for attitude, 0.182 for facilities and infrastructure in pharmacies related to antibiotic service, and 0.325 for environmental conditions that affect individual behavior in using antibiotics. The biggest variable that affects the accuracy of individuals in using antibiotics is the individual's attitude towards antibiotics as a drug with an effect of 0.475.

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Dear Dr. Pristianty,

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