

## Conference Paper

# Factors Associated With Attitudes Towards Antibiotic Usage in Pharmacy Students

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**Abstract.**

The increase in antibiotic resistance caused by inappropriate usage has been influenced by many factors. A positive attitude can lead to proper usage of antibiotics. This study aimed to identify socio-demographic factors that influence the attitudes towards antibiotic usage in pharmacy students at the University of Muhammadiyah Malang. A cross-sectional study design was conducted with 327 respondents recruited using incidental sampling. The data were analyzed through the Chi-square test and logistic multivariate regression. More than half of the respondents (65.4%) had a positive attitude toward antibiotic usage. The results showed a significant correlation between attitudes and socio-demographic factors (i.e., age and semester level) with a p-value < 0.05. The findings showed that fifth and seventh semester students were more likely to have positive attitude than first semester students with an odds ratio of 4.286 and 16.482, respectively (p < 0.01). In conclusion, there were two factors associated with attitudes toward antibiotic usage: age and semester level.

**Keywords:** attitude, antibiotic, students, pharmacy, UMM

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## 1. INTRODUCTION

Inappropriate use of antibiotics can cause microorganism to adapt in its mechanism, so that the effectiveness of antibiotics could reduced and antibiotic resistance occurs [1]

The Data from Center for Disease Control and Prevention in USA 2019 reported more than 2.8 million infections were resistant to antibiotics happened every year, over 35,000 people had died [1]. According to Antibiotic Resistance Control Committee, during 2013 to 2019 has significantly increased from 40% and its peak at 60.4%. The increasing number happened due to uncontrolled usage of antibiotics and triggered the resistance [2]. This study is in line with research with the report from the World Health Organization (WHO) in Antimicrobial Resistance: Global Report on Surveillance also shows that Southeast Asia has the highest number cases of antibiotics resistance [3].

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The Indonesian Ministry of Health has established a policy of the Antimicrobial Resistance Control Program (PPRA). It is applied in all Health Service Facilities (from Hospitals to Community Health Centers), based on Permenkes No. 8 of 2015. Hopefully it will create awareness, understanding, and commitment to reduce and control the antimicrobial resistance which is followed by the integrated manner among hospitals, health professionals, local government, and communities under Ministry of Health control's.

Pharmacy students supposed to be aware of health problems which arise over time. It is important to provide guidance on the rational use of antibiotics. In line with the official article from the Indonesian Ministry of Health about "Improving Pharmaceutical Services in Control of Antimicrobial Resistance by involving pharmacists" as one of the authorized profession in giving approval of drugs prescription. Indeed, it is necessary to control antibiotics usage so that pharmacists provide information about it usage based on prescription and doctor's diagnosis [4].

Attitudes are point of views and feelings that tend to act based on the attitude towards the object [5]. The study among medical students in University of Zambia showed 96.9% of respondents had a positive attitude about antibiotic resistance, while 3.13% had a negative attitude towards its usage and resistance. Moreover, third year students have better attitudes towards antibiotic resistance than the other years[6].

Basic knowledge and attitude influenced the health-related behavior with respect to antibiotic use. Inappropriate attitudes and lack of knowledge about the use of antibiotics are high risk factors which could contribute to the emergence of Antimicrobial Resistance (AMR) cases [7]. In higher education levels is tend to reduce the inappropriate use of antibiotics while those with lower education levels tend to have misunderstanding of antibiotics usage [8]. Another factors are possibly influenced the use of antibiotics are sociodemographic factors including age, income, education, and gender [9].

Recently, the infection that happened around the world is Covid-19 pandemic. Its symptoms are respiratory tract infections including fever and dry cough starting from a case that emerged in Wuhan, China [10]. Other symptoms that may rise, such as: headache, dizziness, fatigue, weakness, vomiting, and diarrhea [11]. From emerging of COVID-19, the data had proven that number increasing rapidly due to the infection. First at 24<sup>th</sup> January 2020, there were 835 laboratory-confirmed COVID-19 infections reported in China. Furthermore, there were 25 fatal cases and several health workers have also been infected in Wuhan [10].

## 2. METHOD AND TOOL

### 2.1. METHOD

This a cross-sectional study conducted on two months (October-November 2020) among Pharmacy Students in the University of Muhammadiyah Malang with 1157 respondents as a total population. Those respondents are about 17 years old or more. Figuring of the number of samples are using the Kish and Leslie formula (1965).

### 2.2. TOOL

$$n = (Z_{1-\alpha})^2 (P (1-P)/D^2)$$

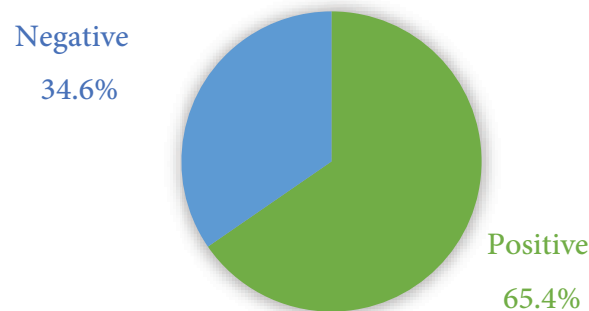
The basic for determining prevalence from previous studies were 25%7 with 5% as an error margin. Thus, a minimum sample (321 respondents) is obtained. The data collection was obtained from 327 participants using online questionnaires that validated [12][13][14][15][16][17]. The questionnaire consists of 2 parts (sociodemographic factors and attitudes towards antibiotic usage). The research ethics permit was obtained from the Health Research Ethics Commission of the University of Muhammadiyah Malang number E.a/254/KEPKUMM/X/2020.

The pilot study was conducted among 10 Pharmacy Students in Universitas Pembangunan Jakarta [18]. Checking the completeness of the data was carried out before the analysis process. Data were analyzed using SPSS 18 version by applying bivariate and multivariate analysis. The independent variable in this study is sociodemographic factors. While the antibiotics usage attitudes are the dependent variable. In attitudes, mean (3) was used as a cut-off point to determine attitudes toward antibiotic usage whether positive or negative [19].

## 3. RESULT AND DISCUSSION

Data were obtained from 327 respondents, most of them were female (86.9%) it is in line with research conducted in China [15]. Based on the semester level, first year student is the highest (37.3%), followed by fifth semester (23.2%), then third semester (21.1%), and last is 7th semester (18.3%). In line with study conducted among undergraduate pharmacy student in Nepal which is the initial semester is greater than other semesters (29.6%) [20]. Based on age, the highest frequency lies in the first group which  $\leq 20$  years

(76.5%). Furthermore, the positive attitude of antibiotics usage reached from more than half of participants (65.4%).



**Figure 1:** Attitudes Result of Antibiotics Usage.

The results of this positive attitude are in line with research among Chinese medical students [15] which states that 56.5% of respondents have a positive attitude. The positive attitude about antibiotic abuse shown around 76.5%. As stated in a study among Saudi Arabia medical students 88.6% respondents had positive knowledge of antibiotics usage attitudes [16]. For other indicators about antibiotic resistance affect the health of themselves and their families, the respondents said positive regarding the issue (71.3%). Similar result found in Saudi arabia research about 68.7% respondents agreed that resistance can affect the health of families and themselves [16].

More than half of participant (59.3%) purchased antibiotics without prescription, it means that they agreed if antibiotics can be purchased without a doctor's prescription. According [16] explained that 63.9% of respondents agree to buy antibiotics without a prescription. This should be informed regularly that taking antibiotics require a doctor's prescription.

The attitude question "whether using antibiotics or not during sore throat" got 55.7% which answered correctly. It means that more than half of respondent using antibiotics correctly when sore throat. This study is in line with study in Saudi Arabia [16] which explains that 66.1% of respondents use antibiotics when they have a sore throat.

The attitude about "keeping antibiotics if needed" showed 52.6% respondents answering disagree. More than half of participants did not agree that antibiotics could be stored and used when needed. In accordance with Saudi Arabia study among medical students [17] showed that 62.65% of respondents answered no, which means they do not agree to keep antibiotics for later use. It must be continuously informed and educated that the inappropriate use of antibiotics such as treating sore throats, using leftover drugs (storing antibiotics), buying antibiotics without a prescription [17]. Awareness and knowledge can reduce antibiotic abuse. Furthermore, lack of enforcement of drug

regulations should prohibit the purchase of antibiotics without a doctor's prescription. This action is one of the factors in using excessively of antibiotics and antibiotic abuse will be happened [17].

TABLE 1: Characteristic of Participant based on Antibiotics Usage Attitudes.

Variable	Negative N (%)	Positive N (%)	p
<b>Age</b>			<b>0,000</b>
≤20 years	77 (47,53)	85(52,47)	
>20 years	36 (21,82)	129(78,18)	
<b>Semester</b>			<b>0,000</b>
1	61(50,00)	61(50,00)	
3	31(49,93)	38(55,07)	
5	16(21,05)	60(78,95)	
7	5(8,33)	55(91,67)	
<b>Gender</b>			<b>0,077</b>
Male	20(46,51)	23(53,49)	
Female	93(32,75)	191(67,25)	

Based on the results of bivariate analysis using chi-square there were two factors had significant result, namely age and semester level, this is in line with previous research in Qatar University with p value around 0,003 [21]. Older people tend to have better knowledge than young people, because older people have more experience and information. Older respondents have better knowledge related to the use of antibiotics. Meanwhile, the increasing knowledge tend to lead to have more positive attitude .

Education level (semester) have a significance value < 0.05. Study in Qatar University among student and family explains a correlation between the level of education and attitude in antibiotics usage (Sig. 0.003) [21]. Students in seventh semester (91.67%) have positive result than other semesters. It is because they have better knowledge than others and better experience while studying in college. Education improves a person health care starting from knowledge, attitude, and practice. Furthermore, it can make people be wiser in doing self-medication [22].

Research conducted in Sub-saharan Africa had proven participants attitudes toward COVID-19. There was positive response about the protective measure recommended by WHO or government regulations. Most respondents (81%) used masks when leaving the house, and maintaining an ideal distance to reduce the spread of the virus [23].

In contrast, study conducted in Ethiopia showed that partial respondents had travelled to the crowded places without wearing a mask when leaving the house [24]. Lack of understanding about COVID-19 infection is significantly related to attitudes and practices toward COVID-19. It is related to sub-optimal knowledge about COVID-19

among people. Society gap happened and it was getting worse due to the gap of knowledge. It affects to the attitudes and practices toward COVID-19 were also less than optimal [24]. Therefore, it is important to strengthen health education and awareness about infection, especially for COVID-19 knowledge, attitudes, and practices to reduce the spreadness. Another important thing to do is providing sufficient personal protective equipment for healthcare workers, increasing their awareness about prevention and infection control in health facilities [23].

TABLE 2: Multivariate Logistic Regression Analysis among Participant toward Antibiotic Usage.

Variabel	OR	p	95% CI
<b>Age</b>			
≤20 years	1		
>20 years	0,647	0,475	0,196-2,134
<b>Semester</b>			
1	1		
3	1,232	0,492	0,679-2,233
5	<b>4,286</b>	<b>0,000</b>	<b>2,025-9,072</b>
7	<b>16,482</b>	<b>0,000</b>	<b>3,583-75,806</b>
<b>Gender</b>			
Male	1		
Female	1,717	0,128	0,857-3,440

From the multivariate analysis, it was found that student in fifth semester and seventh semester were significantly correlated with attitude of using antibiotics with p value 0.000. Meanwhile, in third semester, age and gender were not significant (p value > 0.05). To find out the relationship at the two groups, it can be seen that 5<sup>th</sup> semester more likely to have positive attitudes towards antibiotic usage 4.281 times compared to first semester. Moreover, student in 7<sup>th</sup> semester more likely to have positive attitudes 16.482 times compared with first semester towards using antibiotics.

Similar result from study conducted in Kuwait showed that respondents who had higher education showed a more positive attitude than those with lower education (OR: 2.07; CI: 1.23-3.47; p:0.006) [25]. It mean that the higher the education a person has, the easier it will be to receive and implement the information is obtained.

## 4. CONCLUSION

We can conclude that age and semester level is associated significantly with attitude toward antibiotic usage. Moreover, fifth and seventh semester are more likely to have positive attitude than first semester with 4.281 times and 16.482 times respectively.

## CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

## AUTHORS' CONTRIBUTIONS

Angela Feby Alfirani write original draft, Methodology and Analysis; Sendi Lia Yunita made conceptualization, Data Curation, Investigation, Review & Editing; Mutiara Titani made conceptualization, Review and Methodology; Ika Ratna Hidayati & Rizka Novia Atmadani made Review and Methodology

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