

# Level of Knowledge and Attitudes towards the Practice of Obtaining Antibiotics among Health Students

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## ABSTRACT

Antibiotics are one of the drugs used to treat disease problems caused by bacterial infections. Because they are used to treat bacterial infections, antibiotics should not be used without guidance from a doctor. As a result of inappropriate use, it will impact the emergence of antibiotic resistance. This research aims to determine the knowledge and attitudes of second-semester students regarding practice of obtaining antibiotics to and use of antibiotics at Faculty of Public Health of Ahmad Dahlan University (FKM UAD). This research is an analytical observational study conducted with a cross-sectional design. The population of this study was UAD FKM students in their second semester, from two different study programs. The number of respondents in this study was 127, obtained using accidental sampling. The instrument used in this research is an electronic questionnaire, which will be analyzed using chi-square analysis with a  $p$ -value  $< 0.005$ . Student knowledge is in the low category (61.4%), and student attitudes are also negative (59.1%). Meanwhile, the chi-square test results show that knowledge ( $p$ -value: 0.025; PR: 2.5; 95% CI: 1.179-5.093) and attitude ( $p$ -value: 0.037; PR: 2.3; 95% CI: 1.112-4.713) have a relationship to practice of obtaining antibiotics in second-semester students at FKM UAD. Students' knowledge and attitudes are significantly related to the behaviour and practices regarding antibiotic use among FKM UAD students. It is hoped that related parties can create educational programs for students on the use of antibiotics and the importance of obtaining the right antibiotics.

Keywords: Antibiotics, attitudes, students, knowledge, practice of obtaining antibiotics to use

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## Introduction

Drugs are materials or substances derived from plants, animals, minerals, or certain chemicals that can reduce symptoms, slow down the disease process, and cure diseases. One example of inappropriate drug use is the rampant circulation of illegal drugs and drug abuse among teenagers [1]. Antibiotics must be used properly; otherwise, they will cause fatal effects such as antibiotic resistance. Therefore, the use of antibiotics must follow the correct and proper antibiotic prescription [2]. Irrational use of antibiotics includes inappropriate drugs, dosage, duration of use, frequency, and both overuse and underuse, which will lead to antibiotic resistance [3], [4], [5], [6].

According to global estimates, the number of deaths directly linked to Antimicrobial Resistance (AMR) rose to over 1.2 million in 2019, and is forecast to reach approximately 10 million per year by 2050 if insufficient action is taken to control AMR [7]. Other studies show that students who self-medicate with antibiotics to treat their illnesses in the United Arab Emirates, as many as 38.6%, in Kosovo, as many as 63.2%, and in Australia, the highest is 91.7% [8], [9]. Meanwhile, in Indonesia, based on the 2023 Indonesian Health Survey (SKI), of the 22.1% of people who used oral antibiotics in the past year, 41.0% obtained antibiotics without a prescription. More than 60% of people obtained antibiotics without a prescription from pharmacies or licensed drug stores, and the rest obtained

them from various sources, including online purchases. Based on regional distribution, the Special Region of Yogyakarta (DIY) is the province with the lowest proportion of antibiotics obtained without a doctor's prescription [10].

Apart from knowledge and attitudes, another factor is action to practice of obtaining antibiotics health services in the use of antibiotics, both with and without a prescription [11]. Limited knowledge, recommendations from relatives or peers, and prior experience with antibiotics for similar symptoms are factors influencing behavior; however, the extent of these associations may differ across contexts, and some studies indicate that financial factors are not consistently significant [12].

Low levels of knowledge regarding antibiotic use can lead to inappropriate use of drugs, resulting in treatment effectiveness not being achieved, increased morbidity and mortality, and increased patient treatment costs [13]. Previous research shows that one factor contributing to inappropriate antibiotic acquisition is limited public knowledge. Meanwhile, easy practice of obtaining antibiotics to antibiotics without a doctor's prescription is the result of non-compliance of pharmaceutical personnel with regulations [14].

College students are in a transitional stage from high school to college, which is a critical period for adolescents. First-year university students undergo a transitional phase marked by heightened autonomy and increased responsibility for self-care and health-related decision-making [15], [16].

Faculty of Public Health students at the beginning of the 2023/2024 academic year are currently in semester II. Students who live far from their parents are more likely to self-medicate, especially in the case of Faculty of Public Health of Ahmad Dahlan University (FKM UAD) students who use antibiotics. Based on interviews with 10 students in semester II, seven stated that when taking antibiotics, they did not complete the course and stopped taking the medication when they felt better. Not only that, but students also buy medicine based on previous experiences of illness with drugs that they have previously consumed. So, the researcher aims to determine the knowledge and attitudes of semester II students regarding practice of obtaining antibiotics to and use of antibiotics at FKM UAD.

## Materials and Methods

### Materials

The study was an analytical observational study using a cross-sectional design. The population of this study comprised all second-semester students in the Faculty of Public Health (FKM) at Ahmad Dahlan University (UAD). The sample was obtained using non-probability sampling with the convenience/accidental sampling technique, namely respondents who met the inclusion criteria and were willing to fill out an online questionnaire during the data collection period. Sampling was calculated using the Slovin formula, with a total population (N) of 339 second-semester students (200 public health undergraduates and 139 nutrition undergraduates) and a margin of error (e) of 0.05. The calculation yielded a minimum sample size of 184 people, but in the actual study, only 127 respondents met the criteria and completed the questionnaire. Therefore, data analysis was performed on 127 respondents who met the inclusion criteria: male and female students in their second semester from the Public Health and Nutrition Study Programs. Exclusion criteria in this study were students who completed questionnaires incompletely or outside the research period.

### Methods

#### 1. Measurements and Procedure

The instrument in this study was an electronic questionnaire (Google Form) comprising 4 parts. The first part is about respondents' characteristics, the second about knowledge, the third about attitudes, and the last about the practice of obtaining antibiotics. Knowledge and attitude scores were coded as the mean item score for each variable. Respondents with a score  $\geq$  mean were categorized as high/good (code=0), while respondents with a score  $<$ mean were categorized as low/poor (code=1). Students' ability to get and use antibiotics for illness during the past month is called the practice of obtaining antibiotics. Antibiotics can be obtained with a doctor's prescription (code=0) or without one (code=1), such as from a pharmacy/drug store, from leftover antibiotics, or from family/friends.

#### 2. Statistical Analysis

The results of this study were then analyzed univariately to determine the frequency distribution of variables, and bivariate analysis was continued to see the relationship between knowledge and attitudes towards practice of obtaining antibiotics. Validity and reliability of instruments. This research employed a questionnaire modified from prior studies. Consequently, further validity testing was not performed.

Ethical considerations for this research used an anonymous, low-risk online survey. Participation was voluntary, and electronic informed consent was secured before the initiation of the study. Personal identifiers were not collected, and the data were analyzed in aggregate form.

## Result

The results of the univariate analysis show the frequency distribution of the research respondents' characteristics. The results of this study are shown in **Table 1**.

**Table 1.** Frequency distribution of characteristics of semester II students at FKM UAD

Characteristics		N=127	%
Gender	Man	24	18.9
	Woman	103	81.1
Age	17 years old	2	1.6
	18 years old	28	22
	19 years old	74	58.3
	20 years old	19	15
	21 years	4	3.1
Study Program	S1 Public Health	64	50.4
	S1 Nutrition	63	49.6
Occupational Status	Work	2	1.6
	Doesn't work	125	98.4
	Boarding House/Contract	106	83.5
Residence	Living with parents	13	10.2
	Living with another family	8	6.3

**Table 1** shows that the majority of students are female (81.1%), while males number 22 (21.2%). Then, most of them, namely 74 students (58.3%), are 19 years old, and most of them come from the Nutrition Study Program, numbering 64 (50.4%). Most students are not working (98.4%), and the majority of students live in boarding houses/rented rooms, not with their parents or other relatives (83.5%).

**Table 2.** Frequency distribution of knowledge level and attitude of semester II students at FKM UAD

Characteristics		N=127	%
Knowledge	Tall	49	38.6
	Low	78	61.4
Attitude	Positive	52	40.9
	Negative	75	59.1

Based on **Table 2**, the majority, namely 78 students (61.4%), have low knowledge about antibiotics, while 49 students (38.6%) have high knowledge. The majority of students, namely 75 people (59.1%), have a negative attitude towards the use of antibiotics, while 52 people (40.9%) have a positive attitude towards its use. The bivariate analysis results for the relationship between students' level of knowledge and attitudes at FKM UAD regarding practice of obtaining antibiotics are shown in **Table 3**.

**Table 3.** Relationship between knowledge and practice of obtaining antibiotics among students at FKM UAD

Variables	Practice of Obtaining Antibiotic				P-value	PR	CI 95%
	Medical		Non-medical				
	n	%	n	%			
Knowledge							
Good	29	59.3	20	40.8	0.025	2.5	1.179-5.093
Poor	29	37.2	49	62.8			
Attitude							
Positive	30	57.7	22	42.3	0.037	2.3	1.112-4.713
Negative	28	37.3	47	62.7			

The results of **Table 3** indicate a relationship between students' knowledge level and antibiotic use ( $p$ -value: 0.025). Students with a low level of expertise are at a 2.5 times greater risk of getting practice of obtaining antibiotics to improper antibiotic use (through personnel other than doctors) compared to students with a high level of knowledge about antibiotics (CI 95%:1.179-5.093).

Then there is a relationship between students' attitudes about antibiotic use and antibiotic practice of obtaining antibiotics behavior ( $p$ -value: 0.037). The Prevalence Rate (PR) value of 2.3 means that students who have a negative attitude towards antibiotic use are at 2.289 times greater risk of lousy antibiotic practice of obtaining antibiotics behavior (practice of obtaining antibiotics through personnel other than doctors) compared to students who have a positive attitude (CI 95%:1.112-4.713).

## Discussion

Based on the research results, it was found that knowledge and attitude factors were related to practice of obtaining antibiotics in second-semester students in the FKM UAD environment. This is reinforced by the many students who get antibiotics, not from medical personnel, namely doctors. The results of this study indicate that students obtain most of their antibiotic prescriptions from pharmacies and drug stores. In addition, students use antibiotics without proper advice from personnel to treat themselves or self-medicate.

The results of this study also show that students' knowledge of antibiotic use remains low. This is in line with previous studies that showed the same thing, namely, the level of knowledge regarding the use of antibiotics in the poor category [17]. Knowledge about the use and storage of antibiotics also affects the effectiveness of the antibiotic therapy. Low knowledge about drugs will have negative impacts, such as not achieving the goals of therapy [18]. In addition, another factor that contributes to low student knowledge of antibiotic use is the major they studied during their studies [19]. This is supported by previous research that shows that health students have broader insight into the use of antibiotics than non-health students, also between medical students and regular health students [20], [21].

Research in Malaysia shows that 25.7% of students use antibiotics long-term to treat fever, afternoon throat, cough, and flu. However, the relationship between the use of appropriate antibiotics and the outcome has not been concluded. These

findings suggest a potential tendency towards self-medication and highlight the need for improved education on when antibiotics are necessary [22]. Other studies also show that low knowledge is associated with the conditions and risks of excessive antibiotic use in students [23].

Attitude is a readiness or willingness to act, not to carry out a particular motive. Attitude is not considered an action but is one of the predisposing factors of action or behavior. Attitude is regarded as a closed reaction, while the behavior is an open reaction [24]. This study's results indicate that attitudes are related to practice of obtaining antibiotics in students. Students with negative attitudes, namely those who obtain antibiotics without a doctor's prescription, are at a 2.3-fold higher risk than those with positive attitudes and obtain antibiotics from a doctor.

This study shows that students' attitudes are still not good in getting antibiotics. This aligns with previous studies that reported that attitudes influence antibiotic use [25]. Environmental factors greatly influence students' attitudes, so a good level of knowledge tends to contribute to taking attitudes and actions that do not follow the influence of friends or the experiences of friends around them [11].

Previous studies have reported that students' attitudes towards antibiotic use remain poor [26]. Respondents use antibiotics without a prescription because they feel they already know the diagnosis. The symptoms experienced are the function and dosage of antibiotics needed. In addition, they get information from other people, family, or the internet, and lack knowledge about antibiotics that should be used only with a doctor's prescription. Not only that, but students also use antibiotics because they want them to be fast, cheap, and efficient [21].

A study in Garut reported that the majority of students had insufficient knowledge (57.4%), attitudes (61.8%), and behaviors (56.4%) regarding antibiotic use [26]. Meanwhile, research in Jember showed that the dominant pattern of obtaining antibiotics without a prescription was through pharmacies such as 140 respondents obtained antibiotics from pharmacies, 2 from shops, and 8 from parents/family/friends. Overall, both studies demonstrate a correlation between low attitudes and knowledge and the practice of obtaining antibiotics without a prescription from non-medical sources [21].

Attitude is closely related to knowledge regarding the use of antibiotics without a doctor's prescription, which is considered harmless. A bad attitude can lead to a habit of using antibiotics without a doctor's prescription, from generation to generation, thus giving rise to a negative attitude and supporting the use of antibiotics without a doctor's prescription [27], [28]. The high percentage of students' efforts in self-medication, better known as self-medication in this study, was due to their place of residence being far from their parents. Most students are migrants who must survive far from their parents, which is the reason for students to do self-medication. A 2020 study said inappropriate knowledge will lead to improper use of antibiotics. Information about antibiotics via social media or print media is still lacking, so that antibiotic information obtained is based on the experience of friends or family [29]. Research conducted in Kendal also showed the same results, that attitudes and self-medication among students are related, including antibiotics that are often used for self-medication, especially in non-pharmacy and non-medical health students

who get practice of obtaining antibiotics to antibiotics without a prescription from pharmacies, stalls and parents or family and friends [21], [30], [31].

Overall, the results of this study indicate that among students, knowledge and attitudes play a role in the practice of obtaining antibiotics. Students' understanding of antibiotics is a critical basis for informed decision-making regarding drug use, including the duration of therapy and the implications of premature discontinuation [32], [33]. Nonetheless, knowledge gaps persist; for instance, certain students continue to hold the misconception that antibiotics are effective against viral infections [34]. Regarding attitudes, while a majority of students concur that antibiotic therapy must be completed, some maintain that antibiotics can be discontinued once symptoms diminish, highlighting a discrepancy between knowledge and attitudes toward safe practices [35], [36].

The prevalence of self-medication with antibiotics without a prescription remains significant among students across various countries [35], [37], which may contribute to the accelerated emergence of antibiotic-resistant bacteria [37]. The findings indicate that the relationship among knowledge, attitudes, and practices is not necessarily linear; possessing good knowledge does not guarantee the development of rational attitudes and behaviors. This underscores the need for more comprehensive educational interventions to address this discrepancy [38] and to enhance the curriculum concerning antibiotics and antimicrobial resistance in higher education [39].

## Conclusion

The study results show that students' knowledge and attitudes in semester II are significantly related to the behaviour and practice of obtaining antibiotics among FKM UAD students. This can be one of the concerns of related parties when creating an educational program for students on the use of antibiotics and the importance of proper practices for obtaining them. This study also has limitations because it was conducted via an electronic questionnaire and could not assess the students' actual conditions. so, further research is needed to find other factors in practice of obtaining antibiotics among students with a broader scope. Also, a disadvantage is that it had fewer respondents than Slovin's minimal sample size. This circumstance can affect the precision and power of statistical tests; thus, generalisation must be done carefully. Further research should use probability sampling and raise response rates to fulfil the minimum sample size.

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