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Community Knowledge about Antibiotics and the Role of Interprofessionals in Providing Health Education

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ABSTRACT
Antibiotics are pharmaceutical agents used to prevent or treat infections caused by bacteria. As they are not intended for unrestricted use, antibiotics should be administered with caution and only under appropriate medical guidance to avoid misuse and the development of antibiotic resistance. Improper or non-compliant use of antibiotics can lead to the development of antibiotic resistance, thereby reducing their effectiveness in treating bacterial infections. Therefore, this study aims to identify the knowledge of the community in Kampung Mudik Village, Barus District, and the role of health workers in preventing the effects of resistance to antibiotics. Methods: This is a descriptive study that focused on the community in Kampung Mudik Village, Barus District. The sampling method used a probabilistic method with a margin of error of 5%. The number of respondents was 146 community. The result indicates that the level of community knowledge about antibiotics varies: most communities (58.2%) have high knowledge, (28.8%) have sufficient knowledge, and (13%) have low knowledge. All communities (100%) have used antibiotics, but the majority of communities (79.5%) do not know the side effects of using antibiotics that are consumed carelessly. This study found that most communities already have good knowledge about the use of antibiotics, but many communities still do not know the side effects if they take antibiotics not according to instructions. Therefore, it is suggested that the community needs to be given proper education through inter-professional collaboration to avoid the effects of antibiotic resistance.

Keyword: Community knowledge, Remote community, Antibiotics used

1. Introduction

Antibiotics are drugs that are used to treat bacterial infections (Wall, 2019), (Tufa et al., 2023). Giving antibiotics to community with infectious diseases aims to inhibit growth or kill microorganisms, (Cook & Wright, 2022) especially disease-causing bacteria. The use of antibiotics provides therapeutic success if used rationally (Westerling et al., 2020). The inappropriate use of antibiotics in both animals and humans plays a

role in the spread of antibiotic-resistant bacteria (Munita & Arias, 2016), (Endale et al., 2023), which can significantly threaten human health (Geta & Kibret, 2021).

Antibiotics can also increase morbidity and mortality rates, increase costs (Sipahi, 2008), (Poudel et al., 2023) and treatment length, and increase side effects from the use of multiple drugs and high doses (Wulandari & Rahmawardany, 2022). Antwi et al found evidence showing that misunderstandings regarding the use of antibiotics almost occur in various countries. Therefore, it is necessary to develop and implement policies that regulate and educate the community to fight antibiotic resistance (ABR) (Antwi et al., 2020).

Karuniawati's findings concluded that male community with low incomes, community with low education, and community living in rural areas were more susceptible to the excessive use of antibiotics without knowing the negative impacts of inappropriate use. Therefore, policies on antibiotic use, including the supply, distribution, and sale of drugs, need to be strengthened immediately. Misuse and excessive use of antibiotics triggers an increase in antibiotic resistance (Karuniawati et al., 2021; Mara & Sanjaya, 2018).

This finding was directly proportional to more positive exposure. Among community with higher education, younger age, gender, profession, and higher monthly income were significantly associated with high knowledge and positive attitudes toward antibiotic use. Health education interventions regarding the appropriate use of antibiotics are necessary to reduce antibiotic resistance (Hejaz, 2023).

In contrast to the knowledge regarding antibiotics among Jordanian adults, the results were quite high, but there was still inappropriate use. Therefore, policies are more focused on improving practices that are at risk of having a negative impact on community health (Ayyash et al., 2024). Even Lalithabai's research states that nurses play an important role in controlling infections but often have limited knowledge about methods of preventing antibiotic resistance. Therefore, policies must be sporadically socialized (Lalithabai et al., 2022).

Jewari and Hasan confirmed that many communities had little knowledge of antibiotics. Therefore, they suggested the need for efforts to conduct health campaigns in community places and create and implement programs aimed at increasing community knowledge and awareness in the Arab region. This can help reduce the risk of antibiotic resistance and increase the chances of successful treatment of infectious diseases (Hassan et al., 2023).

Based on random interviews with 10 community in Kampung Mudik Village, almost all of them had consumed antibiotics purchased without a doctor's prescription at the pharmacy. Three of them said that they took antibiotics when they had the flu, four of them took antibiotics when they had a fever, and three of them took antibiotics when they felt sick. Some of them stopped taking the medicine after their fever or flu went away. Based on this background, the researcher wants to identify community knowledge about antibiotics and the role of inter professionals in providing health education in Kampung Mudik Village.

2. Methods

2.1 Design and Sampling

The design used in this research was descriptive, with a cross-sectional study model that aimed to identify community knowledge about the use of antibiotics. The population in this study is community living in Kampung Mudik village, Barus sub-district, Central Tapanuli District, North Sumatra Province, Indonesia. This number is represented by the number of family heads in the village, namely 230 family heads in January 2024. The number of communities in the study was determined using the Slovin formula, with a margin of error of 5%; therefore, a participant of 146 community was obtained. Random sampling was used for participant selection.

2.2 Ethical Consideration

This study was approved by the Health Ethics Committee of the University of Sumatera Utara (USU). Ethical committee approval was obtained (Approval Number: 531/KEPK/USU/2024). This study adhered to the World Medical Association Declaration of Helsinki guidelines. The community were informed that their answers would remain anonymous and that their data would be kept confidential. The community who were willing to participate in the study signed a consent form. If the community were unwilling, the researcher respected their rights; that is, the community had the right to refuse. If a participant is selected but unwilling, another participant will be sought as a replacement.

2.3 Instrument

The instruments used to collect the questionnaires were developed by the researchers themselves based on existing theories. There were 20 questions, including which includes the definition of antibiotics, rules for taking antibiotics, types of antibiotic preparations, duration of taking antibiotics, side effects of antibiotics, how to get antibiotics, how to store antibiotics, and when is the best time to consume antibiotics. The questions

were made in the form of multiple choices, with three answer choices. Multiple choice questions were chosen to make it easier to analyse the data. Each correct answer was assigned a value of 1, and a wrong answer was assigned a value of 0. The knowledge results were converted into percentages and classified into 3, namely: high score (76-100%), moderate score (56-75%), and low score (<56%).

Then, a content validity test was carried out on two experts who had worked for more than 10 years in their field, namely one pharmacology lecturer and one pharmacist. The questionnaire was declared valid with a content validity index value of 0.95. After the validity of the questionnaire was tested, a reliability test was then carried out on 30 residents in Padang Masiang village, and a reliability value of 0.748 was obtained, indicating that the instrument was suitable for use.

2.4 Data Collection and Data Analysis

Data collection began after obtaining ethical permission from the USU Health Research Ethics Commission. Permission from the USU Faculty of Nursing was conveyed by the Head of Kampung Mudik Village. Data collection was carried out by distributing questionnaires to selected community. Community who were willing to participate in the study signed a consent form. Community who were willing to become community were first given an explanation of the objectives, targets, and benefits of the study, then given the opportunity to ask questions regarding things that were not yet understood.

After the community understood the researcher's explanation, they were given time to fill out the questionnaire. The average time to fill out the questionnaire was approximately 20-30 minutes. Data collection was carried out in March and April 2024. The research data were analysed using application SPSS 27.0. Then the results will be presented in the form of a frequency distribution table

3. Results

The results of this study will describe general demographic characteristics, community knowledge about antibiotics based on age, community knowledge about antibiotics based on gender, community knowledge about antibiotics based on educational background, and community knowledge about antibiotics based on occupation.

Table 1 Demographic characteristics and community knowledge about antibiotics (n=146)

Characteristic	f	%
Age		
20-32	99	67.8
33-45	33	22.6
46-55	14	9.6
Gender		
Female	114	78.1
Male	32	21.9
Education Background		
Elementary School	3	2.1
Junior High School	13	8.9
Senior High School	89	61.0
Diploma	7	4.8
Bachelor	34	23.3
Occupation		
Student	33	22.6
Housewife	61	41.8
Farmer	10	6.8
Trader	7	4.8
Project	7	4.8
Private	5	3.4
Teacher	23	15.8

Table 1 Continued

Characteristic	f	%
Have ever used antibiotics		
Yes	146	100
No	0	0
Knowing the side effects of antibiotics		
Know	30	20.5
Do not Know	116	79.5
Community knowledge of antibiotic use		
High	85	58.2
Moderate	42	28.8
Low	19	13.0

Description of Participant Characteristics in Kampung Mudik village, Barus District, showed that the majority of community were aged 20-32 years, (n=99, 67.8%). The majority of community who participated in the sample were in the young adult age group. The number of female communities was almost four times that of the male community (n=114, 78.1%), and most of them were working as housewives (n=61, 41.8%), so it is making them easier to find when distributing the questionnaire.

While the most common educational background of community was high school (n=89, 61.0%). Based on the data, all community had used antibiotics (n=146, 100%); however, not all community knew how to use antibiotics exactly (n=116, 79.5%). and the majority of the community knowledge (n=85, 58.2%) had a high level.

Table 2 Distribution of community knowledge about antibiotics based on age

Age	Amount		Knowledge					
	N	%	High	%	Moderate	%	Low	%
20-32	99	67.8	62	42.5	21	14.4	26	11
33-45	33	22.6	18	12.3	13	8.9	2	1.3
46-55	14	9.6	5	3.4	8	5.5	1	0.7
Total	146	100	85	58.2	42	28.8	19	13

Table 2 shows the results of the study showed that the community with the highest level of knowledge was in the 20-32 age group (n=62, 42.5%). The community with a moderate level of knowledge was also the most in the 20-32 age group (n=21, 14.4%). Likewise, the community with a low level of knowledge was in the 20-32 age group. This happened because most of the respondents were from the 20-32 age group.

Table 3 Distribution of community knowledge about antibiotics based on gender

Age	Amount		Knowledge					
	N	%	High	%	Moderate	%	Low	%
Female	114	78.1	72	49.3	35	24.0	7	4.8
Male	32	21.9	13	8.9	7	4.8	12	8.2
Total	146	100	85	58.2	42	28.8	19	13

Table 3 shows that (n=72, 49.3%) of the community had a high level of knowledge, namely female community, who had a moderate level of knowledge, were (n=35, 24%), namely female community. Meanwhile, community who had a low antibiotic knowledge category (n=12, 8.2%) were mostly male.

Table 4 Distribution of community knowledge about antibiotics based on education background

Education Background	Amount		Knowledge					
	N	%	High	%	Moderate	%	Low	%
Elementary School	3	2.0	0	0	3	2.0	0	0
Junior High School	13	8.9	7	4.8	2	1.4	4	2.6
Senior High School	89	61.0	50	34.2	26	17.8	13	9
Diploma	7	4.8	2	1.4	5	3.4	0	0
Bachelor	34	23.3	26	17.8	6	4.2	2	1.4
Total	146	100	85	58.2	42	28.8	19	13

Table 4 shows that (n=50, 34.2%) community have a high level of knowledge in the senior high school education group. Community who have a moderate level of knowledge are also in the group of community with senior high school education (n=26, 17.8%), and so are community with a low level of knowledge (n=13, 9.0%), are in the group with senior high school education. All levels of knowledge with the highest, moderate and lowest numbers are in this group because the largest number of educations is indeed senior high school.

Table 5 Distribution of community knowledge about antibiotics based on occupation

Occupations	**Amount**		**Knowledge**					
	N	**%**	**High**	**%**	**Moderate**	**%**	**Low**	**%**
Student	33	22.6	26	17.8	5	3.4	2	1.4
Housewife	61	41.2	31	21.3	26	17.9	4	2.7
Farmer	10	6.8	1	0.7	3	2.0	6	4.1
Trader	7	4.8	2	1.4	1	0.7	4	2.7
Project	7	4.8	3	2.0	2	1.4	2	1.4
Private	5	3.4	4	2.7	1	0.7	0	0
Teacher	23	15.8	17	11.6	4	2.7	2	1.4
Total	146	100	85	57.6	42	28.8	19	13.7

Table 5 shows that (n=31, 21.3%) of community had a high level of knowledge; namely, community who had a level of knowledge of housewives (IRT). Community with a sufficient level of knowledge were community with a sufficient level of employment (n=26, 17.9%) and community with a low level of knowledge (n=6, 4.1%), namely community with a job as a housewife.

4. Discussion

The results of the study in table 1 showed that the majority of the community (n=48, 58.2%) had a high level of knowledge (n=42, 28.8%) had a low level of knowledge, and (n=19, 13%) had a low level of knowledge. The results of this study are worse compared to the results of (Belachew et al., 2022) study on the knowledge of attitudes and practices of antibiotic retail outlet staff among residents in Amara district, Ethiopia, which showed a good level of knowledge about antibiotic use (77.9%). However, the results of this study have almost the same percentage of knowledge as the (Puspitasari et al., 2022) study in Ampenan sub-district, Mataram city, Indonesia, which found that community knowledge about antibiotics was in the good category (53.3%).

Based on table 1, it was also found that almost all community who were respondents had consumed antibiotics. Antibiotics are a group of drugs that not just anyone can consume, so to get antibiotics there must be a doctor's prescription. However, in reality, every person can buy them freely at the pharmacy without a doctor's prescription (Septiana & Khusna, 2020). Such as (Adhikari et al., 2021) research which found that buying antibiotics is common in Nepal for a variety of reasons. Pharmacies often prescribe antibiotics without laboratory results, driven by patient demand for quick relief from symptoms. Doan's study in Vietnam (Doan et al., 2025) found that community used antibiotics for self-medication, mostly obtained through community pharmacies without a prescription (71.7%). They even consumed antibiotics for sore throats (45.7%), coughs/colds (42.6%), fevers (37.8%), and runny/blocked noses (31.9%).

Still referring on table 1, the entire community due to antibiotic consumption but only 20.5% understand the side effects of antibiotic use. Karishma's (Jain Karishma et al., 2021) research results show found that majority of the community have a misconception that taking antibiotics will weaken their body (n=142, 37.4%). the study also found majority of allergies in the general population are caused by Sulpha containing antibiotics, which account for 55% of all allergy cases. It is time for the community to improvement correct knowledge about antibiotics, to avoid the effects of resistance.

They obtain information about the use of antibiotics from pharmaceutical technicians, practicing doctors, and practicing midwives who they visit when they are sick. In addition, brochures and leaflets available at health facilities such as clinics, health centres, pharmacies, and hospitals are a means of information that is quite easy for the community to obtain (Schmidt et al., 2022). Specific research is needed to determine the function of each profession in interprofessional collaboration (Seaton et al., 2021). Collaboration that can be done between pharmacy students and teachers, where teachers will socialize it back to their students, shows a significant correlation (Hsueh-Yun Chi , Fong-Ching Chang , Li-Jung Huang , Chun-Hsien Lee & Yeh, 2018).

The results of the study based on age group data (table 2), show that at the age of 20-32 years (n=99, 67.8%) community knowledge about antibiotics is in the highest high category, followed by the age group 33-45 years in the high category (n=33, 22.6%), and finally the age group 46-55 years in the sufficient category

(n=14, 9.6%). This shows that the younger generation has better knowledge. This condition is different from Notoatmodjo's opinion, which states that the level of maturity and strength of a person will be more mature if the person is old enough; then, they will have a mature mindset and experience (Notoatmodjo, 2012), (Rachmahana, 2008). Age greatly affects the ability to grasp such that the knowledge gained will increase. This age is a productive age, namely 15-64 years.

At a productive age, community tend to try to maintain their health condition when doing activities (Melaniawati et al., 2021). Age is a factor that influences knowledge. This is because age affects an individual's ability to grasp and mindset. Increasing age will further develop a person's mindset and comprehension so that the knowledge gained will increase (Yeager & Dweck, 2020). Age is an important factor that determines an individual's level of understanding of what is happening around them. Apart from age, some research states that culture is also a person's level of understanding (Citation, 2018). Psychologically, as a person gets older, anxiety about the problems or diseases they suffer increases. A person's physical condition can be a factor that hinders knowledge. As age increases, a person's ability to receive information about treatment decreases.

In addition to age data, there are other supporting data, namely gender factors, (table 3) and it is known that the level of knowledge of the male gender gets a majority of knowledge levels of less, amounting to 32 community (22%). In addition, 114 community (78 %) had a level of knowledge categorized as sufficient. It can be observed that women are superior to men. In general, women are more concerned about health, including medicines (Melaniawati et al., 2021). Based on gender, the results of data collection showed that male community were in the high category (11.7%), sufficient category (41.2%), and lack category (47.1%) according to research conducted (Distria et al., 2021). Female community were in the high category (22.7%), sufficient category (50%), or lacking category (27.3%).

Based on table 4, female gender is included in the high knowledge category with the highest percentage (22.7%). In general, women tend to be more concerned about health and have better knowledge about treatment (Apolina CCI & Setiawan, 2021; Duymuş & Ayık Aydın, 2023). However, it was still found that community with a college education level were included in the lower category. Increased knowledge is obtained not only from formal education but also from non-formal education. Information about treatment, especially antibiotics, was obtained from the health education. or by medical personnel. According to researchers, the level of education affects the maturity of a person's mindset; the higher the level of education, the easier it is for individuals to think rationally and capture new information. Thus, proper use of antibiotics is important to support life safety.

Education is an effort to develop a person's personality and abilities and last a lifetime; the higher a person's education, the easier it will be to accept so that the more knowledge they have. This means that these community had the knowledge and understanding of the questionnaire. Community who use antibiotics may understand their benefits; however, not all community specifically know the side effects of antibiotics. It could be that the choice of antibiotics in the community is also related to low prices (Mukattash et al., 2024).

Base on the results of the questionnaire distribution, there were (n=116, 79.5%) who did not know the side effects of antibiotics. According to research conducted (Apolina CCI & Setiawan, 2021) the majority of community received information about the use of antibiotics from doctors (88.5%), and there were still community who received information about the use of antibiotics from relatives or friends (11.5%). When they get information from friends, this is the possibility of misunderstanding about how to consume and the side effects of antibiotics correctly.

Table 5 explains the community's knowledge about antibiotics based on their occupation. The occupational group with the highest knowledge about antibiotics is mostly housewives (n=31, 21.3%). Likewise, the community group with the most moderate knowledge is mostly housewives (n=26, 17.9%). However, the group with the lowest knowledge is mostly farmers (n=6, 4.1%). This happened because when the questionnaire was distributed, most of the community who were easily found were female who were housewives because the majority of male were working.

For someone who obtains information, their level of knowledge about something will increase. Based on the results of research in Kampung Mudik Village, Barus District, it is known that many community (79.5%) still do not know what antibiotics are and how to take antibiotics such as amoxicillin which must be finished even though the disease has been cured. Some community say that antibiotics are consumed in the same way as other drugs and do not need to be finished if they have recovered. If they have a fever and feel pain, they often use amoxicillin or other types of antibiotics because according to the community, antibiotics can relieve diseases such as fever and pain.

They assume that taking antibiotics is the same as taking other drugs, if someone feels cured then taking the drug is stopped. According to Kotwani's (Kotwani et al., 2021) research, inadequate knowledge about antibiotics is caused by limited access to public health services, as well as private health services that cause

people to take the initiative to self-medicate. Sachdev's (Sachdev et al., 2022) research also confirms that self-medication by consuming drugs such as antibiotics based only on their own experience and knowledge, without consulting a doctor for either diagnosis or prescription, is one of the main causes of antibiotic resistance in certain microorganisms.

Based on the community's understanding which is still wrong, ongoing education is needed. This is very useful to prevent resistance due to inappropriate use of antibiotics. Many studies state that education can increase knowledge (Jahani eftekhari & Peyman, 2018). Therefore, education about the use of various drugs, especially antibiotics, is very necessary for the general community.

Health education about drugs, especially antibiotics, can be collaborated between several professions based on the main tasks and roles of each profession. Nurses have an important role in managing antimicrobial treatment to reduce antibiotic resistance, as nurses are the health workers who spend the most time with patients, enabling them to raise awareness about this challenge (Yenmee, 2025). Interprofessional collaboration is needed to educate the community, whose general understanding of the benefits and side effects of antibiotics still needs to be improved.

According to (Balea et al., 2024), the role of professionals in health services, especially educating patients about the use of antibiotics to prevent resistance, is very complex, and presents various challenges for nurses, pharmacists, and doctors. These challenges include relational between professional and patient, social, and structural factors as well as time, thus becoming obstacles to the implementation of health education.

Paredes' (Paredes et al., 2022) research findings in Peru suggest that antibiotic knowledge among parents from rural areas in Peru is limited and highlight the need for educational interventions. The more professions involved; it is hoped that it can provide wider benefits to the community. It is also hoped that diverse professions can strengthen each other to increase community knowledge. So that the community avoids the effects of antibiotic resistance. In addition, the community can also transmit the correct understanding of the use of antibiotics to anyone, so that the use of antibiotics without rules does not occur.

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5. Conclusion

Based on the results of research conducted in Kampung Mudik Village, Barus District, it was found that community knowledge about the use of antibiotics is in the high category. However, knowledge about the side effects of antibiotics. This happens because there is a tendency for people to try therapy based on partial information from friends, neighbours or relatives who have diseases with the same symptoms but the diagnosis may be different.

If left untreated, this condition is very dangerous because it can cause resistance to antibiotics. Therefore, it is very necessary to provide health education to the community about drugs and their impacts, especially antibiotics. In order for the scope of health education to be wider, it is recommended that there be interprofessional collaboration between doctors, midwives, nurses, pharmacists, and other health workers to provide the community with a proper understanding of the benefits, how to use and side effects of antibiotics, so that the community can avoid the impact of resistance due to the wrong use of antibiotics.

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