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Research Article

Knowledge and Attitudes Towards Antibiotic Use Among Non-Health Related Majors Students at Andalas University

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ABSTRACT

The knowledge and understanding of the community about antibiotic usage are crucial to avoid inaccuracies in drug utilization. Negative impacts that can arise include the occurrence of resistance and the reduction in antibiotic effectiveness. Students with non-health related educational backgrounds are among the parts of the community that have a limited grasp of issues related to antibiotic usage. The aim of this research is to assess the level of knowledge and attitudes of non-health related major students towards antibiotic usage. This study utilized a cross-sectional method with validated questionnaires. Inclusion criteria for this research were non-health undergraduate students at Andalas University who were willing to complete the questionnaire comprehensively. The obtained data were statistically analyzed using SPSS version 26. The research findings indicate that non-health related major students at Andalas University possess moderate knowledge (54.7%) while their attitudes tend to be positive (71.1%) towards antibiotic usage. A significant correlation between students' knowledge and attitudes towards antibiotic usage was found, with a p-value <0.05. There was no significant correlation found between students' sociodemographic characteristics (faculty, age, gender, presence of family members working in the healthcare field) and their knowledge level. However, concerning attitudes, factors that influence include gender and the presence of family members working in the healthcare field.

INTRODUCTION

The effective and beneficial use of antibiotics is achievable when they are prescribed and consumed in accordance with established guidelines (Hu *et al.*, 2018; Jamhour *et al.*, 2017). Nevertheless, there is a current issue of antibiotics being used without proper understanding of the potential repercussions, leading to a decline in their efficacy (Tiong *et al.*, 2020). Furthermore, unnecessary antibiotic usage may result in individuals taking medication without clear indications, thereby contributing to the emergence of antibiotic resistance (Wax *et al.*, 2017).

Antibiotic misuse may arise because of the convenient availability of antibiotics without a physician's prescription (Ghaieth *et al.*, 2015). This situation poses a risk to the community using antibiotics, particularly those who are unaware of the risks associated with antibiotic resistance (Zafar *et al.*, 2013). Consequently, it is essential for pharmacists, as integral members of the healthcare team, to offer education to ensure the public possesses a solid understanding of how to use antibiotics correctly and to prevent errors in medication usage. A comprehensive grasp of the factors impacting adherence to antibiotic usage is equally crucial for effectively introducing suitable interventions (Gillani *et al.*, 2017).

Several previous studies have shown that the public's knowledge level regarding antibiotic

usage falls within the moderate category (Hu *et al.*, 2018; Lim *et al.*, 2012; Shah *et al.*, 2019). Knowledge is one of the factors that will influence an individual's attitude, thus exerting a significant impact on antibiotic usage (Nuraini *et al.*, 2019). Knowledge-based interventions or education are highly important to promote prudent antibiotic usage. Education plays a role in the learning process, wherein the higher an individual's educational level, the easier it becomes for them to receive information, whether from peers or through mass media, resulting in the accumulation of greater knowledge (Jamhour *et al.*, 2017).

Inappropriate drug usage among university students has become a significant issue in several developing countries (Gillani *et al.*, 2017; Jamhour *et al.*, 2017). They tend to be easily influenced by mass media and pharmaceutical advertisements on television. Typically, students use at least one of the advertised medication products without consulting a doctor. Students with educational backgrounds outside the healthcare field are one of the societal groups that may lack an understanding of drug-related issues, including antibiotic usage. The impact of media and pharmaceutical advertisements on students can lead to errors in drug usage without considering the appropriate indications (Almasdy *et al.*, 2011; Fatmah *et al.*, 2019; Ghaieth *et al.*, 2015).

Providing education on appropriate antibiotic usage for infection prevention is highly important. Accordingly, education or information dissemination related to proper antibiotic usage is needed to ensure that public knowledge and understanding of correct antibiotic usage can reach the desired standard (Hu *et al.*, 2018; Tiong *et al.*, 2020).

METHODS

Study Design

The research employed a quantitative study design using a cross-sectional method. The sample was obtained through purposive sampling, where the researcher applied predetermined inclusion criteria for selecting participants, namely non-health related major students at Andalas University who were actively enrolled in the academic year 2021/2022, agreed to participate in this research and willing to complete the questionnaire comprehensively.

Instrument

This study employed a questionnaire adopted from the research conducted by Ling *et al.*, 2010. The questionnaire consists of 22 questions which will be categorized into two sections: the first section addresses the knowledge aspect regarding antibiotic usage, comprising 14 questions, while the second section focuses on attitudes related to antibiotic usage, consisting of 8 questions. The questionnaire was subsequently translated into Indonesian and underwent validity and reliability tests. Data collection for the research was conducted by completing the questionnaire online using google Forms.

The level of respondents' knowledge is considered low if their answers are ≤ 55% (0-8 correct answers), moderate if their answers are 56-75% (9-11 correct answers), and high if their answers are ≥ 76% (12-14 correct answers). Respondents are deemed to have a negative attitude if their answers are ≤ 50% (score ≤ 8), and they are considered to have a positive attitude if their answers are ≥ 51% (score ≥ 9).

Statistical Methods

The collected data were then analyzed using statistical methods with SPSS version 26 (IBM Corp., Chicago, USA). The data analysis in this research includes:

1. Univariate analysis, to describe individual variables of both dependent and independent nature in the form of frequency distribution.

2. Bivariate analysis, an analysis to observe the relationship between two variables. Analysis to examine the differences in knowledge and attitudes of non-health related major students at Andalas University (dependent variables) based on respondents' sociodemographic data (independent variables) used the Chi-squared test. Additionally, an analysis to determine the association or correlation between two variables, namely knowledge and attitudes, was performed using the Spearman's rank correlation coefficient.

RESULTS AND DISCUSSION

"In this study, a total of 391 non-health related major students from Andalas University who met the inclusion criteria were included.

In Table 1, it can be observed that the number of female respondents is greater than that of male respondents. This is influenced by the distribution of females enrolled in each faculty, especially in non-health faculties, where females are more in the majority compared to males. This is also supported by student data collected from LPTIK Andalas University in the year 2022. The results of this study are in line with research conducted in Malaysia, which

reported a higher percentage of female students compared to male students in higher education institutions in Malaysia (Tiong et al., 2020). Gender differences influence variations in health-related responses, with females showing a higher concern for health compared to males (Jamhour et al., 2017).

Table 1. Sociodemographic characteristics of respondents.

Characteristics of Respondents	Respondents (n=391)	
	n	%
Age (year)		
18	15	3,8
19	51	13
20	133	34
21	109	27.8
22	83	21.2
Gender		
Female	256	65,4
Male	135	34,6
Having a family working in the field of healthcare		
Yes	122	31,2
No	269	68,8
Faculty of Respondents		
Faculty of Agriculture	45	11.5
Faculty of Mathematics and Natural Science	35	8.9
Faculty of Engineering	56	14.3
Faculty of Animal Husbandry	35	8.9
Faculty of Agricultural Technology	23	5.9
Faculty of Information Technology	13	3.3
Faculty of Law	44	11.3
Faculty of Economic	55	14.1
Faculty of Culture Science	35	8.9
Faculty of Social and Political Science	50	12.8

Table 2. Distribution of Respondents According to Knowledge Aspects (n=391)

No	Questionnaire Items	Patient Responses (%)		
		Right	Wrong	uncertain
1	Antibiotics are medications that can kill bacteria	257 (65.7)	79 (20.2)	55 (14.1)
2	Antibiotics be used to cure infections caused by viruses	184 (47.1)	122 (31.2)	85 (21.7)
3	Antibiotics can cure all infections	190 (48.6)	125 (32)	75 (19.2)
4	Antibiotics are effective in reducing inflammation	145 (37.1)	193 (49.4)	53 (13.6)
5	Antibiotics are used to stop fever	189 (48.3)	134 (34.3)	68 (17.4)
6	Penicillin is an antibiotic	205 (52.4)	90 (23.0)	96 (24.6)
7	Aspirin is a new generation of antibiotics	153 (39.1)	139 (35.5)	99 (25.3)
8	Paracetamol is an antibiotic	198 (50.6)	125 (32)	68 (17.4)
9	Diphenhydramine is not an antibiotic	174 (44.5)	86 (22.0)	131 (33.5)
10	Excessive use of antibiotics can lead to antibiotic resistance	244 (62.4)	69 (17.6)	78 (19.9)
11	Antibiotics can cause allergic reactions	187 (47.8)	117 (29.9)	87 (22.3)
12	All antibiotics do not cause side effects	188 (48.1)	111 (28.4)	92 (23.5)
13	I can stop taking antibiotics without finishing complete dose if I am feeling well	193 (49.4)	138 (35.3)	60 (15.3)
14	The effectiveness of the treatment decreases if the dose antibiotics are not completed	198 (50.6)	101 (25.8)	92 (23.5)

Table 3. Distribution of Respondents According to Attitude Aspects (n=391)

No	Questionnaire Items	Patient Responses (%)		
		Agree	Disagree	Netral
1	When I catch a cold, I will take antibiotics to help me recover faster	129 (33)	204 (52.2)	58 (14.8)
2	I hope antibiotics will be prescribed by my doctor if I experience symptoms of the common flu	133 (34)	171 (43.7)	86 (22)
3	I usually stop taking antibiotics when I start feeling well	152 (38.9)	159 (40.7)	79 (20.2)
4	If a family member is sick, I usually give them my antibiotics	113 (28.9)	174 (44.5)	104 (26.6)
5	I usually keep a stock of antibiotics at home for emergency situations.	160 (40.9)	154 (39.4)	77 (19.7)
6	I will use the remaining antibiotics for respiratory illnesses	103 (26.3)	219 (56)	69 (17.6)
7	I will take antibiotics as instructed on the label	310 (79.3)	52 (13.3)	29 (7.4)
8	I usually check the expiration date of antibiotics before taking them	330 (84.4)	27 (6.9)	34 (8.7)

Table 4. Distribution of Respondents According to Knowledge and Attitude Levels of Antibiotic Use (n=391)

Variable	n	%
Knowledge		
Low	145	37.1
Moderate	214	54.7
High	32	8.2
Attitude		
Negative	113	28.9
Positive	278	71.1

The majority of participants in this research are around the age of 20, as indicated in Table 1. Age has the potential to impact an individual's cognitive capacities and thought processes. With advancing age, cognitive abilities and thinking patterns tend to undergo further advancement. In the middle years of life, individuals become more actively involved in societal and social aspects, while also making more efforts to prepare for the adjustments that come with old age (Zafar *et al.*, 2013).

The data presented in Table 2 indicate that the majority of non-health related major students at Andalas University possess a moderate level of knowledge, constituting 54.7%. This outcome aligns with prior research, where >50% of respondents exhibited a moderate understanding of antibiotic usage (Hu *et al.*, 2018; Lim *et al.*, 2012; Shah *et al.*, 2019). Advancing in higher education facilitates students in assimilating information more effectively from diverse sources, whether originating from peers or mass media. Consequently, increased exposure to information leads to a broader accumulation of knowledge, encompassing details related to antibiotics (Jamhour *et al.*, 2017; Zafar *et al.*, 2013).

Participants in this study commonly possess comprehension regarding the appropriate applications of antibiotics for bacterial infections, distinct from viral infections. Moreover, they exhibit a clear grasp of the differences between antibiotics, anti-inflammatories, antipyretics, and antihistamines. Simultaneously, they recognize the potential consequences of excessive antibiotic consumption, which can contribute to the development of antibiotic resistance (Wax *et al.*, 2017)

Tables 2 and 3 present the distribution of respondents' answers regarding knowledge and attitudes in the use of antibiotics. Utilizing antibiotics necessitates accurate knowledge and a proper attitude towards their application. Adequate levels of knowledge can convert attitudes into positive ones, thereby guiding the actions more effectively. Various factors influencing the public's awareness of antibiotic usage encompass experiences, educational attainment, beliefs, healthcare access, income, as well as social and cultural aspects (Jamhour *et al.*, 2017).

The respondents' answer scores in Tables 2 and 3 are calculated to obtain the percentage results of the respondents' knowledge and attitudes regarding antibiotics. In Table 4, a total of 71.1% of the respondents exhibit a positive attitude and 54.7% have moderate knowledge towards antibiotic usage. These results imply that non-health related major students at Andalas University have a thorough understanding of the guidelines for using antibiotics, such as refraining from using antibiotics indiscriminately, avoiding excessive

usage, completing antibiotic courses, reading instructions on labels, and checking the expiration dates before use. The findings of this study align with previous research that also reported favorable attitudes towards antibiotic usage (Rahman *et al.*, 2016).

The study results reveal that there is no association between sociodemographic characteristics and the knowledge of the respondents (as shown in Table 5). This finding is in line with several previous investigations (Hu *et al.*, 2018; Shah *et al.*, 2019). The advancement of an individual's age does not necessarily ensure an increase in their knowledge, since there exist various other factors that can shape knowledge, including experience, education, and more (Notoatmodjo, 2014). Furthermore, the presence of family members employed in the healthcare sector doesn't appear to impact the respondents' level of knowledge. This might be attributed to a lack of interaction among family members, thus not significantly influencing the respondents' knowledge, even though they have relatives working in healthcare (Nuraini *et al.*, 2019).

From Table 6, the results show that there is a relationship between attitudes and gender as well as the presence or absence of family members working in the healthcare field, and there is no relationship between attitudes and the age of respondents in antibiotic usage. This finding is consistent with previous research (Lim *et al.*, 2012). Women exhibit more positive attitudes toward antibiotic usage compared to men, both in terms of utilization and adherence to antibiotic therapy (Zaidi *et al.*, 2020). This difference is attributed to women being more attentive to their health compared to men (Lubwama *et al.*, 2021). The relationship between the presence or absence of family members in the healthcare field and attitudes aligns with previous research, where attitudes also have a significant influence on antibiotic usage. Someone who possesses expertise in the healthcare field tends to garner higher trust from those around them, leading people to believe in the statements and actions of the individual in improving their quality of life (Gillani *et al.*, 2017; Tiong *et al.*, 2020).

Table 5. Relationship Between Sociodemographic Characteristics and Respondents' Knowledge Levels.

Characteristics of Respondents	Knowledge Levels			p value
	Low	Moderate	High	
Age (year)				0.247
18	6	10	0	
19	19	28	5	
20	51	75	11	
21	34	62	14	
22	35	39	2	
Gender				0.526
Female	90	141	23	
Male	55	73	9	
Having a family working in the field of healthcare				0.197
Yes	53	59	10	
No	92	155	22	

Table 6. Relationship Between Sociodemographic Characteristics and Respondents' Attitudes

Characteristics of Respondents	Attitudes Levels		p value
	Negative	Positive	
Age (year)			0.358
18	6	10	
19	12	40	
20	43	94	
21	26	84	
22	26	50	
Gender			0.028
Female	64	190	
Male	49	88	
Having a family working in the field of healthcare			0.002
Yes	65	204	
No	48	74	

Table 7. Relationship between Level of Knowledge and Respondents' Attitudes

Knowledge Levels	Attitudes Levels		*Correlation coefficient*	p Value
	Negative	Positive	0.237	0.000
Low	15.6%	84.4%		
Moderate	12.5%	87.5%		
High	0.76%	99.24%		

In Table 7, the results revealed associations between low knowledge and negative attitudes for 61 respondents (15.6%), low knowledge and positive attitudes for 84 respondents (84.4%), moderate knowledge and negative attitudes for 49 respondents (12.5%), moderate knowledge and positive attitudes for 165 respondents (87.5%), high knowledge and negative attitudes for 3 respondents (0.76%), and high knowledge and positive attitudes for 29 respondents (99.24%).

Based on Table 7, a correlation was found between the level of knowledge and attitudes towards antibiotic usage with a p-value of 0.000. The correlation coefficient value, r=0.237, indicates a weak positive correlation, meaning that as the respondents' knowledge level increases, their positive attitudes towards antibiotic usage also increase. These findings align with previous research that concluded a higher level of knowledge about antibiotics corresponds to a more positive attitude towards their usage (Hu *et al.*, 2018; Shah *et al.*, 2019).

Based on these research findings, one can assert that the disposition of students towards antibiotic usage is notably impacted by their degree of knowledge. Elements that have the potential to impact both knowledge and attitudes encompass gender and the presence of family members engaged in healthcare professions. This study emphasizes the significance of pharmacists delivering precise guidance concerning treatment objectives, timetables, methodologies, duration, adverse effects, preservation, and the administration of medications. Initiating awareness initiatives that advocate for appropriate and judicious antibiotic usage is imperative in order to mitigate the emergence of antibiotic resistance.

CONCLUSIONS

Non-health related major students at Andalas University have moderate knowledge (54.7%) and a positive attitude (71.1%) towards antibiotic usage. There is a significant relationship between the knowledge and attitudes towards antibiotics with a p-value of <0.05.

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CONFLICT OF INTEREST

The authors state that they do not possess any identifiable conflicting financial interests or personal associations that might have seemed to impact the impartiality and credibility of the research presented in this manuscript.

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