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The Level of Community Knowledge about The Use of Antibiotics

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ABSTRACT

Knowledge and use of antibiotics play a large and important role in the success of treatment, so that they do not cause negative effects, such as the cause of antibiotic resistance. The purpose of this study was to determine the profile and level of knowledge of the community regarding the use of antibiotics in Banyior Village, Sepulu District, Bangkalan Regency, East Java, Indonesia. This research is a cross-sectional descriptive study. The measurement is a closed questionnaire. Data were analyzed using SPSS version 18. The survey was conducted from October 2021 to December 2022 on 325 residents of Banyior Village. The result is that the antibiotic most often used by respondents is amoxicillin with a percentage of 47%. The majority of respondents, 45 percent, get antibiotics from drugstores or stalls. The knowledge level of the general public shows a good level of knowledge of 6.82%, an average level of knowledge of 19.60% and a low level of knowledge of 73.57%. The most widely used antibiotic by respondents in this study was amoxicillin, where the most common way to obtain it was through drug stores/stalls and public knowledge of the use of antibiotics was still low.

1. Introduction

Antibiotics are chemical substances that produced by fungi or bacteria, which have lethal or inhibit the growth of microorganisms pathogens (Pratiwi, 2017). Over the past 10 years, worldwide use of antibiotics has increased by 36%, while some antibiotics such as cephalosporins, penicillins, and fluoroquinolones have increased by 55% (Plump, 2014). The use of antibiotics is more than 80% in various provinces in Indonesia and it is found that as many as 30-80% of cases of antibiotic use are not properly indicated. The use of antibiotics in Indonesia which is quite high and inappropriate will increase the incidence of antibiotic resistance (Ministry of Health RI, 2011). The Antimicrobial Resistance Control Committee stated that from 2013, 2016, to 2019 the level of antibiotic resistance in Indonesia continued to increase from 40%, 60% to 60.4%.

Based on the source of obtaining medicine by place of residence, the proportion of households receiving medicine at the pharmacy was higher in urban areas, namely 50.2% and in rural areas, at 25.5%, on the other hand, the proportion of households receiving medicines at drug stores/warungs was higher in rural areas, namely 40 .5% and urban 35.5%. Public knowledge is still lacking so that some people do not know that antibiotics cannot be obtained freely but must be obtained using a doctor's prescription (Robert M Kliegmen, 2011). According to (Riskesdas, 2013) in East Java, 85.5% of people store antibiotics without a prescription. Inappropriate use of antibiotics can cause antibiotic resistance and have a negative impact both economically and socially (Ministry of Health RI, 2011). Several studies show that public knowledge about antibiotics is still in the low category. According to a study conducted by (Hartayu et al., 2013) regarding the level of public knowledge about the use of antibiotics, it is still in the low and medium categories.Then Solihan's research (2015) shows that only 19.57% have high knowledge. Worse yet, in the research conducted by (Hartika, 2018), the knowledge of most people is still in the low category. Based on this, it shows that public knowledge

about the use of antibiotics is very important so that the use of antibiotics becomes more rational and thus is expected to reduce the risk of antibiotic resistance (Hartayu et al., 2013).

Based on the results of a preliminary study conducted at 10 stalls in Banyior, 7 out of the 10 stalls sold antibiotics of the types Amoxicillin, Ampicillin and Supertetra.Store owners think antibiotics can be sold over the counter and bought without a doctor's prescription. In addition, a preliminary study was also conducted on 15 residents of Banyior Village, Sepulu District, Bangkalan Regency and showed that 10 of them did not know how to use and obtain appropriate antibiotics. Based on the data that has been obtained, it is important to conduct research on the level of public knowledge about the use of antibiotics in the village. in this case the researcher wanted to know the level of public knowledge about the use of antibiotics in Banyior Village.

2. Materials and Methods

2.1. Research Type and Design

This type of research is a cross-sectional descriptive study. The research was conducted from December 2021 to February 2022 in Banyior Village, Sepulu, Bangkalan Regency. The population in this study was the Banyior Village community, totaling 2,951 souls. When taking samples the technique used is purposive sampling technique and it is necessary to determine inclusion and exclusion criteria in sampling so that the sample criteria do not deviate from the population. Inclusion criteria in this study included: Adults aged at least 18 years and over, have used antibiotics, can communicate in Indonesian, can read and write

The sample is calculated using the slovin formula as follows:

$$n = \frac{N}{N.d^2+1}$$

$$n = \frac{N}{N.d^2+1} = \frac{2.951}{2.951.(0.5)^2+1} = 352.2 \rightarrow 352 \text{ participants (in this research)}$$

This research was conducted by obtaining data from respondents by distributing question sheets (questionnaires) to respondents directly. The research has received an ethical eligibility letter from the Health Research Ethics Commission, Faculty of Medicine and Health Sciences, State Islamic University of Maulana Malik Ibrahim Malang with number: 073/EC/KEPK-FKIK/2021. The flow of this research is as presented in the following flowchart and are willing to take part in the survey (respondents). While the exclusion criteria were people who did not complete the questionnaire.

This research was conducted by obtaining data from respondents by distributing question sheets (questionnaires) to respondents directly. The aim is to get information about the level of knowledge of respondents about the use of antibiotics. In this study, there were 12 statements in the questionnaire that represented 6 indicators, namely related to antibiotic indications, antibiotic doses, time intervals for using antibiotics, duration of administration, side effects and information on antibiotics.

2.2. Data Analizes

Data processing using SPSS 18 software and Microsoft Excel. The formula used to determine the percentage score of the level of knowledge is $p = \frac{x}{n}$ x 100%. Respondents are said to have good knowledge if the score obtained (76% - 100%), sufficient knowledge (56% - 75%) and lack of knowledge (< 56%) (Arikunto, 2011).

3. Results and Discussion

The sample used in the study amounted to 352 respondents. Characteristics of research respondents as shown in Table I.

3.1.1. Characteristics of Respondents

Based on the results of the study, the data on the characteristics of the respondents included gender, age, education, employment, The following table and explanation of the characteristics of the respondents.

Based on Table 1 it can be seen that the sex of the respondents was mostly female, as many as 206 respondents (59%), while for male respondents there were 146 (59%). This is in accordance with data on the population of Banyior Village, namely 1,549 female residents and 1,402 male residents. This shows that the female population is more than the male population (Central Bureau of Statistics, 2021). The sex of the respondents had no effect on the use of antibiotics. So, a person's gender cannot be used as a benchmark for comparing whether or not a person's knowledge is good (Kurniawan et al., 2020).

Based on Table 1 can be seen the age of the most respondents ranged from 18-40 years with a total of 235 respondents (67%). This is in accordance with data from the Central Statistics Agency of Bangkalan Regency which shows that the age of the population of Banyior Village in the range of 15-39 years is the most, namely 40%, then the age of 40-59 years is 27%. Age 18-40 years is the age when a person is included in the early adult category (Nurhazlina and Jannah, 2021).

Based on Table 1 it shows Most of the respondents' education was elementary school, as many as 164 (47%). This is in accordance with data on the population of Banyior Village based on the latest education, namely most of the population has the last education of elementary school with a total of 1,592.

Based on Table 1, it can be seen that the occupation that dominates in this study is as a farmer, as many as 34.3% (121 respondents). This is in line with the population data based on the type of work in Banyior Village, namely the majority of community work is as farmers with a total of (31.89%) (Central Bureau of Statistics, 2021).

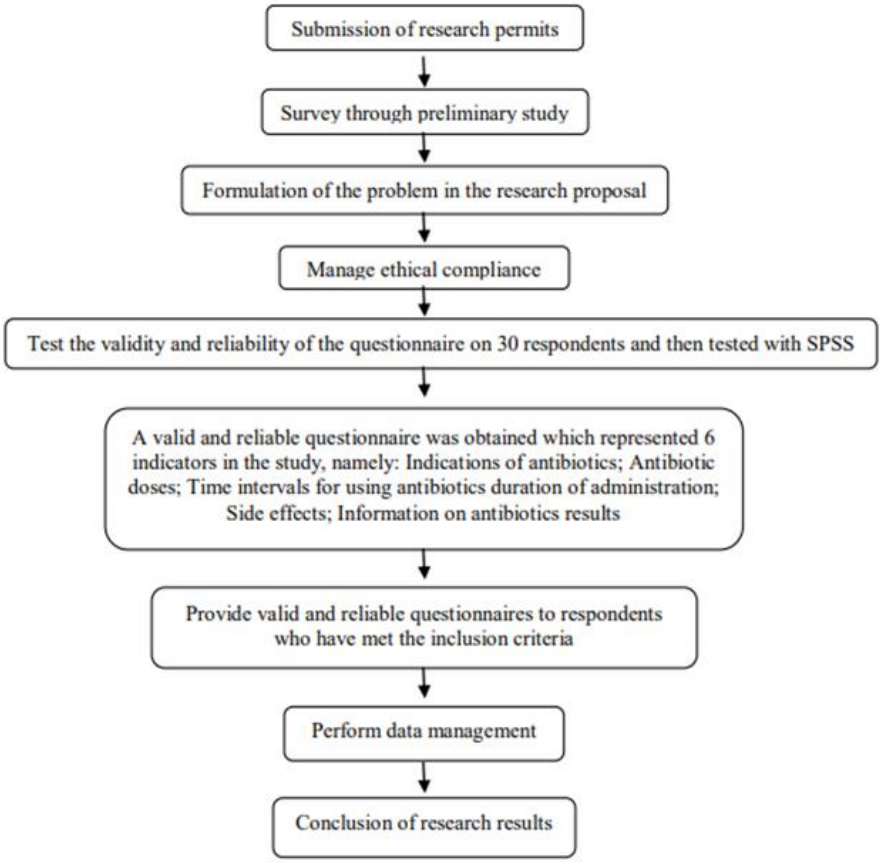

Fig. 1. Research Procedure

Table 1. Characteristics of Respondents

Category	Frequency (N)	Precentage N (%)
Gender		
Male	146	41%
Female	206	59%
Age		
18-40	235	67%
40-60	117	33%
>60	0	0%
Education		
SD	164	47%
SMP	61	17%
SMA	98	29%
Diploma/Bachelor	28	7%
Employment		
Farmer	121	34,3%
Trader	92	26%
Housewife	45	13%
Entrepreneur	31	9%
College student	18	5,1%
Private employees	14	4%
Teacher	14	4%
Doesn't work	8	2.3%
Midwife	3	0.8%
PNS	3	0.8%
Nurse	2	0.5%
Pharmacist	1	0.2%
Total (N)	352	100%

Based on Table 2, it can be seen Antibiotics that are widely used by respondents are Amoxicillin antibiotics with a total of 166 (47%). This is in accordance with Widayati's research (2011) related to the use of antibiotics in Yogyakarta, namely he stated that the drug most consumed by respondents was Amoxicillin (77%) (Widayati et al., 2011). This is because Amoxicillin is common in the ears of the public and some pharmacies can also be said that we still encounter many who sell this Amoxicillin antibiotic drug freely (Pertiwi, 2018). Over-the-counter use of antibiotics often has undesirable effects such as the occurrence of bacterial resistance, increased side effects and toxicity of antibiotics,

increased costs and clinical benefits that are not optimal in the prevention and treatment of infectious diseases (Ulumuddin, 2013).

Profile of the Use of Antibiotics Used by the Community of Banyior Village

Table 2. Data on Antibiotics Ever Used

Profile	Frequency N	Precentage N (%)
Name Antibiotik		
Amoxicillin	166	47%
Supertetra	130	37%
Ampicillin	34	10%
Cefradoxil	16	4%
Etc (option if the respondent does not use the type of antibiotic drug in the abcd option)	6 (drug name not mentioned)	2%
Place		
Doctor's Practice	77	22%
Pharmacy	88	25%
Drug store/stall	159	45%
Drug store/stall	28	8%
Total (N)	352	100%

The profile of places where people get antibiotics from Banyior Village can be seen in Table 2, most of the places where respondents got antibiotics came from drug stores or stalls, as many as 159 respondents (45%). The results of this study are in accordance with Pratomo and Dewi's research (2018) regarding knowledge of the use of antibiotics in residents of the village of Anjir Mambulau Tengah (Pratomo & Dewi, 2018).This is because antibiotics are sold freely and can be purchased without a doctor's prescription and there is no strict supervision from the government (Ambuk, 2020). In addition, the distance from Banyior Village to health facilities such as independent doctor's practices, community health centers and clinics is 5 KM. While the distance to the hospital is 34 KM. The distance of the respondent's house to a health facility also affects the ease of obtaining medicine, where people prefer to buy medicine at the nearest drug store/warung than having to go to a health facility. The distance between the place of residence and the location of the purchase of drugs that are close to provide benefits to patients, including not having to travel long distances to get drugs and can save time. The public needs to know that antibiotics are a group of hard drugs, where to use these drugs they must be prescribed by a doctor because antibiotics cannot be used for self-medication (Ihsan et al., 2016). Antibiotic drugs can only be obtained at Pharmacy Installations such as pharmacies using a prescription from a doctor because the use of antibiotics must be carried out under the supervision of a doctor, so as not to cause side effects (Rudiansyah et al., 2020). The same is also explained in RI Minister of Health Number 28 of 2021 concerning Instructions for Using Antibiotics, that the use of antibiotics must be based on a doctor's prescription (Ministry of Health RI, 2011).

According to Indonesian laws and regulations, it is known that there are OWA (Compulsory Pharmacy Drugs) namely hard drugs that can be delivered by pharmacists without a doctor's prescription, but can only be submitted by pharmacists themselves (not pharmaceutical technical

personnel). The list of mandatory pharmacies is stated in the Decree of the Minister of Health number 347/Menkes/SK/VII/1990, number 924/Menkes/Per/X/1993 and the Decree of the Minister of Health number 1176/Menkes/SK/X/1999. The most widely used by the respondents was Amoxicillin orally, most of which were obtained from drug stores/warungs. Based on the regulation of the Minister of Health of the Republic of Indonesia regarding mandatory pharmacy drugs, antibiotics that are included in OWA are topical antibiotics (for external use) while antibiotics used orally such as Amoxicillin are not included in the OWA list so they cannot be obtained freely or without a doctor's prescription. In addition, in the hard drugs law no. 419 date. December 22, 1949 Article 1 paragraph 1a states that antibiotics are classified as hard drugs, whereas Article 3 paragraph 1 states that hard drugs cannot be used personally without using a doctor's prescription.

3.1.2. Public Knowledge About the Use of Antibiotics

This study consisted of 12 questions that measured the level of public knowledge about the use of antibiotic drugs. Based on the research results, it was obtained data on the level of public knowledge about the use of antibiotics in Banyior Village, as shown in Table 3.

The distribution of respondents questionnaire answers in Table 3, it can be seen that the respondents from the Banyior Village community have the highest percentage of correct answers on the indicator of side effects of antibiotics and the lowest percentage of correct answers on the indicator of antibiotic dose. The highest percentage is 56.25% of respondents who answered correctly on the side effect indicator consisting of 2 questions, namely "Side effects are responses to unwanted drugs" and "Side effects of Amoxicillin are nausea and vomiting, diarrhea and pain. joints" with the CORRECT answer is correct. This is because the majority of respondents already know the side effects of antibiotics, such as the side effects that often appear on penicillin antibiotics, namely hypersensitivity, gastric disorders (nausea, vomiting and diarrhea) and at high doses it can cause neurotoxicity and nephrotoxicity. (Tjay & Rahardja, 2007). This is also possible because people have read about the side effects on the packaging of drugs that have been used.

The lowest percentage of correct answers is on the indicator of antibiotic dose, which is only 25.57% of respondents who answered correctly and 74.43% of others answered incorrectly. In the indicator there is 1 statement, namely "Use of antibiotics must be stopped if it improves even though antibiotic drugs are still available" with the RIGHT answer is incorrect. This is because most respondents do not know the correct dose of antibiotic use, most of them prefer to reduce the dose and stop using antibiotics if their condition has improved even though people should not easily reduce or increase the dose that has been determined by the doctor because it can affect the success of treatment. (Yanti, 2016). The use of antibiotics with excessive doses will soon be followed by the emergence of antibiotic-resistant bacteria, so the benefits will be reduced. Resistance of bacteria to antibiotics, especially multi-drug resistance which is a difficult problem to overcome in the treatment of patients (Negara, 2014).

3.1.3. Category Level of Community Knowledge About Antibiotic Use in Banyior Village

According to Arikunto (2010) the knowledge category is grouped into 3 groups, namely good knowledge (>76%), sufficient knowledge (56% - 75%) and less knowledge (<56%). The following table shows the results of the category of community knowledge about the use of antibiotics in Banyior Village.

Category level of public knowledge about antibiotics In table 3, It can be seen that there are 259 (73.58%) respondents who have less knowledge. Factors that affect a person's knowledge consist of age, experience, education level, occupation, interests, environment, and information (Notoatmodjo, 2010). Based in the data obtained, the majority of respondents' last education was elementary school, which was 164 (47%). Where, according to Law no. 20 of 2003 states that formal education levels consist of lower education (SD and SMP), secondary education (SMA) and higher education (diploma, bachelor, master, specialist, and doctoral). In connection with this research, the majority of respondents' education in this study is included in the category of low education and education is one of the factors that affect a person's knowledge. Someone with a final elementary education has better knowledge of someone with a college education. The higher the level of education of a person, the knowledge possessed will also increase. People who have higher education generally have broad knowledge and insight so that it is easier to absorb and receive information and can participate in overcoming health problems for themselves and their families (Yuswantina et al., 2019). This statement is supported by a statement in Ivoryanto (2017) which states that someone who has

graduated from college is 2.39 times more aware of the correct use of antibiotics than someone with an elementary school education level.

Employment as a factor that affects knowledge is obtained by the most respondents' occupation data, namely as farmers with 121 respondents (34.3%). In connection with this research, a person's occupation will affect the knowledge of the use of antibiotics. The majority of respondents' knowledge about antibiotics in this study was lacking. This is caused by the respondent's job as a farmer where the job someone has will affect the process of seeking information on a matter. The easier it is to find information, the more information can be obtained so that the knowledge possessed by a person will increase (Notoatmodjo, 2010). This statement is supported by Syafiruddin's (2019) statement which states that work experience can provide a person's knowledge and skills so that their knowledge can develop (Syarifuddin et al., 2019). (Lisnawati & Pangesti, 2012) also stated that when people work, they will use their brains and body's abilities so that they can store or there is an increase in memory because they often do it.

Information also affects a person's knowledge, where the ease of obtaining information can help a person to gain new knowledge. In general, the more information he receives, the faster a person acquires new knowledge. In the context of this study, the majority of respondents obtained the antibiotics they used from drug stores/stalls with a total of 159 (45%), so it is possible that the community did not get correct information about the use of antibiotics.Based on the literature, antibiotic drugs can only be obtained at Pharmacy Installations such as pharmacies using a prescription from a doctor (Rudiansyah et al., 2020).

The results of this study where public knowledge about antibiotics is still in the category of lack, it is a special concern in the world of health, especially for pharmacists so as not to cause effects from actions taken by the community due to lack of knowledge. Lack of knowledge regarding the proper use of antibiotics can cause side effects that are quite dangerous, one of which is the occurrence of antibiotic resistance (Loni, 2020). One of the impacts of antibiotic resistance is failure to treat disease with antibiotic therapy. This is very detrimental and has a bad impact on public health in the future (Farida et al., 2016). Therefore, educational activities related to the use of antibiotics need to be carried out to increase public awareness and knowledge about the proper use of antibiotics and the importance of knowing the dangers that can occur due to irrational use of antibiotics (Yunita & Sukmawati, 2021). Pharmacists as one of the health care providers, have a big role and responsibility in the use of antibiotics. The level of public awareness is less about antibiotics, therefore pharmacists have a very important role in providing education and counseling about controlling antibiotic resistance to health workers, the community or family members. In addition, it can work together with other health workers to conduct outreach to the wider community to increase public awareness about antibiotics and drug classification. In addition, the government can also make policies related to the supervision of antibiotics in the market so as to minimize antibiotics that are sold freely either in pharmacies or drug stores / stalls.

In this study the respondents used were people ranging in age from 18 years, had used antibiotics, could read and write, were able to communicate using Indonesian and were willing to be respondents in this study. This research was only conducted on 352 respondents from Banyior Village. This amount the result of the sample calculation using the Slovin formula with an error rate of 5%.

The limitation or weakness in this research lies in the research process, the researcher realizes that in a study there must be deficiencies and there are still many weaknesses. One of the weaknesses in this study was that in filling out the questionnaire, the questionnaire filled out by the respondents was sometimes not completed until the end. To solve this problem, the researcher finally re-checked after the respondents submitted the questionnaires to the researcher. With this research, it is hoped that it will become a view and information for local health workers that there are still many people who lack knowledge regarding the use of antibiotics, it is hoped that education will be carried out to the public regarding the proper use of drugs, especially antibiotics through seminars or counseling and further research is still needed on matters that affect the level of knowledge in Banyior Village (because the value of the level of knowledge is low) and research related to education to increase knowledge of the use of antibiotic drugs.

Table 3. Distribution of Respondents Questionnaire Answers

Indicator	Answer		Average	
	Exactly	Not Exactly	Exactly	Not Exactly
Indications for antibiotics				
Antibiotic drugs can be used for infectious diseases	70.45%	29.55%	40.20%	59.80%
Fever and flu can be treated by taking antibiotics	24.72%	75.28%		
Antibiotics, such as chloramphenicol, can be given for typhoid sufferers	19.60%	80.40%		
Antibiotics such as supertetra can be used to treat the flu				
	46.02%	53.98%		
Antibiotic dose	25.57%	74.43%	25.57%	74.43%
The use of antibiotics should be discontinued if it has improved even though antibiotic drugs are still available				
Time interval of using antibiotics	37.50%	62.5%	37.50%	62.5%
All antibiotics can be taken 2-3 times a day				
The duration giving of antibiotics	48.58%	51.42%	48.58%	51.42%
The minimum time to take antibiotics is 3-7 days				
Antibiotic side effects				
Side effect is an unwanted response to a drug	59.38%	40.63%	56.25%	43.75%
The side effects of Amoxicillin are nausea and vomiting, diarrhea and joint pain	53.12%	46.88%		
Information of antibiotics	40.34%	59.66%	47.92%	52.08%
You can give antibiotics if you have the same illness				
Examples of antibiotic drugs are Amoxicillin, Ampicillin, Cefadroxil, and Supertetra	67.61%	32.39%		
Antibiotics must be obtained with a doctor's prescription because they are strong drugs				
	35.20%	64.80%		

Table 4. Category Level of Commonity Knowledge About Antibiotic

Category	Frequency N	Precentaage N (%)
Good	24	6.82%
Enough	69	19.60%
Less	259	73.58%
Total (N)	352	100%

4. Conclusion

Based on the results of the study it can be concluded that the most widely used antibiotic in this study was amoxicillin, namely no less than 166 respondents (47%) and the way to get it was mostly purchased at drugstores/stalls 159 respondents. (45%). The level of public knowledge about the use of antibiotics in Banyior Village obtained data that from 352 respondents there were 24 respondents (6.82%) with good knowledge, as many as 69 (19.60%) had sufficient knowledge and as many as 259 (73.58%) less knowledgeable.

Author Contributions: Ismea Munawaroh compiled and designed the research. Ismea Munawaroh did all the data analysis. Hajar Sugihantoro, Ismea Munawaroh, Fidia Rizkiah Inayatilah, Yen Yen Ari Indawijaya interpreted the results and revised the manuscript. Ismea Munawaroh wrote the script. All authors read and approved the final manuscript.

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Competing Interests

The authors disclose no conflict.

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References

Ambuk, Y. L. (2020). *The use of antibiotics by the community in Watu Village, Langke Rembong District, Manggarai Regency as a Dental Self Treatment. Doctoral dissertation*. Poltekkes Kemenkes Kupang.

Arikunto, S. (2011). *Prosedur penelitian suatu pendekatan praktik*. Jakarta : Rineka Cipta.

Central Bureau of Statistics. (2021). *Sepulu district in figures. Bangkalan city central Bureau of statistics*.

Farida, H., Herawati, H., Hapsari, M., Notoatmodjo, H., & Hardian, H. (2016). Penggunaan antibiotik secara bijak untuk mengurangi resistensi antibiotik, studi intervensi di bagian kesehatan anak RS Dr. Kariadi. *Sari Pediatri*, *10*(1), 34. https://doi.org/10.14238/sp10.1.2008.34-41.

Hartayu, T. S., Wijoyo, Y., & Wijayanti, L. W. (2013). Community understanding of the sub-districts of Mergangsan, Gondokusuman, Umbulharjo and Kotagede Yogyakarta regarding antibiotics. *Journal of Science and Community Pharmacy*, *10*(1), 22–28.

Hartika, N. A. (2018). *An overview of the level of community knowledge about the use of antibiotics in Pucangan Bumirejo Mungkid Hamlet. (Skripsi)*. Muhammadiyah University of Magelang.

Ihsan, S., Kartina, K., & Akib, N. I. (2016). Studi penggunaan antibiotik non resep di apotek komunitas kota Kendari. *Media Farmasi: Jurnal Ilmu Farmasi*, *13*(2), 272. https://doi.org/10.12928/mf.v13i2.7778.

Kurniawan, A. H., Wardiyah, W., & Tadashi, Y. (2020). The correlation between knowledge with community behavior in antibiotic use in kelurahan petukangan utara with home pharmacy care. *SANITAS: Jurnal Teknologi Dan Seni Kesehatan*, *10*(2), 136–147. https://doi.org/10.36525/sanitas.2019.14.

Lisnawati, L., & Pangesti, W. D. (2012). Hubungan pemberian pendidikan kesehatan dengan pengetahuan ibu tentang tumbuh kembang Balita di desa Kedungrandu Kecamatan Patikraja. *Medisains*, *11*(2).

Loni, S. P. U. (2020). *Tingkat pengetahuan masyarakat tentang penggunaan antibiotika (Karya Tulis Ilmiyah)*. Politeknik Kesehatan Kemenkes Kupang.

Ministry of Health RI. (2011). *Rational drug use module, pharmaceutical service development*. Jakarta.

Negara, K. S. (2014). Analisis implementasi kebijakan penggunaan antibiotika rasional untuk mencegah resistensi antibiotika di RSUP Sanglah Denpasar: studi kasus infeksi Methicillin resistant Staphylococcus Aureus. *Jurnal Administrasi Rumah Sakit Indonesia*, *1*(1). https://doi.org/10.7454/arsi.v1i1.2169.

Notoatmodjo, S. (2010). *Behavioral health sciences*. Jakarta: Rineka Cipta.

Nurhazlina Mohd. Ariffin, Miftahul Jannah, S. R. K. (2021). Perkembangan usia dewasa : tugas dan hambatan pada korban konflik pasca damai. *Bunayya : Jurnal Pendidikan Anak*, *7*(2), 114. https://doi.org/10.22373/bunayya.v7i2.10430.

Pertiwi, R. A. (2018). *Level of knowledge about antibiotics in students of the Muslim Nusantara University (Skripsi)*. University of North Sumatra Pharmacy, Medan.

Plump, W. (2014). *Study Shows Significant Increase in Antibiotic Use Across The World*. Princeton Environmental Institute.

Pratiwi, R. H. (2017). Mekanisme pertahanan bakteri patogen terhadap antibiotik. *Jurnal Pro-Life*, *4*(3), 418–429.

Pratomo, G. S., & Dewi, N. A. (2018). Tingkat pengetahuan masyarakat desa Anjir Mambulau Tengah terhadap penggunaan antibiotik. *Jurnal Surya Medika*, *4*(1), 79–89. https://doi.org/10.33084/jsm.v4i1.354.

Riskesdas. (2013). *Agency of Health Research and Development (Indonesia). Indonesia Basic Health Research 2013.* Jakarta.

Robert M Kliegmen. (2011). *Nelson textbook of pediatrics*. USA: Elsevier.

Rudiansyah, L., Hasani Furdiyanti, N., & Yuswantina, R. (2020). *Study of the use of antibiotics without prescription in the Langensari village community, West Ungaran sub-district. (Doctoral dissertation)*. Ngudi Walyo University.

Syarifuddin, N., Kassaming, K., Laela, N., & Syamsidar, S. (2019). Hubungan karakteristik masyarakat desa Carawali kabupaten Sidenreng Rappang dengan tingkat pengetahuan terhadap penggunaan antibiotik. *Jurnal Ilmiah Kesehatan Iqra*, *7*(1).

Tjay, T. H., & Rahardja, K. (2007). *Important drugs efficacy, Use and Side Effects* (Sixth Edit). Jakarta.

Ulumuddin, I. (2013). *Tingkat pengetahuan pasien Apotek Kimia Farmas Assyifa kota Bima tentang penggunaan antibiotik (Karya Tulis Ilmiah)*. Jurusan Farmasi Kesehatan Makassar. Makassar.

Widayati, A., Suryawati, S., & Hiller, C. de C. J. E. (2011). Self medication with antibiotics in Yogyakarta City Indonesia: a cross sectional population-based survey, BMC Res Note. *BMC Research Notes*.

Yanti, Y. E. (2016). *Rationality of use of antibiotics in inpatients toddlers with Pneumonia with gyssens approach at Sultan Syarif Mohamad Alkadrie Hospital Pontianak (Skripsi).* Pharmacy,

Tanjungpura University.

Yunita, M., & Sukmawati, S. (2021). Edukasi bahaya resistensi bakteri akibat penggunaan antibiotik yang tidak rasional kepada masyarakat desa Air Salobar. *Indonesia Berdaya*, *Journal of Community Engagement*, *2*(1), 1–6.

Yuswantina, R. wantina, Dyahariesti, N. D., Sari, N. L. F., & Sari, E. D. K. (2019). The relationship between age and education levels on knowledge of antibiotic use in Sidorejo Kidul Village. *Indonesian Journal of Pharmacy and Natural Products*, *2*(1), 25–31.