

Self-Medication of Antibiotic Use: Investigating Knowledge and Attitude Among Rural Population in Umbul Natar Village, South of Lampung

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Abstract: Self-medication with antibiotics is a common phenomenon among the general population, including in rural areas. This practice has been the subject of particular attention because the consequences are very dangerous in terms of the development of antibiotic resistance. There are several factors underlying this practice in rural communities. Therefore, it is necessary to study the knowledge, attitudes and practices of rural communities. This study is an observational study with a cross-sectional approach. Data were collected using a validated questionnaire. A total of 257 respondents dominated by low education level (53,53%) and low-income status (98,44%). A numerous 59,92% had poor knowledge and 59,53% had a negative attitude. Factors such as educational level ($p=0.035$), income status ($p=0.010$), knowledge ($p=0.004$) and attitude ($p=0.000$) were significantly associated with the practice of self-medication with antibiotics. In general, socio-demographic factors influence people's decision to self-medicate with antibiotics. The health care providers such as doctors and physicians should be concerned to improve knowledge and awareness towards antibiotic use in properly.

1 INTRODUCTION

Self-medication of antibiotic is frequently encountered in the general population. This act closest to inappropriate antibiotic use and leads to antibiotic resistance. Ninety percent of antibiotics are purchased without a prescription (Puspitasari et al., 2011). The Indonesian Minister of Health has issued a regulation on general guidelines for the use of antibiotics in Minister of Health Regulation No. 28 in 2021. Under these rules, antibiotics can only be given or purchased with a medical prescription (Regulation of The Minister of Health of The Republic of Indonesia Number 28 of 2021, 2021).

The practice of self-medication involves the unsupervised administration of medication, including antibiotics, by an individual without seeking expert medical advice for diagnosis or prescription (Nepal & Bhatta, 2018). It is considered as unhealthy behaviour and inappropriate as a treatment method.

Previous studies have shown that even when people have access to knowledge about dosage, appropriate duration of use and risk of drug interactions, many still misuse antibiotics (Nepal & Bhatta, 2018). This leads to antibiotic resistance, where the infection is difficult to treat with standard antibiotic therapy (Sachdev et al., 2022; Ventola, 2015).

Antibiotic resistance is a global health problem and continues to be a major target framework. As

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many as 700,000 people will die from antimicrobial resistance in 2013, and by 2025, about 10 million people will die each year from antimicrobial resistance (WHO, 2014). Case fatality rates of resistance in hospital-acquired infections in newborn babies have been reported to range from 44.3% to 31%. Antimicrobial resistance is a condition where the infection becomes resistant to standard antibiotic therapy. This condition can affect the effectiveness of therapy and the cost of treatment. Several factors are the cause of antibiotic resistance, including overuse and misuse (Aris et al., 2012; Voidāzan et al., 2019; WHO, 2014).

Basic Health Research data from the Indonesian Ministry of Health in 2013 reported that 10% of the population kept antibiotics at home. Of these, 86.10% received antibiotics without a prescription (The Indonesian Ministry of Health, 2013). Antibiotic self-medication is common in developed and developing countries with a prevalence range of 35%-75% (F.A. et al., 2009; Skliros et al., 2010). In Indonesia, antibiotics are often given without prescription, such as in pharmacies, drug stores, and even roadside stalls. A survey on the population in the province of Yogyakarta reported that 64% of purchases of antibiotics were without prescription. Generally, the use of antibiotics is in cases of respiratory disorders, which is 80% (Hadi et al., 2008), including the common cold, cough, sore throat, dizziness, and other symptoms of respiratory disorders. Types of antibiotics that are often used are amoxicillin, fradiomycin-gramicidin, tetracycline, and ciprofloxacin.

There are several factors that contribute to self-medication with antibiotics. These include a lack of knowledge about the use of antibiotics, a perception of the high cost of visiting a doctor, and a belief that antibiotics must always be used to treat a specific illness. In fact, self-medication is an important factor driving the overuse of antibiotics, especially in low and middle-income countries, where antibiotics are readily accessible without a prescription (Ayukekong et al., 2017). Low-income and middle-income countries (LMICs) play an important role in the global response to antimicrobial resistance (AMR) (Chandler et al., 2016). The population in these countries considers self-medication with antibiotics to be cheaper and more affordable than seeing a doctor. They were often associated with lack knowledge and negative attitudes towards the appropriate use of antibiotics (Dyar et al., 2020). Various factors play a role in the behaviour of self-medication antibiotics, such as purchasing antibiotics freely without supervision, economic conditions and

urgency of time, the influence of family or friends, and the level of community knowledge. Antibiotic self-medication is affected by ease of access to getting antibiotics without a prescription (Insany et al., 2015). Good knowledge and positive attitude considerably affect the practice of antibiotic self-medication, although in some situations it does not result in good practice regarding the use of antibiotics (Pham-Duc et al., 2019). The study of Al Qarni et al. stated that individuals with good knowledge about antibiotics also have a good attitude towards the use of antibiotics (Alqarni & Abdulbari, 2019).

One of the rural areas not far from the capital city of Lampung is the village of Umbul Natar South Lampung. The majority of the population in this village work as farmers and traders, with a medium to low level of education, which can provide an overview of the pattern of antibiotic use in self-medication. One of the strategies to tackle antimicrobial resistance is to improve knowledge and attitudes about antibiotic use. One of the efforts to support the World Health Organization (WHO) Emergency Programme on Antimicrobial Resistance (AMR) is community education. Therefore, it is necessary to investigate the relationship between knowledge, attitudes and practices regarding antibiotic self-medication in rural communities in South Lampung, Indonesia. This study aims to identify the factors that influence the implementation of the antibiotic resistance control programme.

2 METHOD

2.1 Research Design

This is an analytical observational study with a cross-sectional approach. The instrument used is a questionnaire consisting of questions about knowledge, attitudes, and practice in antibiotic self-medication. The target population is community in Umbul Natar Village South of Lampung, Indonesia. Technic sampling by purposive sampling. The inclusion criteria in this study were people from adolescence to adulthood who were willing to be respondents. The exclusion criteria were that the respondents did not fill out the questionnaire. The data obtained will be presented descriptively in tables and figures. To determine the correlation between demographic factors towards knowledge, attitudes, and practice, we used the chi-square test was carried out with a 95% confidence level ($p < 0.05$). This research has received ethical approval from the Research Ethics Committee of the Faculty of

Medicine, the University of Lampung with Number 1378/ UN26.18/ PP.05.02.00/ 2020.

2.2 Collected Data Knowledge, Attitude

Knowledge and attitude measurements were conducted using a questionnaire adapted from similar research questionnaires with modifications and tailored to the expected information (10,20–22). The questionnaire was narrated in Bahasa Indonesia and consisted of 4 knowledge questions (K1-K4) on a Guttman Scale, 7 attitude statements (A1-A7) on a Likert scale and 4 practice questions on a Guttman Scale. The questionnaire has been validated with the Cronchbach score of knowledge, attitude and practice questions being 0.684; 0.799; 0.604 respectively.

2.2.1 Knowledge

There are 4 question items (K1-K4) in the knowledge section with true and false statements. K1, K2 and K4 are questions with false statements or unfavourable question and K3 true statements or favourable question. The determination of the knowledge level referred to the cut of mean value of the respondent's answer. The cut of median score is 3 which means that less than 3 is considered as poor and more than equal to 3 was as a good level.

2.2.2 Attitude

This section consists of 7 statement items with the answers strongly agree, agree, disagree, and strongly disagree. Statements A1, A2, A3, and A4 are negative statements so that the highest score starts from the answers strongly disagree = 4, disagree = 3, agree = 2, and strongly agree = 1. Statements A5, A6, and A7 are positive statements so that the highest score starts from the answers strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1. The criteria for the positive attitude category refer to the median cut off score of the respondent's answer value, where positive attitude ≥ 15 , and negative attitude if the value is < 15 .

2.2.3 Practice

This section consists of 3 questions that aim to determine antibiotic use or the experience of using antibiotics. Description of the questions P1: Did you take the antibiotics as recommended by your doctor or health care professional, P2: Have you finished the full course of antibiotics prescribed by your doctor, P3: Did you consult a healthcare professional before

antibiotic use? P4: Would you share the antibiotics you are currently using if your family were ill. Question P1-P3 are favourable and P4 unfavourable. The questions using “Yes” or “No” answer, and if they had a value of ≥ 2 then it was considered a good practice. This statement illustrated respondents doing antibiotic self-medication and practicing doing antibiotics self-medication.

3 RESULTS

3.1 Demographic Data

A total of 257 respondents completed the questionnaire. The socio-demographic data of the respondents are presented in Table 1. Overall, most of the respondents were male (50.97%) and dominated by the age group of 36-55 years (41.78%). Most of them had primary and basic education (53.31%). In terms of income status, the majority of the respondents were below the regional minimum wage (90.44 %). Many respondents worked as housewives (26.46%) and farmers (19.07). Information about antibiotics was received from the family by 75.49% of respondents.

3.2 Knowledge's and Attitude Data

Based on the respondents' answers to several knowledge questions, the majority of respondents had poor knowledge (59.92%) and as many as 40.08% had good knowledge. Table 2 shows respondents' responses to questions about antibiotics. Many respondents thought that antibiotics did not need to be finished (60.31%) and thought that antibiotics could treat cold and cough (97.28%). In addition, most respondents understood that antibiotics can boost the immune system (98.44%), but many of them also knew that antibiotics have side effects.

Table 1: Characteristic of Respondents

Characteristics	n	%
Sex		
Male	131	50,97
Female	126	49,03
Age (cut off in years)		
<35	135	52,53
≥ 35	122	47,47
Education level		
Elementary and basic school	137	53,31
Middle education level	113	43,97
At University level	3	1,17
Income (Regional Minimum Rate)		
Under Regional Minimum Rate	253	98,44
Regional Minimum Rate or more	22	8,56
Occupation		
Businessman	19	7,39
Employee	17	6,61
Farmer	49	19,07
Freelancer	25	9,73
Housewife	68	26,46
Labor	35	13,62
Student	41	15,95
Unemployment	3	1,17
Source of information Antibiotic Use		
Health Providers	29	11,28
Family	194	75,49
Friend/Colleague	32	12,45
Internet	2	0,78

Table 2: Knowledge Respondents on Antibiotic Use

Code	Knowledge on antibiotic use	Correct response	%	Incorrect response	%
K1	Antibiotics don't require the full course to be completed	155	60,31	102	39,69
K2	Antibiotic work for the flu and cough	250	97,28	7	2,72
K3	Antibiotic have side effect	251	97,67	6	2,33
K4	Antibiotics boosted your immune system	253	98,44	4	1,56

Table 3 demonstrates the attitudes of the participants. Statements A1-A4 are negative statements, whereas disagree or strongly disagree indicates a positive attitude. Regarding the results of participants' responses to several attitude questions, the majority had negative (59.53%) and some positive (40.47%) attitudes. A total of 64.59% of respondents agreed with the statement "Buying antibiotics without a prescription". A total of 93.39% of respondents agreed that they give antibiotics to their family as long as they have the same illness, and 90.66% of respondents agreed with the statement that they keep a stock of antibiotics at home for use when they are ill. In statement A4, 94.55% of respondents agreed

that they use antibiotics for farm animals (chickens). Overall, negative attitudinal statements (A1-A4) generally indicate that respondents self-medicate with antibiotics. Statements A5-A7 are positive, i.e. respondents agree or strongly agree, indicating a positive attitude. A total of 89.11% of respondents disagreed with the statement that a course of antibiotics must be completed, more than 89.49% of respondents agreed that not taking antibiotics properly can be harmful to health (A6) and 94.55% agreed with the statement that consultation with health provider before taking antibiotics (A7). Most respondents also have negative attitudes based on favorable questions.

Table 3: Attitude Respondents on Antibiotic Use

Code	Statements	Strongly Disagree	%	Disagree	%	Agree	%	Strongly agree	%
A1	Buy antibiotics without a prescription	0	0,00	88	34,24	166	64,59	0	0,00
A2	Give antibiotics to the family as long as having the same illness	3	1,16	9	3,50	240	93,39	5	1,95
A3	Keep stock of antibiotics at home for usage when sick	2	0,77	8	3,11	233	90,66	14	5,45
A4	Antibiotics are given to farm animals (chickens)	0	0,00	5	1,95	243	94,55	9	3,50
A5	Full course of antibiotics must be finished	0	0,00	229	89,11	13	5,06	15	5,84
A6	Not taking antibiotics properly can be harmful to health	2	0,77	230	89,49	21	8,17	4	1,56
A7	A health provider should be consulted before taking antibiotics	0	0,00	5	1,95	243	94,55	9	3,50

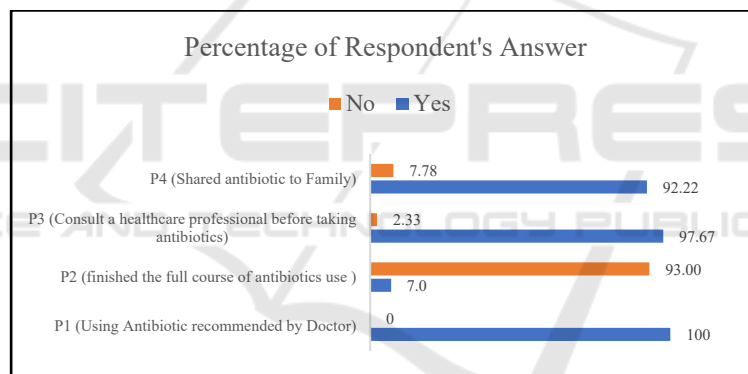


Figure 4: Respondent's Practice of Antibiotic used

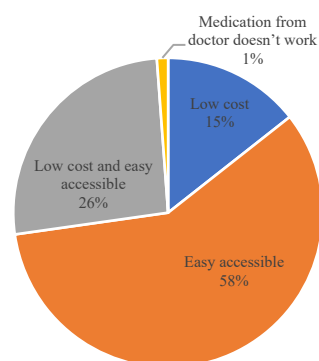


Figure 3. Reasons for The Use of Antibiotic Self-Medication

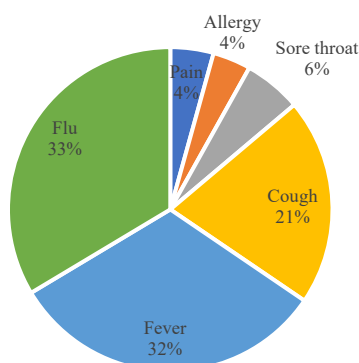


Figure 3. Reasons to Use Antibiotics without Prescription Among Respondents.

We collected data reason for the use of antibiotic self-medication from the respondents. Overall, respondents were considered self-medication with antibiotic is easy-accessible and low cost. Respondent also consumed it for some medical problem such as flu (33%), fever (32%), cough (21%) and others.

3.3 Correlation Characteristic Respondents Toward Knowledge and Attitude

We also analyzed a number of characteristics in relation to knowledge and attitudes on a bivariate

basis (Table 4). Gender ($p=0.308$), level of education ($p=0.075$), income ($p=0.756$) was not significantly related to knowledge, but age was significantly related to knowledge ($p=0.032$) with a p -value < 0.05 . Meanwhile, the factors age ($p=0.045$) and education ($p=0.018$) were significantly related to the respondents' attitude with a p -value < 0.05 , but the factors age ($p=0.161$) and income ($p=0.102$) were not significantly related to this attitude.

Table 4: Characteristic's Respondents toward Knowledge and Attitude

Characteristics	Knowledge				<i>p-value</i>	Attitude				<i>p-value</i>
	Poor n=154	%	Good n=103	%		Negative n=153	%	Positive n=104	%	
Gender										
Male	83	32,3	48	18,7	0,308	84	32,7	47	18,3	0,161
Female	71	27,6	55	21,45		69	26,8	57	22,2	
Age										
<35 years	72	28,0	63	24,5	0,032*	72	28,0	63	24,5	0,045*
≥ 35 years	82	31,9	40	15,6		81	31,5	41	16,0	
Level of Education										
Elementary and basic school	88	34,2	49	19,1	0,075	90	35,0	47	18,3	0,018*
Middle education level	60	23,3	53	20,6		57	22,2	56	21,8	
At University level	6	2,3	1	0,4		6	6	1	0,4	
Income (Regional Minimum Rate)										
Under Regional Minimum Rate	142	55,3	93	36,2	0,756	144	56	91	35,4	0,102
Regional Minimum Rate and more	12	4,7	10	3,9		9	3,5	13	5,1	

Chi square with p value $< 0,05$

Table 5. Correlation Characteristics toward Self-Medication with Antibiotic

Characteristics	Self Medication Antibiotic				<i>p value</i>
	No n=11	%	Yes n=246	%	
Gender					
Male	5	1,9	126	49,0	0,947
Female	6	2,3	120	46,7	
Age					
<35 years	9	3,5	126	49,0	0,093
≥ 35 years	2	0,8	120	46,7	
Level of Education					
Elementary and basic school	2	0,8	135	52,5	0,035*
Middle education level	9	3,5	104	40,5	
At University level	0	0,0	7	2,7	
Income (Regional Minimum Rate)					
Under Regional Minimum Rate	22	7,53	245	83,90	0,010
Regional Minimum Rate and more	6	2,05	19	6,51	
Knowledge					
Poor	2	0,8	152	59,1	0,004*
Good	9	3,5	94	36,6	
Attitude					
Positive	10	3,9	94	36,6	0,000*
Negative	1	0,4	152	59,1	

Chi square with p value <0,05

3.4 Characteristic's Respondents Toward Self-Medication with Antibiotic Practice

We also assessed the relationship between socio-demographic factors, level of knowledge and attitude towards the practice of antibiotic self-medication (Table 5). This analysis showed the respondents who performed or had experience of antibiotic self-medication based on the factors suspected to be related. Based on the bivariate analysis, the factors of education ($p=0,035$), income ($p=0,010$), knowledge ($p=0,004$) and attitude ($p=0,000$) were significantly associated with the practice of antibiotic self-medication at $p<0,05$. On the other hand, other socio-demographic factors such as gender ($p=0,947$) and age ($p=0,093$) were not significantly associated with the practice of self-medication with antibiotics

4 DISCUSSIONS

This is an observational study of antibiotic self-medication in a village community in Lampung Province. Of the 257 participants, 95.71% of respondents were engaged in the practice of antibiotic self-medication. The high prevalence of antibiotic self-medication in the rural population is also found

in several countries, including Greece 77.9% (Skliros et al., 2010), Sindh Pakistan 81.25% (Bilal et al., 2016), and India 74% (Pentareddy et al., 2017), and also in regions with different population characteristics (non-rural), such as Yogyakarta Indonesia (58%) (Kristina et al., 2020a), Saudi Arabia (78.1%) (Al Rasheed et al., 2016), Eritrea (Africa) (45.1%) (Ateshim et al., 2019), Tanzania (58%) (Horumpende et al., 2018), and Ethiopia (67%) (Bogale et al., 2019). These data indicate that self-medication with antibiotics is common in rural communities, especially among lower-middle-income people. Some of the findings among the respondents included the belief that antibiotics can enhance the immune system and treat colds and coughs. A study in Yogyakarta revealed that the majority of respondents (58%) had a low level of knowledge about antibiotic use and awareness, and mistakenly thought that colds and coughs can be treated with antibiotics (75%) (Kristina et al., 2020b). Misperceptions about the indications for antibiotics may influence people's attitudes and practices regarding antibiotic use. No study has been done to investigate the perception that antibiotics improve the immune system, and it demonstrates a lack of understanding of the immune system and the role of antibiotics in the rural population. Another study found that individuals engage in self-medication with antibiotics for various reasons such as flu, cough,

common cold, sore throat, diarrhea, toothache, pain relief, and fever (Aslam et al., 2020; Hawking et al., 2017). Most people do not understand the difference between antibacterial and antiviral, they consider they are the same (Hawking et al., 2017). A similar misunderstanding is also found in several countries such as in South Africa (66%) (Farley et al., 2019), Yogyakarta-Indonesia (70%) (Aris et al., 2012), and Kosovo (42,1%) (Zajmi et al., 2017). Misconceptions about antibiotics as having antiviral or antibacterial properties are also found in some countries such as Malaysia, 75% of respondents have an understanding that antibiotics can cure colds and coughs (Ka Keat & Chew Charn, 2012).

We found age and level of education associated to attitude of self-medication with antibiotic. Bhardwaj et al, reported that respondents with a high school education level had less knowledge of antibiotics than respondents with higher education (Bhardwaj et al., 2021). Generally, our discovered shows respondents in basic school to secondary school level (senior high school, junior high school, and elementary school) had insufficient knowledge level. Knowledge is an essential component to determine attitudes and practice. Good knowledge supports a person to be more aware of how to use antibiotics properly (Voidāzan et al., 2019). And it correlated positively with attitudes towards antibiotic use ($p < 0.001$) (Ka Keat & Chew Charn, 2012).

Another fact from this study shows that majority of the respondents agreed that antibiotics should be given to farm animals. As reported in several studies, antimicrobial use in farm animals is also quite widespread (Founou et al., 2016; Van Boeckel et al., 2015). One of the reasons for this is a lack of understanding and public awareness of the correct use of antibiotics. While antimicrobials have been used to maintain animal health and improve productivity, their overuse in feed has led to increased antimicrobial resistance (Ma et al., 2021). The attitude assessment showed that 90.75% of respondents had a negative attitude towards the use of antibiotics. Based on gender characteristics, men and women have the same proportion of negative attitudes towards the use of antibiotics. Mostly, respondents who have a negative attitude are those with high school education and below. Only the level of education and knowledge correlate significantly to the respondent's attitude ($p < 0.05$). Another study reported that higher levels of education relate to more favourable attitudes towards antibiotic use (Alqarni & Abdulbari, 2019; Waaseth et al., 2019). This indicate that knowledge does not reflect a positive attitude, it can be seen in the inconsistency of respondents'

answers. All respondents (100%) gave the correct answer for the statement that antibiotics require a prescription. However, 60.96% answered that they do buy antibiotics without a prescription. People who have negative attitudes toward antibiotic use tend to keep antibiotics at home as stock when sick. Most of the respondents agree with this statement (86,99%). A study in the Philippines reported about 52.4% of respondents agree with the statement of the need to keep antibiotics in stock (Barber et al., 2017). Keep antibiotic in stock leads improper and overuse antibiotic, beside antibiotic use needs indication and dosage appropriate. Numerous people use it refer to the past history prescription from doctor.

Socioeconomics is one factor that influences self-medication, such as income factor. Rural communities tend to have low incomes or earn below the regional minimum wage. This condition encourages people to try solutions to overcome their health problems by using antibiotics freely/without a prescription (Haenssger et al., 2019). The characteristics of population studies affecting towards antibiotics self-medication behaviour at varied levels of significance. The rural population is identical to the low-income and middle-income. We found the majority of respondents have income below the Regional Minimum Wage. Income level as factor affecting to practice antibiotic self-medication showed correlated significantly. Based on several observational studies, it has been reported that antibiotic self-medication antibiotics is more frequently found in people with lower middle income (Aslam et al., 2020). Self-medication was considered to be less time-consuming, cheaper, and overall, more convenient than accessing them through healthcare facilities (Do et al., 2021). In this study, respondents stated that the reason was that they thought the drugs prescribed by doctors were less effective, as in the Haque et al (2019) study which reported that one of the driving factors is a lack of confidence in the drug prescribed by physicians (Haque et al., 2019). In contrast to the study in Croatia, where the number of respondents with a high level of confidence in doctor's treatment is greater and who tend to more and they are those who have good knowledge (Farkaš et al., 2019).

In general, behaviour is affected by knowledge and attitudes. This study showed a significant correlation between knowledge and attitudes towards antibiotics self-medication ($p < 0.001$). Poor knowledge and negative attitudes correlate with respondent's practice in using antibiotics without a prescription. The results of surveys on the use of antibiotics in various countries are quite diverse.

However, there have the same misconceptions regarding knowledge and awareness, self-medication, left-over antibiotics, and reasons for using antibiotics (Antwi et al., 2020). Healthcare professionals, including physicians, pharmacists, nurses, and other healthcare professionals, have a responsibility for clinical practice to keep antibiotics effective (Napolitano et al., 2019; Pearson & Chandler, 2019; Rábano-Blanco et al., 2019). The extent of misconception and inappropriate practice in the community and has been going on for a long time, which makes this misunderstanding a serious matter to be corrected. Attempt to increase knowledge and awareness of the use of antibiotics can be done in various ways, one of which is by pharmacist playing an active role in educating the public (Shehadeh et al., 2016). In addition, providing direct counselling on antibiotic information has proven to be effective in increasing knowledge and awareness of antibiotic use (Mason et al., 2018). A systematic review study states that the provision of information through leaflets delivered during an infectious disease consultation is more effective in increasing understanding and attitudes towards drug use (De Bont et al., 2015). Education on the risks of potential side effects of antibiotics and their benefits is more likely to have a major impact on antibiotic self-medication decisions than education about antibiotic resistance (Spicer et al., 2020). This study was an observational and did not specific age population which would give the certain information about self-medication antibiotic use in rural areas. Our finding provides the general information antibiotic self-medication in village where majority had lower education level. Proper and wise use of antibiotics is an effort to prevent antibiotic resistance which is currently considered an emergency global problem. Based on the results of this study, factors associated with antibiotic self-medication behaviour can help determine appropriate strategies to prevent and overcome this problem. Such as the outreach of information about antibiotic use to people living in rural areas, taking into account the characteristics of the population from the level of education and socio-economic aspects. Furthermore, the strategy of providing education for health workers needs to be improved, especially for rural populations.

5 CONCLUSIONS

Population living in rural area dominated lower level of education, income status. These may have impact or correlate to level of knowledge, attitude and

practice self-medication antibiotic. We found that knowledge, attitude associated to self-medication with antibiotic practice. The management risk that would be implemented is improve the understanding and awareness toward antibiotic use. Furthermore, it needs contribution of health professional such physician, pharmacist and nurse to encourage rural communities to improving knowledge and positive attitudes toward behaviour of antibiotic self-medication.

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CONFLICT OF INTEREST

The authors declared no conflict of interest in this study

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