Cross-Sectional Study on Knowledge and Attitudes of Nonhealth Students Towards The Use of Antibiotics in Bangkalan Regency

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ABSTRACT

Antibiotics are drugs to kill bacteria or slow their growth. Antibiotics should be used at the doctor's clinical discretion and administered to the patient on prescription. The purpose of this study was to determine the relationship of unhealthy student knowledge level to the attitude and behavior of antibiotic use. Descriptive analysis research method with cross sectional approach on unhealthy students in Bangkalan Regency. Sampling was done by purposive sampling technique with questionnaire. The number of samples was 96 respondents conducted in March-May 2024. Analysis of bivariate and mulitivariate data. Data analysis with logistic regression. The results of the study stated that most of the non-health students in Bangkalan have enough knowledge in the category (40.2%), have enough attitude in the category (43.3%) and enough behavior (48.4%). The relationship of students ' level of knowledge to the attitude and behavior of antibiotic use using spearman correlation test that is sig value of 0.000 (<0.05) shows the relationship between the level of knowledge with the attitude and behavior of antibiotic use.

Keywords: Antibiotics, Knowledge, Behaviour, Attitude

1. INTRODUCTION

Infectious diseases can be caused by pathogenic microorganisms such as bacteria, viruses, parasites, or fungi where improper treatment of infections will cause resistance. One of the therapies for infectious diseases is using antibiotics (Sartelli *et al.*, 2020). Antibiotics are a class of antimicrobial compounds that have the effect of killing or stopping the proliferation of bacteria in the body. Antibiotics must be used based on the doctor's clinical judgement and given to the patient through a prescription. Antibiotics if used inappropriately can cause resistance (Alnasser *et al.*, 2021).

Antibiotic resistance is becoming a serious global health issue and is projected to cause 10 million deaths worldwide by 2050 if incorrect and excessive antibiotic use continues (Nuraini et al., 2019). The rise of antibiotic resistance in lowmiddle income countries is likely to be influenced by high poverty rates, longer duration of hospital stays, higher medical costs, and the risk of premature death, all of which have a direct impact on reducing overall productivity. Globally, the incidence of resistance due to antibiotic use has been gradually increasing in recent times (Meriyani et al., 2021).

In a study at Fatmawati Hospital Jakarta, Staphyloccus aureus was found to be resistant to penicillin G, ampicillin, sulbenicillin and

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amoxicillin. Resistance of Staphyloccus aureus to various types of antibiotics. 79.5% of isolates were reported to be resistant to penicillin, 34.6% resistant to gentamicin and 33.3% resistant to ciprofloxacin (Kemenkes, 2023). Resistance to various antibiotic agents has a significant negative impact in the form of increased therapeutic costs to the risk of complications that can be life-threatening (Kosiyaporn *et al*., 2020).

Proper and wise use of antibiotics can reduce resistance. Antibiotic resistance cannot be eliminated, but can be inhibited and controlled by making rational use of antibiotics (Sartelli *et al*., 2020). Factors that can cause the use of lack of irrational antibiotics are knowledge lack of knowledge about antibiotics, trust in neighbours, previous experience of antibiotic use and economic factors (Bunda, 2021).

The lack of public knowledge regarding the use of antibiotics and attitudes towards antibiotic treatment has led to a serious problem of antibiotic resistance. One of the factors causing antibiotic misuse is the lack of understanding and awareness of antibiotics (Ompusunggu, 2020). The understanding of people who receive antibiotic drugs is very important for the success of therapy and avoiding the incidence of resistance

Students are expected to have knowledge and positive attitudes related to antibiotics to support efforts to prevent antibiotic resistance, because knowledge plays a role in shaping one's attitude. Students in the health sector have sufficient understanding of antibiotics so that they are expected to prevent antibiotic abuse through education. Meanwhile, non-health students play a role in community development. Therefore, it is important to know the extent of knowledge and attitudes of non-health students, and whether the knowledge and attitudes are adequate to support the rational use of antibiotics and prevent resistance.

Research conducted on 2019 non-medical study programme students at Malikussaleh University, Cot Tengku Nie Reuleut, Muara Batu District, North Aceh Regency, Aceh, showed that 87.5% of students had good knowledge of antibiotic use, 12.5% had moderate knowledge, and no students with low knowledge were found. Knowledge has a positive effect on the behaviour of using antibiotics in students (p<0,05) (Sahputri *et al*., 2020).

According to previous research, the level of knowledge of non-medical students is in the

moderate category (49%), which is influenced by age and education level. Age and level of education play an important role, because the higher a person's level of education, the easier it is for him to think critically and understand the information received (Shahpawee *et al.,* 2020). in terms of attitudes towards antibiotic use, non-medical students were in the poor category (72%), which was caused by factors such as cost, occupation, and experience. The results showed a significant relationship between attitude and the use of antibiotics without a doctor's prescription (p < 0.05) (Zahra *et al*., 2022).

Adolescence is the transition from childhood to adulthood, where adolescents experience rapid physical, cognitive, emotional, and social maturity for both boys and girls. One of the groups in society that do a lot of self-medication is the teenage community such as students. Students are one component of society that has high knowledge. With a higher level of education, it is expected that they can make changes to the surrounding environment (Meriyani, *et al*., 2021). Research from Ajman University in the United Arab Emirates showed that medical students scored better on knowledge, attitudes and behaviour on antibiotic use than nonmedical students (Jairoun *et al*., 2019). Most students do not know about antibiotic resistance. So there needs to be an effort to increase understanding of antibiotics in students. Based on this background, it is necessary to conduct research on the Relationship between Knowledge of Non-Health Students on Attitudes and Behaviours of Antibiotic Use in Bangkalan Regency.

2. RESEARCH METHODS

This study is a cross sectional study which is a study that is conducted without intervening in research subjects (communities) that are directed at explaining a situation, with the aim of comparing, analysing and evaluating something. This method allows for research to be conducted in a shorter period of time with sample groups that are different but have the same characteristics. The sampling technique was carried out using purposive sampling technique, which is a sampling technique with certain considerations. The considerations taken in determining this sample are tailored to needs research usage antibiotics. The sample selected is a representative part of the population.

This research was conducted on non-health students in Bangkalan Regency in March-May 2024. The sample size was 96 respondents from universities in Bangkalan Regency, namely Trunojoyo Madura University and STKIP PGRI Bangkalan. The inclusion criteria in this study were active students at universities in Bangkalan Regency, with a non-health education background, willing to fill out a questionnaire, and had consumed antibiotics. Exclusion criteria were students with an educational background in the health sector, taking college leave, who refused to participate and students who answered incomplete all questions in the questionnaire. The location in this study was Bangkalan Regency, East Java.

The instrument in this study was a questionnaire sheet including a questionnaire of knowledge, attitudes and behaviour of antibiotic use. The instrument used must perform the validity test stage. Validated by means of a questionnaire of knowledge, attitudes and behaviour towards the use of antibiotics. Then the questionnaire was tested on 30 non-health students. The data obtained will be analysed using SPSS. Reliability is an instrument measurement that shows the extent to which the measurement results remain consistent when done repeatedly. In this study, the Cronbach's Alpha value formula was used using SPSS version 25.00. To determine the number of respondent samples, the minimum sample (n) was calculated using the Lameshow formula as follows:

$$n = \frac{Z\left(1 - \frac{a}{2}\right)^2 P\,(1 - P)}{d^2}$$

Description:

n : Sample size

$Z\left(1 - \frac{a}{2}\right)^2$: Z value at degree of significance 95% with a value of 1,96

P : The proportion of a particular case to the population, if the population is unknown, is set at 50% (0.50).

d : Degree of deviation from the desired population 10% (0.10) (Ahyar et al., 2020)

With the known formula, the sample size was calculated:

$$n = \frac{1,96^2 \cdot 0,5\,(1 - 0,5)}{0,1^2} = 96,04 \sim 96$$

The questionnaire used consisted of three parts: (1) An open-ended questionnaire to determine patient demographics. Demographic data containing gender and faculty. (2) Knowledge questionnaire to measure the level of understanding by patients about antibiotics including the meaning of antibiotics, providing drug information by health workers, understanding antibiotic resistance, preventing antibiotic resistance and antibiotic use rules. In this study, knowledge about antibiotics was measured using a Guttman scale with 15 questions with correct answers rated 1 and wrong answers rated 0. (3) Attitude questionnaire with 12 questions using a Likert scale. (a) Favourable statements. If the respondent answers strongly agree score 4, if agree score 3, if disagree score 2, and if strongly disagree score 1. (b) Unfavourable statements. If the respondent answers strongly agree score 1, if agree score 2, if disagree score 3, and if strongly disagree score 4. (4) Behaviour questionnaire with 10 questions using Likert scale. (a) Favourable statements. If the respondent answers strongly agree score 4, if agree score 3, if disagree score 2, and if strongly disagree score 1. (b) Unfavourable statements. If the respondent answers strongly agree score 1, if agree score 2, if disagree score 3, and if strongly disagree score 4.

The next step is to conduct a normality test to determine whether the data has a normal distribution or not. If the data is normally distributed, the Pearson correlation test is used, while if the data is not normally distributed, the Spearman correlation test is applied. This step aims to analyse the influence or relationship between the independent and dependent variables. In correlation analysis, the correlation coefficient (r) is obtained as a statistical measure that indicates the covariance or relatedness between two variables. This coefficient indicates the strength of the linear relationship and the direction of the relationship between the variables. Data analysis of the relationship between knowledge and attitude with behaviour used logistic regression test.

3. RESULTS AND DISCUSSION

The validity test results of knowledge, attitude and behaviour questionnaires were valid, because the value of rcount> table (0.361). The results of the reliability test of the knowledge, attitude and behaviour questionnaire regarding the use of antibiotics respectively have a Cronbach Alpha

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value of 0.608, 0.702 and 0.754. So the questionnaire regarding knowledge, attitude and behaviour of antibiotic use was declared reliable. Based on gender, the most respondents of this study were female with 63 people (66%) because more female students were willing to fill out the questionnaire than men. This is in accordance with the research of Madania et al. (2022), women are more concerned about health and have more free time than men (Madania *et al.*, 2022). In Santoso et al. (2022) stated that there are differences in the knowledge of men and women, where women are easier to interact and care more than men, especially in the social field of society (Santoso *et al.*, 2022). The students who participated the most were students from the Faculty of Economics, namely 32 students (33%).

Table 1.   Characteristics of Respondents

Characteristics	Category	f	%
Gender	Male	63	66
	Women	33	34
Faculty	Economics	32	33
	Law	11	11,3
	Psychology	17	17,5
	InformaticsEngineering	9	9,3
	English Education	8	8,2
	Teacher Education Primary School	16	16,5
	Social Sciences and Science Culture	3	4,2

Knowledge underpins a person's attitude and behaviour. Knowledge is an important domain for the formation of real action. Good knowledge will change attitudes to be positive so that the actions taken are positive (Sami *et al.*, 2022). Low knowledge and understanding that antibiotics should only be used based on a doctor's prescription causes their use to be irrational. Attitude is a form of evaluation or reaction to an aspect in the surrounding environment. A person's positive attitude is influenced by positive knowledge, and vice versa (Wisudanti *et al.*, 2023).

Knowledge, attitude and behaviour variables based on the Kolmogrov-Smirnov test are not normally distributed so the descriptive analysis is presented in table 2 below:

Table 2. Median, Minimum and Maximum Values of Knowledge, Attitude

Variabel	Median	Minimal	Maximum
Knowledge	9	7	12
Attitude	25	22	40
Behaviour	21	18	32

The score on the knowledge variable has a median value of 9 with the lowest score value of 7 and the highest of 12. The variable score on attitude has a median of 25 with the lowest score value of 22 and the highest of 40. The score on the behaviour variable has a median value of 21 with the lowest score of 18 and the highest of 32.

The research questions on the knowledge dimension were analysed. Table 3 shows the percentage of respondents' answers on the knowledge dimension.

Table 3. Frequency Distribution of Answers Antibiotic Knowledge

Aspects	Answer Correct		Answer Wrong	
	f	%	f	%
Definition of antibiotics	46	48,5	50	51,5
Classification of antibiotics	29	30,9	67	69,1
Antibiotic side effects	41	43,3	55	56,7
Antibiotic purchase	35	37,1	61	62,9
Antibiotic use	27	28,9	69	71,1
Antibiotic resistance	43	45,4	53	54,6

Based on the distribution of answers regarding antibiotic knowledge, it is known that 48.5% of respondents know about the meaning of antibiotics. Respondents know that antibiotics are drugs used to treat the disease. bacterial infection. This is in line with the research of Meinitasari et al. (2021) stated that 62.65% of respondents out of a total of 96 respondents agreed that antibiotics are drugs used to treat bacterial infections (Meinitasari *et al.*, 2021).

The most wrong answers in the statement about the use of antibiotics are used to treat pain and inflammation as much as (60.8%). This is in line with the research of Sasenga et al., (2022) which states that antibiotics can be taken when fever and pain are not caused by bacterial

infections. The use of antibiotics does not need to be given if there is no inflammation or fever that indicates a concomitant infection by bacteria (Sasenga, *et al.*, 2020).

Knowledge, attitude and behaviour were categorised into two categories: good, fair and poor. The distribution of knowledge level, attitude and behaviour towards the use of antibiotics can be seen in table 4 below:

Table 4. Respondents' Knowledge, Attitude and Behaviour towards Antibiotic Usage

Variables	Category	f	%
Knowledge	Good	23	24,7
	Simply	39	40,2
	Less	34	35,1
Attitude	Good	33	34
	Simply	41	43,3
	Less	22	22,7
Behaviour	Good	18	18,6
	Simply	46	48,4
	Less	32	33

Table 5 shows that in non-health students, knowledge about the use of antibiotics is mostly in the sufficient category (40.2%). In the attitude variable, most of them were in the moderate category (43.3%) and in the behaviour variable, most non-health students had moderate antibiotic use behaviour (48.4%).

Table 6. Results of Logistic Regression Analysis of Knowledge and Attitude towards Antibiotic Use Behaviour

Variabel	OR	p value	95% CI
Knowledge	1,237	0,011	1,050-1,456
Attitude	1,064	0,046	1,001-1,131

Students' knowledge significantly influenced the behaviour in using antibiotics. The significant value of the effect of knowledge on behaviour is 0.011, as well as attitudes have a significant effect on behaviour in using antibiotics. The significant value of the effect of knowledge on behaviour is 0.046. Because the significant value obtained < 0,05 and the regression coefficient is positive, it can be concluded that knowledge and attitude have a positive and significant effect on behaviour.

Correlation analysis was conducted to see whether there was a relationship between the variables of knowledge, attitude and behaviour of antibiotic use by non-health students in Bangkalan Regency. The correlation test used in this study is the Spearman rank correlation test. With n = 97, the results of the correlation coefficient and correlation significance are obtained as in the table below:

Table 7. Relationship between Knowledge Level and Attitude towards Antibiotic Use Behaviour

Variables		Knowledge	The hood	Behaviour
Knowledge	Coefficient correlation	1,000	0,321	0,425
	p	-	0,000	0,000
Attitude	Coefficient correlation	0,321	1,000	0,377
	p	0,000	-	0,000
Behaviour	Coefficient correlation	0,425	0,377	1,000
	p	0,000	0,000	-

Based on table 7, it is known that the correlation coefficient of knowledge to attitude, knowledge to behaviour, attitude to behaviour has a correlation coefficient value. < 0.5, meaning the correlation between variables is weak However, the positive sign (+) in the correlation coefficient indicates the same direction of relationship, meaning that the better the respondent's knowledge, the better the attitude and behaviour, and the better the respondent's attitude, the better the behaviour. In the significance test of the correlation number of knowledge-attitude, knowledge behaviour and attitude-behaviour, the value obtained < 0,05 Nevertheless, positive signs (+) pada means that there is a correlation between knowledge and behaviour, attitude and behaviour and knowledge and behaviour. This is in line with previous research conducted on students of Muhamadiyah University Surakarta which also showed the same results, namely that there was a significant relationship between knowledge and behaviour in using antibiotics (Yunita *et al*., 2021).

There are several limitations of this study, including not conducting direct interviews with respondents to find out the complete causes of inappropriate antibiotic use behaviour. This study did not separate samples based on the school year of the respondents to find out differences in knowledge, attitudes and behaviour of students based on each school year of the respondents, so that the results could be better analysed. Suggestions obtained from the results of this study need to be carried out counselling activities to increase student knowledge, especially non-health students, on the importance of wise use of antibiotics through posters, pamphlets and social media.

CONCLUSIONS

Based on the results of the study, it can be concluded that the level of knowledge, attitudes and behaviour of antibiotic use among non-health students in Bangkalan Regency is in the sufficient category. There is a significant relationship between knowledge, attitude and behaviour of antibiotic use among non-health students.

ADVICE

Suggestions obtained from the results of this study are that health workers are expected to collaborate with health workers to socialise the use of antibiotics so that a decrease in antibiotic resistance rates can be realised, for further researchers need further research on factors that influence the relationship between knowledge of attitudes and behaviour of antibiotic use in nonhealth students.

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