Analysis of The Demographic Characteristics of The Community And Patterns of Use Of Antibiotic Processing Methods In Kebonagung Village, Demak

Nauval Alfarizi[1*], Ahmad Suriyadi Muslim[2], Intan Adevia Rosnarita[3]

[1,2,3]Fakultas Farmasi, Universitas Muhammadiyah Kudus, Jawa Tengah, Indonesia
*Corresponding Author:
Email: nauvalizzy@gmail.com

Abstract.

Irrational antibiotic use remains a serious challenge in efforts to control bacterial resistance globally. One form of this irrational use is the purchase of antibiotics without a prescription, which is still widespread in various regions, including rural areas such as Kebonagung Village, Kebonagung District, Demak Regency. Lack of supervision and community demographic characteristics also influence antibiotic acquisition methods. This study aims to determine the relationship between demographic characteristics and antibiotic use patterns and antibiotic acquisition methods in the community in Kebonagung Village, Kebonagung District, Demak Regency. The research method used was an observational analytic study with a cross-sectional design. A total of 118 respondents were selected using a purposive sampling technique. Data were collected through questionnaires and analyzed using the Chi-square test with a significance level of 0.05. The results showed that age (p = 0.011), education level (p = 0.015), occupation (p = 0.006), and type of antibiotic (p = 0.001) showed a significant relationship to the method of obtaining antibiotics, while gender (p = 0.138) and reasons for using antibiotics based on symptoms felt (p = 0.616) did not show a significant relationship.

Keywords: *Antibiotics; Antibiotic Use Patterns; Demographic Characteristics; Antibiotic Acquisition Methods and Kebonagung Village.*

I. INTRODUCTION

Irrational antibiotic use contributes to bacterial resistance, which is now a global health problem. The World Health Organization (WHO) reported that in 2019 there were 4.95 million deaths related to antibiotic resistance, with 1.27 million of them directly caused by resistant bacterial infections (WHO, 2022). Indonesia faces a similar situation, with a trend of increasing proportions of resistant bacteria in recent years. Data from the Committee for the Control of Antimicrobial Resistance shows that in 2013 the number of resistant bacteria reached 40%, then increased to 60% in 2016, and continued to grow to 60.4% in 2019. This increase is associated with the uncontrolled use of antibiotics in the community (Ardiyanto et al., 2021). The 2023 Indonesian Health Survey (SKI) recorded a national prevalence of diseases that frequently require antibiotic therapy, such as acute respiratory infections (ARI) at 2.2%, pneumonia at 0.48%, and pulmonary tuberculosis (TB) at 0.30%. Central Java Province recorded a prevalence of acute respiratory infections (ARI) of 2.5%, pneumonia of 0.41%, and pulmonary tuberculosis of 0.25% (SKI, 2023). This situation indicates a high public demand for antibiotics. This high demand is not always accompanied by adequate oversight of how the public obtains antibiotics. The availability of antibiotics that are easily accessible without medical supervision presents a challenge in controlling how they are obtained. Regulations have limited the distribution of antibiotics without a doctor's prescription, but the practice of over-the-counter purchasing remains widespread. A study at Pharmacy X Palembang showed that 33% of antibiotics were obtained without a doctor's prescription, with amoxicillin being the most commonly obtained type (Rista et al., 2022).

A similar study in the Talaud Islands Regency found that 34% of the public obtained antibiotics without a prescription, with amoxicillin accounting for 54% of the total antibiotics obtained without a prescription (Rista et al., 2023).A similar situation was also found in a preliminary study conducted in February 2025 on 30 residents of Kebonagung Village, Kebonagung District, Demak Regency who had used

antibiotics. The results showed that 16 people admitted to having obtained antibiotics without a doctor's prescription. This finding indicates that purchasing antibiotics without a prescription also occurs in rural communities, including in Kebonagung Village, thus requiring a more in-depth study. Therefore, this study was conducted to further examine how people obtain antibiotics in Kebonagung Village, Demak Regency. This location was selected based on the lack of research specifically analyzing factors influencing antibiotic acquisition in the area. This study aimed to determine the relationship between demographic characteristics, such as age, gender, education, and occupation, and antibiotic use patterns, and how people obtain antibiotics. The antibiotic use patterns in this study were limited to two aspects: the type of antibiotic used according to the WHO AWaRe classification and the reasons for antibiotic use based on experienced symptoms.

This limitation was established to ensure the focus of the analysis remained in line with the research objectives, considering that not all respondents had a documented medical diagnosis. The results of this study are expected to be a first step in understanding how the community obtains antibiotics in Kebonagung Village, Kebonagung District, Demak Regency. These findings can serve as a basis for developing educational strategies tailored to local conditions, increasing awareness of how to obtain antibiotics appropriately and supporting efforts to prevent antimicrobial resistance at the community level.

II. METHODS

This research is a quantitative study with an observational analytical approach. Observational analytical is a research approach used to understand how and why certain health phenomena occur, by examining the dynamic relationship between independent variables and dependent variables related to the phenomenon (Budiman et al., 2023). This approach was carried out without intervention on the research subjects with a cross-sectional design. Cross-sectional is a research method used to evaluate the relationship between these variables by collecting data at a specific time. Observation and measurement of variables are carried out only once during the research process (Abduh et al., 2022). This design was used to analyze the relationship between demographic characteristics and antibiotic use patterns on how antibiotics are obtained in the community in Kebonagung Village, Kebonagung District, Demak Regency. This research was conducted in Kebonagung Village, Kebonagung District, Demak Regency in 2025. The population used in this study was the entire community of Kebonagung Village, Kebonagung District, Demak Regency, totaling 5,398 people. Based on the calculations used, 118 respondents were recruited in this study, using purposive sampling. Data collection used a questionnaire.

III. RESULTS AND DISCUSSION

Results

Demographic Characteristics of Society

To obtain a clearer picture of the characteristics of the respondents in this study, we grouped them based on several demographic variables, including age, gender, education level, and occupation. These demographic characteristics are important for understanding the social context and background of the respondents, which can influence the results and interpretation of the study. The following is a breakdown of the distribution of respondents based on these variables:

1. Age

To determine the age distribution of respondents in this study, we grouped them into two age categories: 17–40 years and 41–65 years. The distribution of respondents by age group can be seen in Table 1 below:

Table 1. Frequency Distribution Based on Respondents' Age

Age	Frequency(n)	Percentage(%)
17 – 40 years	44	37.3%
41 – 65 years	74	62.7%
Amount	118	100%

Source: Primary data, research results, 2025

Based on Table 1, it can be seen that the majority of respondents (74 people) were in the 41–65 age group. A total of 44 people (37.3%) were in the 17–40 age group. This indicates that the majority of respondents in this study were in the 41–65 age group.

2. Gender

Gender is one of the basic demographic characteristics that is important to analyze. The following is the frequency distribution of respondents by gender, presented in Table 2:

Table 2. Frequency Distribution Based on Respondent's Gender

Gender	Frequency(n)	Percentage(%)
Man	59	50.0%
Women	59	50.0%
Amount	118	100%

Source: Primary data, research results, 2025

Based on Table 2, it can be seen that of the 118 respondents, the number of men and women was equal, at 59 each (50.0%). This indicates that the distribution of respondents in this study based on gender was balanced.

3. Level of education

The respondents' highest level of education provides insight into their background knowledge and insights. Table 3 below shows the distribution of respondents by education level:

Table 3. Frequency Distribution Based on Respondent Level

Education	Frequency(n)	Percentage(%)
Elementary School	25	21.2%
JUNIOR HIGH SCHOOL	34	28.8%
SENIOR HIGH SCHOOL	41	34.7%
Diploma/Bachelor's Degree	18	15.3%
Amount	118	100%

Source: Primary data, research results, 2025

Based on Table 3, it can be seen that the majority of respondents had a secondary education (SMA) of 41 people (34.7%), followed by SMP of 34 people (28.8%). Respondents with an elementary school education were 25 people (21.2%) and those with a Diploma/Bachelor's degree were 18 people (15.3%).

4. Work

Employment status is an important indicator in identifying respondents' socioeconomic conditions. Employment was categorized into three groups in this study: formal, informal, and unemployed. The distribution of respondents by employment status is presented in Table 4 below:

Table 4. Frequency Distribution Based on Respondents' Occupation

Work	Frequency(n)	Percentage(%)
Formal	41	34.7%
Informal	52	44.1%
Doesn't work	25	21.2%
Amount	118	100%

Source: Primary data, research results, 2025

Based on table 4, it is known that the majority of respondents work in the informal sector, as many as 52 people (44.1%), followed by formal employment as many as 41 people (34.7%), and finally respondents who do not have jobs as many as 25 people (21.2%).

Overview of Community Antibiotic Use Patterns

Antibiotic use patterns in this study were limited to two components: the type of antibiotic used based on the WHO AWaRe classification and the reason for antibiotic use based on symptoms experienced. The following shows the distribution of respondents based on these two components:

1. Types of Antibiotics

The types of antibiotics consumed by respondents were grouped based on the WHO AWaRe classification, which divides antibiotics into three categories: Access, Watch, and Reserve. This grouping is

used to identify trends in antibiotic use in the community. Detailed distribution is presented in the following table:

Table 5. Frequency Distribution Based on Respondent's Antibiotic Type

Types of Antibiotics Based on AWaRe Classification	Frequency(n)	Percentage(%)
Access	66	55.9%
Watch	37	31.4%
Reserve	15	12.7%
Amount	118	100%

Source: Primary data, research results, 2025

Based on Table 5, it can be seen that the majority of respondents (66 people) used Access class antibiotics. 37 respondents (31.4%) used Watch class antibiotics. The remaining 15 respondents (12.7%) used Reserve class antibiotics.

2. The reason for using antibiotics is based on the symptoms experienced.

Information on infection symptoms was obtained from respondents' perceptions through a questionnaire containing several choices of conditions they experienced as reasons for antibiotic use, such as cough, diarrhea, painful urination, purulent wounds, and others. Based on the similarities in the body systems involved, these symptoms were then grouped by researchers into six categories: respiratory tract infections, gastrointestinal infections, urinary tract infections, dental and oral infections, skin infections, and ear and eye infections. This grouping aims to describe the reasons for antibiotic use at the community level more systematically. Details of the distribution of each symptom category are presented in the following table:

Table 6. Frequency Distribution Based on Reason for Use Antibiotics Based on Symptoms Experienced

Types of Symptoms	Frequency(n)	Percentage(%)
Symptoms of Respiratory Tract Infection	31	26.3%
Symptoms of Tooth and Mouth Infections	23	19.5%
Symptoms of Urinary Tract Infection	21	17.8%
Symptoms of Skin and Soft Tissue Infections	14	11.9%
Symptoms of Gastrointestinal Tract Infection	16	13.6%
Symptoms of Ear or Eye Infection	13	11.0%
Amount	118	100%

Source: Primary data, research results, 2025

Based on Table 6, respiratory tract infection symptoms were the most frequently reported category by respondents when using antibiotics, with 31 respondents (26.3%). Dental and oral infection symptoms came in second with 23 respondents (19.5%), followed by urinary tract infection symptoms with 21 respondents (17.8%). Skin and tissue infections, gastrointestinal infections, and ear and eye infections were reported in smaller numbers.

How to Obtain Antibiotics in the Community

This study identified how respondents obtained antibiotics, which were classified into two general categories: prescription and non-prescription. This classification is used to describe community antibiotic acquisition practices. Details of the distribution are presented in the following table:

Table 7. Frequency Distribution Based on Source of Acquisition Respondent Antibiotics

How to Obtain Antibiotics	Frequency(n)	Percentage(%)
With Recipe	66	55.9%
Without Prescription	52	44.1%
Amount	118	100%

Source: Primary data, research results, 2025

Table 7 shows the distribution of respondents based on antibiotic acquisition method. Sixty-six respondents (55.9%) obtained antibiotics through a prescription, while 52 respondents (44.1%) obtained antibiotics without a prescription. The over-the-counter category in this study includes direct purchases from pharmacies or general stores without a recommendation from a healthcare professional.

The Relationship between Demographic Characteristics and the Community's Methods of Obtaining Antibiotics

Demographic characteristics in this study included age, gender, education level, and occupation. Each variable category was tested to determine whether there was a significant relationship with how people obtained antibiotics. The results of the Chi-square test for demographic characteristics and method of acquisition are presented in the following table:

Table 8. Relationship between Demographic Characteristics and Community Antibiotic Acquisition Methods

Demographic Characteristics	How to Obtain				Significance (P-Value)
	With Recipe		Without a prescription		
	n	%	n	%	
Age					
17 – 40 years	18	40.9%	26	59.1%	0.011
41 – 65 years	48	64.9%	26	35.1%	
Gender					
Man	37	62.7%	22	37.3%	0.138
Women	29	49.2%	30	50.8%	
Education					
Elementary School	12	48.0%	13	52.0%	0.015
JUNIOR HIGH SCHOOL	15	44.1%	19	55.9%	
SENIOR HIGH SCHOOL	23	56.1%	18	43.9%	
Diploma/Bachelor's Degree	16	88.9%	2	11.1%	
Work					
Formal	31	75.6%	10	24.4%	0.006
Informal	25	48.1%	27	51.9%	
Doesn't work	10	40.0%	15	60.0%	

Source: Primary data, research results, 2025

Based on Table 8, the chi-square test results show a significant relationship between age and the method of antibiotic acquisition (p = 0.011). Respondents aged 41–65 years tended to obtain antibiotics with prescriptions more often than those aged 17–40 years. The gender variable did not show a significant relationship with the method of antibiotic acquisition (p = 0.138). Women appeared to obtain antibiotics without prescriptions slightly more often, although this difference was not statistically significant. A significant relationship was found in the education variable (p = 0.015). Respondents with a Diploma/Bachelor's degree were more likely to obtain antibiotics through prescriptions. Respondents with primary and secondary education (elementary, junior high) tended to obtain antibiotics without prescriptions more often. The relationship test for the employment variable also showed significant results (p = 0.006). Respondents with formal employment were more likely to obtain antibiotics with prescriptions, while respondents who worked informally and were unemployed were more likely to obtain antibiotics without prescriptions.

The Relationship Between Usage Patterns and Community Antibiotic Acquisition Methods

The antibiotic use patterns in this study consisted of two components: the type of antibiotic used based on the WHO AWaRe classification and the reason for antibiotic use based on symptoms. Statistical tests were conducted to examine the relationship between these two aspects and the method of antibiotic acquisition, categorized as prescription and nonprescription. The results of the Chi-square test for antibiotic use patterns and method of acquisition are presented in the following table:

Table 9. Relationship between Usage Patterns and Community Antibiotic Acquisition Methods

Usage Patterns	How to Obtain				Significance (P-Value)
	With Recipe		Without a prescription		
	n	%	n	%	
Types of Antibiotics Based on AWaRe Classification					
Access	27	40.9%	39	59.1%	0.001
Watch	24	64.9%	13	35.1%	
Reserve	15	100%	0	0.0%	

Conditions of Use					
Symptoms of respiratory tract infections	16	51.6%	15	48.4%	0.616
Symptoms of tooth and mouth infections	12	52.2%	11	47.8%	
Symptoms of urinary tract infection	15	71.4%	6	28.6%	
Symptoms of skin and soft tissue infections	8	57,1%	6	42.9%	
Symptoms of digestive tract infections	7	43.8%	9	56.3%	
Symptoms of ear or eye infection	8	61.5%	5	38.5%	

Source: Primary data, research results, 2025

Based on Table 9, the chi-square test results indicate a significant relationship between antibiotic type and method of antibiotic acquisition (p = 0.001). The Access category was the most frequently used by respondents and was mostly obtained without a prescription. The Watch category was mostly obtained with a prescription, while all Reserve antibiotics were only obtained with a doctor's prescription. This pattern illustrates the tendency that the higher the antibiotic category in the WHO AWaRe system, the stricter the monitoring of antibiotic acquisition. Access category antibiotics, which are intended for first-line use, were the group most frequently obtained without a prescription. Reserve antibiotics, which include antibiotics for serious conditions, were obtained entirely through official channels. Analysis of reasons for antibiotic use based on symptoms showed no significant relationship with method of acquisition (p = 0.616). Antibiotic acquisition was reported to occur both through prescriptions and without prescriptions for all symptom categories, with a relatively even distribution. This finding suggests that the public does not differentiate antibiotic acquisition routes based on symptoms.

Discussion

The results of a study of residents aged 17–65 years in Kebonagung Village, Kebonagung District, Demak Regency, in May 2025 provide a comprehensive overview of the demographic characteristics of respondents, their antibiotic use tendencies, and their relationship to antibiotic acquisition methods. This study examined several variables that potentially influence whether residents obtain antibiotics through official channels (with a prescription) or without a doctor's prescription. The analysis of the relationships included age, gender, education level, type of employment, type of antibiotic based on the AWaRe (Access, Watch, Reserve) classification, and reasons for use as assessed by symptoms. The findings are expected to provide a starting point in understanding community acquisition tendencies. These results can also serve as a reference in designing public health policies and educational strategies that are appropriate to the social conditions and demographic characteristics of Kebonagung Village. The expected impact includes increased public awareness of obtaining antibiotics in accordance with regulations, as part of efforts to prevent resistance at the community level.Demographic characteristics were analyzed as variables influencing how people obtain antibiotics. The demographic characteristics covered in this study included age, gender, education level, and type of employment. Each variable category was tested against antibiotic acquisition methods using the chi-square test. Age was one of the variables that showed a significant relationship with antibiotic acquisition methods (p = 0.011). The majority of respondents were in the 41–65 age group (74 people (62.7%), while the 17–40 age group (44 people (37.3%) participated.

The distribution showed that the 41–65 age group more often obtained antibiotics with a doctor's prescription (64.9%), while the 17–40 age group more often obtained antibiotics without a prescription (59.1%). This was influenced by time constraints due to busy schedules, so respondents chose faster antibiotic acquisition routes without having to consult a health professional. This group also relied on personal experience or advice from their surroundings in making decisions about obtaining antibiotics. This finding is in line with a study by Nurafni et al. (2024) which found a significant relationship between age and antibiotic acquisition. This age group is busy working so they do not have more time to queue up first to see a doctor, which results in this group choosing to take shortcuts to get antibiotics without consulting a doctor, even though antibiotics must be obtained with a doctor's prescription (Nurafni et al., 2024).Gender was also analyzed in this study, but the results showed that gender was not significantly associated with antibiotic acquisition method (p = 0.138). The data distribution showed that women were slightly more likely to use antibiotics without a prescription than men, while men were more likely to obtain antibiotics through prescriptions. This difference in distribution was not strong enough to be declared statistically significant.

Similar results were also reported by Rosyidah et al. (2021), who found that women had a higher chance of obtaining antibiotics without a prescription based on an odds ratio analysis, but the difference was not statistically significant.

Men and women have relatively similar habits, but differences may arise due to the influence of other variables such as education level and type of employment. Education level showed a significant association with antibiotic acquisition method (p = 0.015). There were 18 respondents with a Diploma/Bachelor's degree (15.3%), and the majority (88.9%) obtained antibiotics through prescriptions. In the elementary and junior high school education groups, the use of antibiotics without a prescription was higher. These findings indicate that education level can influence people's tendencies in accessing antibiotics, particularly regarding compliance with regulatory procurement channels. People with higher education have broader access to information and are more likely to critically evaluate medical information. Research by Ode et al. (2023) supports that low education levels correlate with a tendency to obtain antibiotics without a prescription, which may be due to limited information or low risk perception. These findings reinforce the need for community-based education, particularly for people with primary and secondary education.Occupation type also showed a significant association with antibiotic acquisition methods (p = 0.006). Respondents working in the formal sector were more likely to obtain antibiotics with a doctor's prescription, at 75.6%, while those working in the informal sector or unemployed were more likely to obtain antibiotics without a prescription. Occupation type can influence access to health facilities and the ease of obtaining formal medical services. Mamusung et al. (2023) stated that informal workers such as farmers and fishermen are at higher risk of obtaining antibiotics without going through appropriate medical channels.

The formal work environment can shape more rational health behaviors, including how antibiotics are obtained. These findings provide an initial basis for understanding trends in community access to antibiotics and emphasize the importance of educational interventions that consider social and demographic characteristics to increase awareness of appropriate antibiotic acquisition and prevent resistance at the community level.Antibiotic use patterns are also an important variable in this study. Assessment of use patterns in this context is limited to two main aspects: the type of antibiotic used (based on the WHO AWaRe classification) and the reason for use based on symptoms experienced. Both were analyzed to see the relationship with how people obtain antibiotics. The type of antibiotic used refers to the WHO AWaRe classification system, which divides antibiotics into three categories: Access, Watch, and Reserve. Access antibiotics are first-line and considered safer, Watch antibiotics require high caution, and Reserve antibiotics are only used for severe infections. The majority of respondents used Access antibiotics (55.9%), followed by Watch antibiotics (31.4%), and Reserve antibiotics (12.7%). The test results showed a significant relationship between antibiotic type and method of acquisition (p = 0.001). Respondents using Access antibiotics were more likely to obtain antibiotics without a prescription (59.1%), while Reserve antibiotics were obtained entirely with a doctor's prescription. Antibiotics categorized as having a high risk of resistance are generally not available without a prescription. Inaccurate public perceptions that Access antibiotics are “milder” or “safer” contribute to over-the-counter purchasing behavior. Research by Islam et al. (2022) found a similar pattern in Bangladesh, where Access antibiotics were most frequently purchased without a prescription.

This situation highlights the importance of monitoring the distribution of first-line antibiotics to prevent misuse.Reasons for antibiotic use based on perceived symptoms were analyzed as part of the usage patterns in this study. Grouping was based on the affected body system: respiratory tract, gastrointestinal tract, urinary tract, oral cavity and teeth, skin, and ears and eyes. Symptoms of respiratory tract infections included cough, runny nose, and sore throat. Symptoms of gastrointestinal infections included diarrhea, nausea, and vomiting. Symptoms of urinary tract infections were identified by pain during urination or increased frequency of urination. Symptoms of oral and dental infections included toothache and swollen gums, while symptoms of skin infections included purulent wounds or skin infections, and symptoms of ear and eye infections included pain, redness, or discharge from the ears or eyes. Chi-square test results showed no significant relationship between reasons for antibiotic use based on perceived symptoms and the method of antibiotic acquisition (p = 0.616). This study indicates that people do not differentiate between the method

of obtaining antibiotics based on the type of symptoms they experience. People's decisions to obtain antibiotics were not based on a systematic process of considering their complaints. This indicates a growing tendency for a practical mindset within society to shape this behavior, where antibiotics are perceived as a quick fix for various complaints and positioned as a "all-in-one remedy" for any condition when feeling unwell. This view is reinforced by concerns about the cost of medical consultations, ease of access, personal or other people's experiences perceived as successful, and advice from those around them, such as family or neighbors.

Findings from Rosyidah et al. (2021) support this finding. The study also found no relationship between the primary complaint as the reason for use and the method of obtaining antibiotics. The type of symptoms experienced was not always the basis for determining how people obtained antibiotics. Ease of access and the perception that treatment would be cheaper without a medical examination were common reasons (Rosyidah et al., 2021). These findings align with the findings in this study, which found that people tend not to consider specific symptoms when deciding how to obtain antibiotics. These decisions are more influenced by practical perceptions and social influences within the community. The information obtained from these findings can be used as a basis for designing more comprehensive educational strategies. Education is not enough to just convey medical information about the type of infection, but also needs to emphasize how to obtain antibiotics in accordance with applicable regulations.The public needs to be educated that antibiotics are powerful drugs that can only be legally obtained through a prescription from a healthcare professional. By strengthening education regarding proper access channels, it is hoped that the public will become more aware of the importance of following legal procedures for obtaining antibiotics, thereby helping to reduce the unlawful free access of antibiotics.

IV. CONCLUSION

Most respondents were aged 41–65 years, with a relatively equal proportion of men and women. The education level was dominated by high school/vocational school graduates, and the majority worked in the informal sector such as farmers and traders. The most commonly used antibiotic class was Access, with respondents citing their use as symptoms of respiratory infections. The majority of people obtained antibiotics with a doctor's prescription (55.9%), and 44.1% obtained antibiotics without a prescription. Age ($p = 0.011$), education level ($p = 0.015$), type of employment ($p = 0.006$), and type of antibiotic ($p = 0.023$) were significantly associated with antibiotic acquisition methods. Gender ($p = 0.138$) and reasons for antibiotic use based on symptoms ($p = 0.616$) did not show a significant association with antibiotic acquisition methods.

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