

Original article

Antibiotic self-medication in a rural filipino community: patterns, determinants, and implications for responsible antibiotic use

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Abstract

Background: Antibiotic self-medication is a persistent public health concern that contributes to inappropriate infection management, adverse drug reactions, and antimicrobial resistance, particularly in communities with limited access to formal healthcare.

Objective: This study assessed the patterns, adverse-effect experiences, and determinants of antibiotic self-medication among household respondents in Barangay Pagatpatan, Butuan City, Agusan del Norte, Philippines.

Methods: A community-based cross-sectional descriptive quantitative study was conducted among 293 randomly selected household respondents. Data were collected using a semi-structured questionnaire adapted from a previously validated instrument and analyzed using Microsoft Excel and JASP version 0.16. Descriptive statistics were used to summarize respondent characteristics and antibiotic-use patterns, while association analyses were performed to examine factors related to selected antibiotic use.

Results: Nearly half of the respondents (49.2%) reported self-medicating with antibiotics within the previous 12 months. Respondents were predominantly female (80.6%), married (63.1%), self-employed (62.5%), and aged 39–48 years (26.3%). Amoxicillin was the most commonly used antibiotic (55.0%), with cost-related reasons reported as the leading driver of self-medication (42.7%). Although 65.5% of respondents were aware that antibiotics may cause adverse effects, only 10.9% reported experiencing adverse reactions, most commonly allergic reactions (34.3%). Association analyses showed statistically significant but weak relationships between selected reasons for self-medication and specific antibiotic use, suggesting that antibiotic self-medication was shaped by multiple overlapping factors rather than a single dominant determinant.

Conclusion: Antibiotic self-medication was common in this rural Filipino community and was influenced by economic, behavioral, and access-related factors. These findings emphasize the need for community-based health education and strengthened antimicrobial stewardship policies to promote rational antibiotic use and reduce risks associated with self-medication.

Keywords: Antibiotic self-medication, adverse effects, post-Covid-19, rural community health.

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Antibiotic self-medication is a persistent public health challenge and a major driver of antimicrobial resistance (AMR), particularly in communities with constrained access to formal healthcare.⁽¹⁻³⁾ Although self-care may be acceptable for minor illnesses, the unsupervised use of antibiotics can delay appropriate diagnosis, promote incorrect dosing, encourage premature discontinuation, and increase the selection pressure for resistant microorganisms.^(1,2) These risks extend beyond the individual, as resistant bacteria and resistance genes can circulate across households, communities, animals, food systems, and the environment.^(4,5)

Recent evidence shows that antibiotic self-medication remains widespread across diverse settings. In a Saudi primary care population, 65.6% of adults reported antibiotic use in the previous year, nearly half purchased antibiotics without a prescription, and many used leftover antibiotics or took them for colds and sore throats.⁽¹⁾ In Northern Uganda, 67.79% of adults reported self-medicating with antibiotics, with drug shops or pharmacies serving as the main source.⁽²⁾ Commonly misused antibiotics include amoxicillin, ciprofloxacin, metronidazole, co-trimoxazole, and related broad-spectrum agents, which are often taken for cough, fever, diarrhea, wounds, and other perceived minor conditions without clinical assessment.^(1,2)

The determinants of antibiotic self-medication are multidimensional. Previous successful treatment, perceived mildness of illness, distance from health facilities, consultation costs, long waiting times, poor experiences with healthcare providers, use of old prescriptions, household influence, and easy access to informal medicine sources have all been associated with inappropriate antibiotic use.⁽²⁾ These factors are especially relevant in rural and resource-limited communities, where self-medication may reflect not only individual choice but also structural barriers to timely and affordable healthcare.

In the Philippines, community-level evidence on antibiotic self-medication remains limited, particularly in rural barangay settings where informal access to medicines may be common. Barangay Pagatpatan, Butuan City, Agusan del Norte, provides an important local context for examining how antibiotics are accessed, used, and normalized outside formal medical supervision. Understanding these patterns and determinants is essential for designing targeted interventions that promote responsible antibiotic use and reduce AMR risk.

This study investigated the antibiotics commonly used, the conditions for which they are taken, their sources, and the sociodemographic, behavioral, economic, and health-system factors associated with self-medication. By generating local evidence from a rural Filipino community, the study supports AMR prevention, community health education, and One Health-oriented action aligned with SDG 3 on good health and well-being, SDG 6 on clean water and sanitation, and SDG 15 on life on land.

Materials and methods

Study Design

This study employed a community-based, cross-sectional, descriptive, quantitative design to assess the patterns and determinants of antibiotic self-medication among residents of Barangay Pagatpatan, Butuan City, Philippines. Data were collected at a single time point using a structured questionnaire administered to eligible community respondents. This design was appropriate for describing antibiotic self-medication practices and identifying associated sociodemographic, behavioral, economic, and health-system factors within the study population.

Study area

The study was conducted in Barangay Pagatpatan, Butuan City, Agusan del Norte, Philippines (**Figure 1**), a rural community where access to formal healthcare services may be constrained by distance, limited transportation, and poor road conditions. Residents commonly need to travel to reach hospitals, health facilities, or authorized medicine outlets, making timely consultation difficult, particularly for minor or perceived non-urgent illnesses.⁽⁶⁾ In such contexts, antibiotics may be obtained through informal or semi-formal community sources, including neighborhood stores, household leftovers, previous prescriptions, relatives, or other non-prescription channels. Given these conditions, Barangay Pagatpatan provides an appropriate community setting for examining the local patterns and determinants of antibiotic self-medication.

Respondents of the study

The respondents were randomly selected residents of Barangay Pagatpatan, Butuan City, Philippines. Eligible participants were adults aged 18–60 years who had lived in the barangay for at least six months, had self-medicated with antibiotics within the past 12 months, and served as household heads or primary

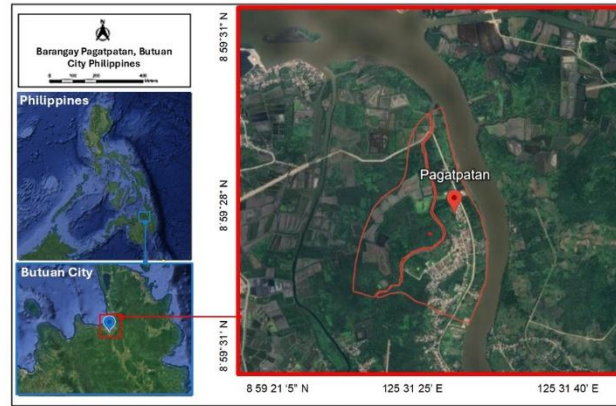


Figure 1. The map shows Barangay Pagatpatan in Butuan City, Philippines (8.9914° N, 125.5250° E). The main panel provides a satellite view with the barangay boundary marked in red along the Agusan River, while the left insets indicate Butuan City's location within the Philippines.

health decision-makers. Household heads (mothers, fathers, grandparents, or single parents) were selected because they commonly influence healthcare-seeking behavior and medication use during illness episodes in rural households.⁽⁷⁾

Participants were excluded if they were non-residents or temporary visitors, or had not used antibiotics without a prescription within the specified period. Individuals who were unable to provide informed consent or had communication barriers that could compromise the accuracy and reliability of their responses were also excluded.

Sample Size Determination and Sampling Technique

The sampling frame consisted of 1,226 dwelling units and 1,351 households recorded in Barangay Pagatpatan, Butuan City, Philippines, during the study period from April to May 2022. The minimum sample size was estimated using Cochran's formula:

$$\frac{NZ^2pq}{(N-1)e^2 + Z^2pq}$$

with finite population correction, assuming a 95% confidence level, 5% margin of error, and 50% expected proportion of antibiotic self-medication to maximize sample size. Using a population size of 1,226 households, a Z value of 1.96, $p = 0.50$, $q = 0.50$, and $e = 0.05$, the required and computed sample size was 293 households.

A simple random sampling technique was used to ensure that each household in the sampling frame had an equal probability of selection. The list of eligible

households was encoded in Microsoft Excel, assigned unique identification numbers, and randomly selected until the required sample size of 293 was reached. From each selected household, one eligible respondent was recruited.

Research instrument, validation, and data collection procedure

Data were collected through face-to-face interviews using a semi-structured questionnaire adapted from Shah SJ, *et al.*⁽⁸⁾ The original instrument included items on respondent characteristics, antibiotic self-medication practices, types and frequency of antibiotics used, treatment duration, dosage recall, symptoms treated, reasons for self-medication, source of recommendation, knowledge of adverse effects, and awareness of antibiotic resistance.

For the present study, the questionnaire was modified to fit the rural community setting of Barangay Pagatpatan and the study objectives. The final tool consisted of three sections with 17 items. Section A collected sociodemographic information, including age, sex, marital status, source of income, monthly household income, household size, and health insurance status. Section B assessed antibiotic self-medication patterns, including frequency of antibiotic use within the past 12 months, duration of use, symptoms or conditions treated, reasons for self-medication, source of antibiotic recommendation, and commonly used antibiotics. A checklist and images of common branded and generic antibiotics were used to facilitate recall. Section C assessed respondents' knowledge and reported experiences of adverse effects associated with antibiotic use, including follow-up questions on concurrent medicine use and frequency of reported adverse events.

The adapted questionnaire underwent content and face validation before data collection. Experts in toxicology and pharmacy reviewed the instrument for relevance to antibiotic use, adverse effects, and self-medication practices. Two statisticians assessed item clarity, structure, and alignment with the study variables. A licensed pharmacist reviewed the list of generic and branded antibiotics to verify their appropriateness and local accessibility. The questionnaire was translated into the local dialect to improve comprehension and was checked for consistency with the original English version.

The source instrument was pilot-tested by Shah SJ, *et al.* ⁽⁸⁾ among 30 eligible participants, and feedback indicated no major difficulty for either respondents or researchers. In the present study, the adapted questionnaire was further reviewed for contextual appropriateness before field administration. Because the tool primarily consisted of categorical and descriptive items rather than multi-item psychometric scales, Cronbach's alpha was not computed for the entire questionnaire.

During data collection, the researcher explained the study objectives, procedures, risks, benefits, confidentiality measures, and the voluntary nature of participation. Written informed consent was obtained from each eligible respondent before the interview. Each survey interview lasted approximately 5–10 minutes. Data collection followed prevailing Department of Health and Inter-Agency Task Force COVID-19 protocols, including physical distancing and other safety measures. All 293 selected and eligible respondents completed and returned usable questionnaires; thus, the final analytic sample consisted of 293 respondents, yielding a 100.0% response rate.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using JASP version 0.16. Descriptive statistics were used to summarize respondent characteristics and antibiotic self-medication patterns. Categorical variables, including type of antibiotic used, reported indications for use, reasons for self-medication, and adverse-effect experiences, were presented as frequencies and percentages. Continuous variables, including frequency of antibiotic use within the past 12 months and number of treatment days, were summarized as mean $\pm$ standard deviation (M $\pm$ SD).

Inferential analysis was performed to examine the association between the reported reasons for self-medication and the use of specific antibiotics. The chi-square test of independence was used to determine whether selected reasons for self-medication were significantly associated with the use of commonly reported antibiotics, including amoxicillin, doxycycline, clindamycin, amoxicillin–clavulanate, and levofloxacin. Statistical significance was set at $P < 0.05$.

To estimate the strength of association between categorical variables, the Phi coefficient (ϕ) was computed. The magnitude of association was interpreted as follows: 0.00–0.09 = none or very weak, 0.10–0.29 = weak, 0.30–0.49 = moderate, and 0.50–1.00 = strong. Results were reported using both p-values and Phi coefficients, where the P -value indicated statistical significance and the Phi coefficient indicated the strength of association.

Declaration of AI use

The author conducted all analyses, interpretations, and final conclusions; artificial intelligence (OpenAI's ChatGPT) was used only for idea generation, clarity, and grammatical improvement.

Ethical considerations

This study was conducted in accordance with ethical principles for human participant research. The final research protocol was reviewed and approved by the Caraga Health Research and Development Consortium Ethics Review Committee (CHRD-ERC) in December 2021, prior to community data collection. The protocol incorporated revisions addressing methodological rigor, participant protection, informed consent procedures, confidentiality, and COVID-19-related public health safeguards.

Written informed consent was obtained from all eligible respondents before participation. The consent form was attached to the first page of the questionnaire and explained the study purpose, participant selection, survey procedures, potential benefits, voluntary participation, confidentiality measures, and the right to decline or withdraw without penalty. To ensure comprehension, the researcher read and explained the consent form in the local language before respondents indicated their willingness to participate by signing the form.

Confidentiality and anonymity were maintained throughout the study. No personally identifiable information was included in the analysis or reporting of results. Completed questionnaires were handled securely, and responses were reported only in aggregate form. During field data collection, applicable Department of Health and Inter-Agency Task Force COVID-19 protocols, including physical distancing and other precautionary measures, were observed to minimize risk to both participants and researchers.

Results

Socio-demographic profile of the respondents

A total of 293 respondents participated in the study. The respondents represented different sociodemographic backgrounds (**Table 1**).

Respondents between the ages of 39 and 48 made up the largest percentage (26.3%), closely followed by those between the ages of 29 and 38 (24.9%). There were more male participants (19.5%) than females (80.5%) in this study. Regarding marital status, the majority (63.1%) were married, others were single (14.7%), live-in/cohabitation (9.9%), and widowed (9.6%). Self-employment (62.46%) was the respondents' main source of income. The majority of respondents had household incomes between Php 2,000 and Php 5,000 (38.6%), and 61.4% lived in homes with 4 or 6 people. Regarding health coverage, the majority of respondents were PhilHealth-insured (90.1%).

Table 1. Sociodemographic Profile of the Respondents in Barangay Pagatpatan, Butuan City, Philippines.

Variable	Category	N	(%)
Age	18-28 years old	55	18.8
	29-38 years old	76	25.9
	39-48 years old	77	26.3
	49-59 years old	56	19.1
	60 years old and above	29	9.9
Sex	Male	57	19.5
	Female	236	80.6
Marital status	Single	43	14.7
	Married	185	63.1
	Widowed	28	9.6
	Divorced	8	2.7
	Live-in/cohabitation	29	9.9
Source of income	Self-employed	183	62.5
	Government employee	35	12.0
	Private employee	40	13.7
	Pension/ family assistance	35	12.0
Household monthly income	Php 2,000-5,000	113	38.6
	Php 5,001-10,000	97	33.1
	Php 10,001-15,000	39	13.3
	Php 15,001-20,000	24	8.2
	Php 20,001-40,000	20	6.8
Household size	1-3 members	54	18.4
	4-6 members	180	61.4
	7-9 members	59	20.1
	10 and above members	0	-
With health insurance (PhilHealth)	Yes	264	90.1
	No	29	9.9

Commonly used antibiotic drugs, their usage, and the adverse effects experienced

The survey of antibiotic usage (**Table 2**) among residents shows that amoxicillin was the most frequently used antibiotic, with 55.0% of respondents reporting its use over the past 12 months, averaging 2.2 ± 0.9 times per year and 4.8 ± 2.4 days per treatment. Co-trimoxazole (17.4%), Metronidazole (11.6%), and Cephalexin (10.9%) were also commonly used. Less frequently used antibiotics included Doxycycline (3.8%), Clindamycin (3.1%), Ciprofloxacin (3.4%), Amoxicillin/Clavulanate (4.1%), Ampicillin (5.5%), Azithromycin (5.1%), and Levofloxacin (0.7%). Treatment duration varied, with Clindamycin having the longest mean treatment period (5.8 ± 7.4 days) and Ciprofloxacin the shortest (3.1 ± 1.2 days). Furthermore, Amoxicillin was used to treat a wide range of infections, including respiratory (47.2%), skin (45.3%), mouth and tooth (5.3%), and urinary tract (26.7%). Cotrimoxazole was used to treat (62.8%) respiratory infections, (21.6%) GI infections, and (7.5%) urinary tract infections (11.8%). Metronidazole (an antiprotozoal) was also used to treat GI infections (91.2%), genital infections (5.9%), and mouth and tooth infections (5.9%). Cephalexin was also used to treat (34.4%) skin infections, mouth and tooth (34.4%) infections, and UTIs (15.6%).

Influence of using antibiotics

Among respondents, the majority self-prescribed antibiotics (49.2%), indicating that nearly half are taking antibiotics without professional guidance. Intermediate family members (16.7%), parents (11.6%), and friends (10.9%) also influenced antibiotic use. Professional suggestions were minimal, with only pharmacists (1.0%), dentists (1.0%), and midwives (3.8%) contributing to recommendations. Also, relatives (5.8%) are included in the suggestions (**Figure 2**).

General awareness about the adverse effects of antibiotics

Among the respondents, 65.5% reported being aware of the adverse effects of antibiotics, while 34.5% reported not being aware (**Figure 3**). This implies that even while most people in the community are aware of the prospective risks connected to using

antibiotics, a sizable portion are still ignorant about potential side effects, which could lead to inappropriate or dangerous use.

Common adverse effects experienced by respondents

The most commonly reported adverse effect (**Figure 4**) of antibiotic use among respondents was allergic reaction (34.3%), followed by nausea or vomiting (21.8%) and tiredness or dizziness (12.5%). Other reported effects included sleep problems (9.7%), diarrhea or abdominal pain (9.3%), headache (6.2%), and heartbeat abnormalities (3.1%).

Respondents who are taking other medications other than antibiotics

Follow-up response from the respondents was noted for those who have only experienced adverse effects after antibiotic use (**Figure 5**). A majority (68.8%) reported not taking other medications concurrently, while 31.3% indicated concurrent drug use (**Figure 5-A**), suggesting possible drug–drug interaction risks in a subset of respondents. Most participants (81.3%) were currently using antibiotics at the time of the survey, and over half (53.1%) reported having used antibiotics twice (**Figure 5B**), followed by once (28.1%), thrice (12.5%), and more than three times (6.3%) within the observed period (**Figure 5C**).

Possible reasons for the self-medication of antibiotic drugs

The distribution of possible reasons for choosing antibiotic self-medication over consulting a licensed healthcare expert for perceived diseases was also determined (**Table 3**). The most frequently cited motivations were saving money (42.7%) and using the same medicine that resolved previous complaints (35.2%), indicating that economic and experiential factors strongly influence antibiotic self-medication. Other reasons included saving time (12.6%), avoiding hassles in visiting a doctor (11.3%), and availability of antibiotics over the counter (10.2%). Few reported self-medicating because of leftover medicines (7.5%) and Covid-19–related concerns, including the pandemic itself or fear of contracting or being diagnosed with Covid-19 (9.6% combined).

Table 2. Antibiotic drugs, their usage, and adverse effects experienced among the households in Brgy. Pagatpatan, Butuan City, Philippines.

Antibiotic drugs	Usage		Usage in 12 months (Mean $\pm$ SD)	No. of days of treatment (Mean $\pm$ SD)	D1 (%)	D2 (%)	D3 (%)	D4 (%)	D5 (%)	D6 (%)	D7 (%)	D8 (%)
	N	(%)										
Amoxicillin	161	55.0	2.2 $\pm$ 0.9	4.8 $\pm$ 2.4	45.3	47.2	4.4	6.8	26.7	7.5	2.5	3.1
Doxycycline	11	3.8	3.5 $\pm$ 2.4	4.8 $\pm$ 3.1	36.4	18.2	27.3	0.0	27.3	9.1	0.0	0.0
Clindamycin	9	3.1	5.6 $\pm$ 4.5	5.8 $\pm$ 7.4	77.8	0.0	22.2	0.0	0	0.0	0.0	0.0
Cephalexin	32	10.9	1.6 $\pm$ 0.6	4.8 $\pm$ 1.5	34.4	12.5	6.3	0.0	34.4	15.6	9.4	3.1
Ciprofloxacin	10	3.4	1.4 $\pm$ 0.5	3.1 $\pm$ 1.2	50.0	10.0	30.0	10.0	0.0	0.0	10.0	0.0
Co-trimoxazole	51	17.4	1.5 $\pm$ 0.8	4.5 $\pm$ 1.8	7.8	62.8	21.6	0.0	2.0	11.8	0.0	7.8
Amoxicillin and Clavulanate	12	4.1	1.8 $\pm$ 0.8	6.9 $\pm$ 2.5	50.0	16.7	0.0	0.0	41.7	8.3	0.0	0.0
Levofloxacin	2	0.7	2.5 $\pm$ 0.7	4.0 $\pm$ 1.4	0.0	50.0	50.0	0.0	0.0	50.0	0.0	0.0
Ampicillin	16	5.5	2.1 $\pm$ 1.2	4.8 $\pm$ 3.2	31.3	18.8	18.8	0.0	18.8	0.0	0.0	18.8
Azithromycin	15	5.1	2.0 $\pm$ 1.6	3.7 $\pm$ 1.7	0.0	53.3	13.3	0.0	0.0	6.7	0.0	13.3
Metronidazole	34	11.6	1.7 $\pm$ 1.0	4.0 $\pm$ 1.8	0.0	0.0	91.2	5.9	5.9	0.0	0.0	0.0

Legend: D1 Skin Infections; D2 Respiratory Infections; D3 Gastrointestinal Infections; D4 Genital Infection; D5 Mouth and Throat Infection; D6 UTI; D7 Joint Pain; D8 Ear Infection

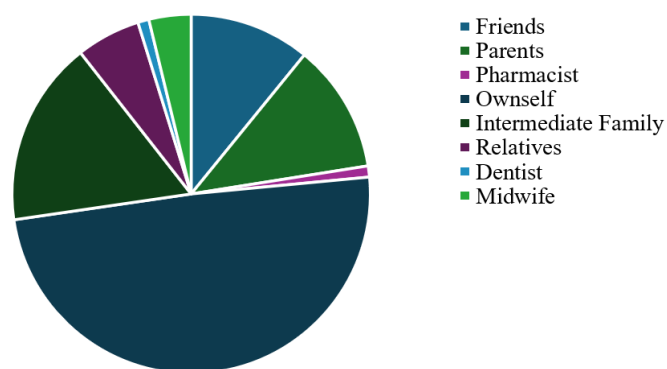


Figure 2. Distribution of reported sources influencing household antibiotic-use decisions among respondents in Barangay Pagatpatan, Butuan City, Philippines (n = 293).

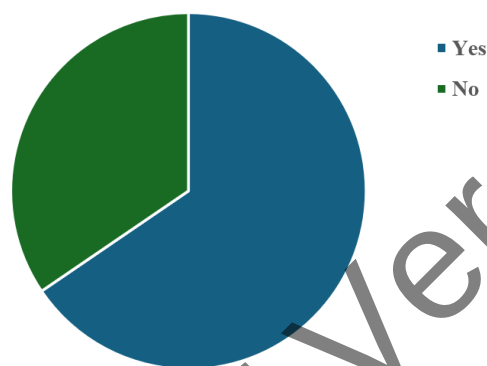


Figure 3. Awareness of antibiotic-related adverse effects among household respondents in Barangay Pagatpatan, Butuan City, Philippines (N = 293).

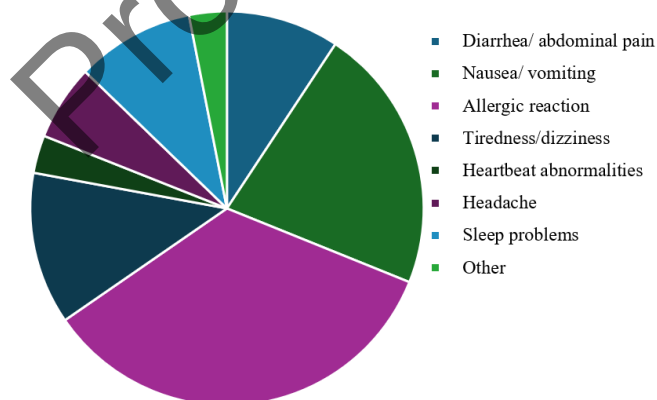


Figure 4. Distribution of self-reported adverse effects experienced after antibiotic use among respondents in Barangay Pagatpatan, Butuan City, Philippines (N = 293).

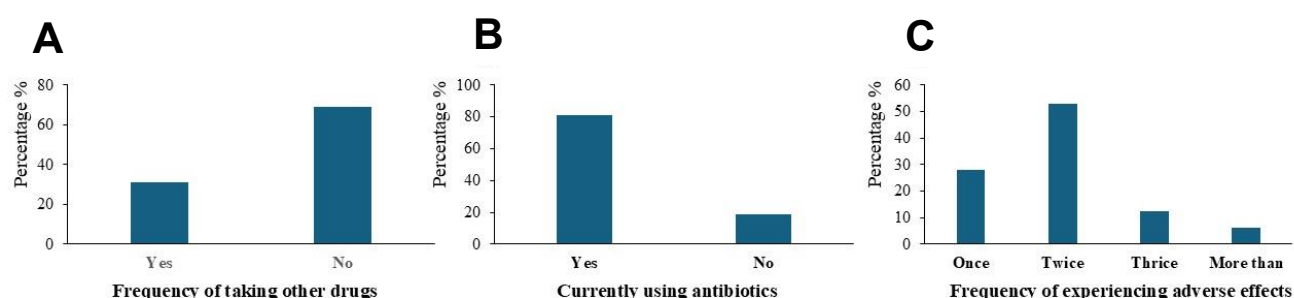


Figure 5. Follow-up responses among respondents ($n = 293$), who reported adverse effects after antibiotic use in Barangay Pagatpatan, Butuan City, Philippines. Panels show the percentage distribution of respondents according to (A) concurrent use of other drugs; (B) current antibiotic use; and (C) frequency of adverse-effect experience.

Table 3. Distribution of possible reasons in self-medication of antibiotic drugs among the respondents in Brgy. Pagatpatan, Butuan City, Philippines, ($n = 293$).

Reasons	(%)
Saves time	12.6
Saves money	42.7
To avoid hassles when going to the doctor	11.3
The same medicine resolved my complaints previously	35.2
The same medicine worked for my friends/family members	3.8
Leftover medicine was present	7.5
Availability in over-the-counter	10.2
Covid 19 pandemic	6.5
Afraid of diagnosing Covid-19 because of some symptoms experienced	2.1
Afraid of catching Covid-19 in hospitals	1.0
Manageable pain	5.8
Convenient and easy access to buy	1.4
Reduce absenteeism from work	1.4
Suggested by the midwife	3.4
Expensive hospital bill	1.4

Strength of association between identified reasons and antibiotic use of the respondents

Significant associations were observed between selected reasons for self-medication and specific antibiotics (**Table 4**), although effect sizes were consistently weak. Amoxicillin use was associated with leftover medicines at home ($P = 0.023$, $\phi = 0.132$), manageable pain ($P = 0.004$, $\phi = 0.166$), and midwife recommendation ($P = 0.023$, $\phi = 0.132$). Clindamycin use was associated with prior successful use ($P = 0.025$, $\phi = 0.131$), perceived effectiveness among friends or family members ($P = 0.003$, $\phi = 0.173$), work absenteeism reduction ($P = 0.010$, $\phi = 0.150$),

and expensive hospital bills ($P = 0.010$, $\phi = 0.150$). Pandemic-related avoidance of hospitals was associated with doxycycline ($P = 0.007$, $\phi = 0.158$) and amoxicillin–clavulanate use ($P = 0.010$, $\phi = 0.150$), while levofloxacin use was associated with leftover medicine availability ($P = 0.022$, $\phi = 0.134$). Overall, these findings suggest that antibiotic self-medication was shaped by medicine availability, prior experience, informal recommendations, economic constraints, and healthcare avoidance; however, the weak Phi coefficients indicate a limited effect size.

Table 4. Strength of association between reported reasons for self-medication and use of selected antibiotics among respondents in Barangay Pagatpatan, Butuan City, Philippines.

Possible reasons	Amoxicillin and									
	Amoxicillin		Doxycycline		Clindamycin		Clavulanate		Levofloxacin	
	P-value	Phi (φ)	P-value	Phi (φ)	P-value	Phi (φ)	P-value	Phi(φ)	P-value	Phi(φ)
Saves time	0.907	0.007	0.572	0.033	0.247	0.068	0.188	0.077	0.590	0.032
Saves money	0.306	0.060	0.293	0.061	0.139	0.086	0.505	0.039	0.833	0.012
To avoid hassles when going to the doctor	0.674	0.025	0.459	0.043	0.291	0.062	0.124	0.090	0.613	0.030
The same medicine resolved my complaints previously	0.883	0.009	0.932	0.005	0.025**	0.131	0.452	0.044	0.659	0.026
The same medicine worked for my Friends/family members	0.555	0.034	0.504	0.039	0.003**	0.173	0.394	0.050	0.779	0.016
Leftover medicine was present	0.023**	0.132	0.335	0.056	0.385	0.051	0.912	0.006	0.022**	0.134
Availability in over-the-counter	0.082	0.101	0.376	0.052	0.930	0.005	0.824	0.013	0.632	0.028
Covid 19 pandemic	0.101	0.096	0.373	0.052	0.567	0.033	0.352	0.054	0.709	0.022
Afraid of diagnosing Covid -19 for similar symptoms	0.158	0.082	0.625	0.029	0.660	0.026	0.609	0.030	0.837	0.012
Afraid of catching Covid -19 in Hospitals	0.449	0.044	0.007**	0.158	0.757	0.018	0.01**	0.150	0.885	0.008
Manageable pain	0.004**	0.166	0.401	0.049	0.449	0.044	0.702	0.022	0.725	0.021
Convenient and easy access to buy	0.417	0.047	0.691	0.023	0.720	0.021	0.677	0.024	0.867	0.010
Reduce absenteeism from work	0.841	0.012	0.691	0.023	0.01**	0.150	0.677	0.024	0.867	0.010
Suggested by the midwife	0.023**	0.132	0.525	0.037	0.567	0.033	0.338	0.056	0.790	0.016
Expensive hospital bill	0.417	0.047	0.691	0.023	0.01**	0.150	0.677	0.024	0.867	0.010

**significant at α, 0.05; 1.00 – 0.50 strong association; 0.49 – 0.30 moderate association; 0.29 – 0.10 weak association; 0.09 – 0 none or very weak association.

Discussion

The respondent profile reflects a rural household population in which women, married adults, self-employed individuals, and low-income households were highly represented. This pattern is consistent with evidence that antibiotic self-medication is shaped not only by individual knowledge but also by household roles, economic pressure, and access to care. Women, particularly mothers and married household members, often serve as primary caregivers and may influence medicine-use decisions during illness episodes⁽⁹⁾ In low-resource settings, self-medication may also function as a cost-saving strategy when consultation fees, transport costs, and indirect costs of seeking care are perceived as burdensome⁽¹⁰⁾ This supports the interpretation that self-medication in Barangay Pagatpatan may reflect structural barriers to timely healthcare rather than simple non-compliance with medical advice. Although many respondents reported PhilHealth coverage, insurance membership may not fully eliminate barriers to healthcare access. Thus, the socio-demographic profile of respondents underscores the importance of community-level interventions that address both antibiotic awareness and the broader socioeconomic and health-system conditions that sustain self-medication.

The pattern of antibiotic use observed in this study is consistent with reports from other low- and middle-income settings, where broad-spectrum and commonly available antibiotics are frequently used without prescription. Amoxicillin was among the most commonly reported antibiotics, which may reflect its affordability, familiarity, and perceived effectiveness for common infections^(11, 12) Similar patterns were reported in Northern Uganda, where amoxicillin was the most frequently self-medicated antibiotic, followed by ampiclox, metronidazole, and ciprofloxacin.⁽²⁾ Cotrimoxazole and metronidazole may also be commonly used because of their frequent association with gastrointestinal, urinary, and other community-managed symptoms, while fluoroquinolones such as ciprofloxacin and levofloxacin may be preferred because they are perceived as fast-acting or suitable for shorter treatment courses.^(13, 14, 15) However, the unsupervised use of these agents raises important concerns, particularly because antibiotic choice, dose, and duration require clinical assessment. Evidence from Saudi Arabia similarly showed that antibiotics were often purchased without prescription, reused from leftovers, or taken for common conditions such as colds and sore throat, highlighting how informal access and misconceptions can sustain inappropriate

antibiotic use.⁽¹⁾ The adverse effects reported by respondents further underscore the risks of antibiotic self-medication, as unsupervised use may expose individuals to avoidable reactions while contributing to antimicrobial resistance at the community level.

The findings on adverse-effect awareness and experience suggest that antibiotic self-medication exposes respondents to avoidable health risks while highlighting gaps in community knowledge.^(13, 14) Previous studies have shown that public awareness of antibiotic-related adverse effects remains insufficient, with knowledge often influenced by education, access to health information, and exposure to advice from healthcare professionals. Limited awareness may contribute to unsafe practices such as incorrect dosing, premature discontinuation, repeated use of old prescriptions, and self-medication, all of which increase the risk of adverse reactions and antimicrobial resistance.⁽¹⁵⁾ In the present study, the reported adverse effects were mainly allergic and gastrointestinal symptoms, which is consistent with the known reactions associated with commonly used antibiotics, particularly β -lactams such as amoxicillin.^(16, 17) Similar patterns have been reported in self-medication studies, where allergy, nausea, abdominal discomfort, and diarrhea were among the most frequently reported adverse effects. The relatively low reporting of neurological, cardiovascular, or less obvious adverse reactions may reflect limited recognition of these events rather than their complete absence.^(12, 13, 15) Overall, these findings emphasize the need for community-based education on antibiotic safety, proper dosing, treatment completion, and early consultation when adverse effects occur.

The reported sources of influence for antibiotic use suggest that self-medication in Barangay Pagatpatan is shaped by both accessibility and social decision-making. In many low- and middle-income settings, antibiotics are frequently obtained and used without prescription because they are perceived as accessible, affordable, and convenient alternatives to formal consultation.^(11, 13) This pattern is consistent with evidence from Northern Uganda, where nearly all respondents who self-medicated obtained antibiotics from drug shops or pharmacies, and self-medication was associated with distance from health facilities, inability to pay medical charges, previous successful treatment, and use of old prescriptions.⁽²⁾ The involvement of family members, peers, and other informal advisers also reflects the role of close social networks in household health decisions, particularly in rural communities where illness management often

begins at home.^(12, 14) However, the limited involvement of medical professionals indicates a gap in formal guidance on antibiotic selection, dosage, and treatment duration.⁽¹⁵⁾ This is concerning because recent evidence shows that non-prescription purchase, leftover use, and antibiotic use for common symptoms remain common even in primary-care populations.⁽¹⁾ These findings highlight the need for community-based antibiotic stewardship interventions that address not only knowledge gaps but also the social and economic conditions that normalize antibiotic use without professional supervision.

The reasons for antibiotic self-medication observed in this study suggest that non-prescription antibiotic use is driven largely by economic constraints, convenience, prior experience, and limited access to care.^(18, 19) Financial and time-related barriers are commonly reported in low- and middle-income settings, where consultation costs, transport expenses, long waiting times, and work-related interruptions may discourage formal healthcare-seeking and encourage the use of readily available antibiotics.^(20, 21) The use of antibiotics based on previous successful treatment also reflects how past therapeutic experience can reinforce future self-treatment decisions, particularly when similar symptoms recur.⁽²²⁾ In addition, access to leftover medicines and over-the-counter antibiotic sources may normalize unsupervised use and increase the risk of inappropriate dosing, incomplete treatment, and antimicrobial resistance.⁽²³⁾ Notably, COVID-19-related fear may have further intensified self-medication behavior, as concerns about acquiring infection in hospitals and restricted healthcare access during the pandemic likely encouraged some respondents to avoid consultation and manage symptoms at home.⁽²⁴⁾ Overall, these findings indicate that antibiotic self-medication in Barangay Pagatpatan was shaped by overlapping economic, behavioral, accessibility, and pandemic-related factors rather than by a single determinant.

The weak but statistically significant associations between selected reasons for self-medication and specific antibiotic use suggest that antibiotic self-medication in Barangay Pagatpatan is shaped by multiple modest but converging determinants. Household availability of leftover medicines, perceived symptom manageability, previous successful use, social recommendation, high hospital costs, work-related concerns, and fear of acquiring COVID-19 in

healthcare facilities were associated with selected antibiotic use.⁽²⁵⁾ These findings are consistent with earlier evidence showing that self-medication is influenced by beliefs, healthcare access, and health-system constraints⁽²⁶⁾, as well as by time-saving, previous successful experience, and avoidance of clinic-related inconvenience. Similar determinants have been reported in developing-country contexts, where household antimicrobial self-medication is linked to access barriers, old prescriptions, and prior treatment experience.⁽²⁷⁾ Recent evidence from low- and middle-income settings also highlights the role of non-prescription antibiotic access through community drug outlets and informal supply channels.^(28, 29) In the context of COVID-19, antibiotic self-medication has been associated with altered health-seeking behavior and avoidance of healthcare facilities due to fear of exposure.⁽³⁰⁾ Although the Phi coefficients observed in the present study indicate weak effect sizes, their statistical significance suggests that these determinants may operate cumulatively rather than independently. Thus, self-medication in this rural Filipino community appears to reflect convenience- and fear-driven decision-making shaped by household medicine availability, prior experience, economic constraints, informal advice, and healthcare avoidance.

Conclusion

This study identified the commonly used antibiotics, indications, sources, and determinants of antibiotic self-medication among residents of Barangay Pagatpatan, Butuan City, Philippines. Nearly half of the respondents reported self-medicating with antibiotics, with use shaped mainly by medicine accessibility, cost and convenience, previous successful treatment, household availability, and barriers to formal healthcare. Although awareness of antibiotic-related adverse effects was reported, self-medication practices persisted, and significant associations between selected reasons and antibiotic use showed weak effect sizes, indicating that the behavior is driven by multiple overlapping factors. These findings provide local evidence that antibiotic self-medication in rural Filipino communities is both a behavioral and access-related public health issue, emphasizing the need for community-based health education, improved access to regulated healthcare, and strengthened antimicrobial stewardship to promote rational antibiotic use and reduce risks associated with antimicrobial resistance.

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Conflict of statement

The authors declare that there are no conflicts of interest regarding the publication of this article.

Data sharing statement

All data generated or analyzed during the present study are included in this published article and the citations herein. Further details, opinions, and interpretations are available from the corresponding author on reasonable request.

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