ORIGINAL ARTICLE

Analysis on the Prevalence and Practices of Antibiotic Misuse among Adult Residents of Rodriguez, Rizal: An Explanatory Sequential Mixed Methods Study

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ABSTRACT

Background. Addressing the global public health threat that antimicrobial and antibiotic resistance pose to both the international community and the national health security of the country is of paramount importance. In line with the WHO's One Health Approach in combating AMR, it is important to recognize and assess the public's knowledge, attitudes, and practices to better understand the gaps, barriers, issues, and patterns present in terms of antibiotic use.

Objectives. This study aimed to examine the prevalence and practices of antibiotic misuse in the general population by assessing the knowledge and identifying the attitudes and practices of the adult residents in Rodriguez, Rizal, toward antibiotics.

Methods. An explanatory mixed-method (quantitative and qualitative) research design was utilized in this study. The research participants involved the adult (18-59 years old) residents of Rodriguez, Rizal, who do not possess a medical background. The quantitative phase involved a cross-sectional survey of 384 residents. The survey questionnaire consisted of four sections: knowledge, attitudes, practices toward antibiotics, and socio-demographic profile. Descriptive and inferential statistical analyses were performed with Stata version 17. The qualitative phase utilized in-depth semi-structured interviews with nine residents. The data obtained underwent thematic analysis using Microsoft Excel.

Results. The study revealed that most residents were aged 18–29 years (39.06%), male (52.08%), and bachelor's degree holders (33.85%), with over half earning below ₱10,957 monthly (51.04%). Self-medication with antibiotics (SMA) was highly prevalent (68.23%). Over half demonstrated excellent knowledge (51.56%) and attitude (60.94%), while nearly half (48.18%) exhibited moderate practices. Knowledge showed significant associations with sex, age, education, and socioeconomic status, and a positive linear relationship was observed between knowledge, attitude, and practice, though not between knowledge and practice. Qualitative findings revealed seven major themes, such as reliance on non-traditional information sources, limited awareness of antibiotic risks, healthcare and financial barriers, informal access, and non-adherence to prescriptions, which collectively help to better understand the high prevalence of self-medication observed quantitatively, and provide context for patterns in knowledge, attitudes, and practices.

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Conclusion. This study assessed the knowledge, attitudes, and practices on antibiotic use among residents of Rodriguez, Rizal. Despite high awareness, nearly 70% practiced self-medication, often for viral infections, incomplete regimens, or through informal sources. Interviews revealed that misuse stems from sociocultural norms, economic pressures, and healthcare barriers rather than ignorance. These results underscore the need for stricter antibiotic regulation, improved healthcare access, and culturally sensitive education to promote rational antibiotic use and curb antimicrobial resistance in the Philippines.

Keywords: cross-sectional study, mixed methods design, health knowledge, attitudes, practice, prevalence, drug resistance, microbial

INTRODUCTION

"*The world is heading toward a post-antibiotic era, where common infections and minor injuries—once easily treatable—may again become fatal*," warned the former World Health Organization (WHO) Assistant Director-General for Health Security, Dr. Keiji Fukuda, during the release of the organization's first global report on antibiotic resistance.[1] Between 2006 and 2023, global antibiotic consumption increased by 20.9%, reflecting a persistently rising demand in the healthcare sector.[2] However, this growth in use has not translated into responsible usage, as evidenced by a systematic review by Alhomoud et al. that estimated over 50% of antibiotics worldwide are obtained and used without prescription.[3] This misuse directly contributes to the emergence of Antibiotic Resistance (ABR), recognized globally as a major public health threat.[4-6] ABR occurs when previously susceptible bacteria adapt to withstand antibiotic treatment, rendering infections harder to cure.[7] Consequently, once-manageable diseases are becoming resistant to first-line therapies, leading to treatment failures, prolonged illnesses, increased hospitalization, higher healthcare costs, and rising morbidity and mortality.[8-10] Alarmingly, WHO estimates indicate that antimicrobial resistance (AMR) caused 4.95 million deaths in 2019, with projections reaching 10 million annually by 2050.[4,11] In connection, a 2024 *Lancet* systematic review further predicts a 69.6% increase in ABR-attributed deaths by mid-century.[12] Notably, the growing resistance burden poses severe challenges to healthcare systems and economies worldwide, disproportionately affecting low- and middle-income countries (LMICs).[13,14] Among the strategies to combat this, effective antimicrobial resistance (AMR) surveillance is essential to address this threat; however, in LMICs such as the Philippines, its implementation remains hindered by limited resources, weak laboratory capacity, and systemic healthcare inefficiencies.[14] Acknowledging these research and data gaps, the present study investigates the prevalence and underlying practices of antibiotic misuse in a local context to serve as possible bases for future evidence-based prevention strategies.

As mentioned, global data consistently indicate that improper antibiotic use is markedly more prevalent in LMICs than in high-income countries (HICs).[8,15] A systematic review by Torres et al. reported a 78.8% prevalence of non-prescription antibiotic use in LMICs in 2020, compared with only 2%–20% in HICs.[7,16] This disparity is particularly concerning in Southeast Asia, where the WHO identified the region as having the *highest risk* for the emergence and spread of AMR.[17] In response, the Philippines is among the 164 countries that have adopted a National Action Plan (NAP) on AMR.[18] Locally, efforts began with Administrative Order No. 42 (2014), which established the Inter-Agency Committee on Antimicrobial Resistance under the Department of Health (DOH) and Department of Agriculture (DA).[19] Subsequently, the National Action Plans on AMR (2015–2017; 2019–2023) provided coordinated intervention guidelines, including the Antimicrobial Resistance Surveillance Program and Antimicrobial Stewardship Trainings launched in 2015.[19] Republic Act No. 10918 ("No Prescription, No Dispensing") further restricts the sale of antibiotics without a valid prescription, supported by public education campaigns such as the DOH information caravans.[20,21]

Despite these policy efforts, the persistent misuse of antibiotics among Filipinos suggests a gap between policy implementation and community behavior.[21] Antibiotic misuse is seen as one of the major contributors to ABR and AMR. Formally recognized as the self-medication of antibiotics (SMA), it refers to the practice of non-prescription purchase and/or consumption of antibiotics, usage of antibiotics as prophylaxis for non-indicated diseases, noncompliance with the antibiotic regimen (e.g., discontinuation or exceeding in dosage), storing, recycling, or sharing of leftover antibiotics, and the unnecessary use for unsuitable illnesses.[11,13,22-24] While a dangerous health behavior, it was highlighted in Barber et al. that the prevalence of SMA in the nation ranged from 31% to 66%, which possibly ranks the highest in the Southeast Asian region.[25] These patterns underscore the persistent public health risks posed by improper antibiotic use and highlight the need for interventions that promote responsible self-medication and public awareness.[25,26] While knowledge alone does not guarantee behavioral change, it is a critical determinant in influencing the beliefs and attitudes of individual health behaviors.[6] The necessity and effectiveness of these campaigns rely on up-to-date data on antibiotic prevalence, knowledge, attitudes, and practices, yet recent local literature remains limited.[25,27] Few studies provide comprehensive, population-level insights, and national participation in international assessments, such as those by the WHO, remains minimal.[25] While it is limited, existing research has begun to explore Filipino KAP toward antibiotics, consistently showing a significant relationship between knowledge and SMA practices, which supports the

claims mentioned earlier.[10,14,28-31] Concerningly, however, most studies focus on specific groups—college students, medical professionals, or mothers—and are primarily conducted in urban centers like Manila, with limited data on the general population or rural areas.[10,14,28-32]

With all these in mind, this study recognizes that while the improper use of antibiotics can pose significant risks, it's undeniable that when used correctly, these drugs play a crucial role in preventing and treating various infections.[7] As such, to properly create action plans and interventions on how to prevent its loss of effectiveness in the future, this study aims to contribute to the gap in local literature, which assesses the prevalence, level of knowledge, prominent attitudes, and common practices exhibited towards antibiotics by the general population in Rodriguez, Rizal. This will add to the currently existing local literature and provide baseline data for future researchers and policymakers on the topic of antibiotic use and combating AMR. In general, the study aims to determine the levels of knowledge, attitudes, and practices towards antibiotics, and prevalence of SMA among the adult residents of Rodriguez, Rizal, and their interrelationships with their socio-demographic profile. The researcher specifically aims to: (1) determine the socio-demographic profile of the residents; (2) determine the prevalence of SMA among the residents of Rodriguez, Rizal; (3) determine the association between prevalence of SMA and the socio-demographic profile of the residents of Rodriguez, Rizal; (4) determine the levels of KAP towards antibiotics among the residents of Rodriguez, Rizal; (5) determine the association between the socio-demographic profile and the levels of KAP towards antibiotics among the residents of Rodriguez, Rizal; and (6) determine the associations between the levels of knowledge, attitude, and practice of the residents towards antibiotics.

METHODS

Study Design

The study was conducted from February 2024 to June 2024 and employed an explanatory sequential research design. The study has two main phases: (a) a cross-sectional descriptive design and (b) a phenomenological research design. The integration and overall flow of these two phases is illustrated in Figure 1.

Selection of Participants

Community residents who were: (a) a Filipino citizen; (b) between the ages of 18 and 59 years old; (c) resident or currently residing in the municipality of Rodriguez; (d) have experience with antibiotics (can be prescribed or self-prescribed); and (e) are willing to participate were included in the survey. Residents who have an educational or occupational background related to health were excluded, as their prior knowledge on the subject might skew the results.[6,10] Residents were free to withdraw at any time or phase of the study.

Phase I: Cross-sectional Survey

Sampling size and technique

A minimum sample size of 384 residents was computed using Raosoft© 2004, considering a municipality population of 288,511 residents, 95% confidence interval, 50% margin of error, and 50% response distribution.[33]

In listing down the barangays to be considered in this study, Barangays Macabud, Mascap, Puray were excluded for safety and logistical reasons. From the eight remaining barangays, the top three most populous ones were chosen, namely Barangays San Isidro (N = 159,612), San Jose (N = 141,819), and Burgos (N = 51,444). This decision was a deliberate methodological choice due to the disproportionate distribution of the municipality's population across its 11 barangays. For instance, Barangays San Isidro alone accounts for 35.95% of the total population, while most barangays like Geronimo only account for 1.52%.[33] Only the three aforementioned barangays exceeded the 10% mark in terms of contribution to the total population, while the remaining eight comprise around as little as 1~4%, and only one barely reaching 7%.[34] Given this disparity, the researcher decided to employ a more focused approach that not only effectively utilizes time, resources, and logistics but also ensures better representativeness without compromising on the reliability and validity of the findings. The chosen barangays were promptly contacted to seek permission and assistance in distributing the survey questionnaires within their respective areas. To ensure representative sampling, proportional sampling was employed based on the population sizes of the three selected barangays. Consequently, the survey aimed for a minimum of 173 residents from San Isidro, 154 from San Jose, and 58 from Burgos.

Data collection and recruitment

Data were collected through paper-based questionnaires administered in randomly selected neighborhoods or *sitios*, identified in coordination with barangay officials. Certain areas were excluded due to safety concerns and limited personnel availability. The researcher, accompanied by a Barangay HOA Coordinator or Barangay Public Safety Officer (BPSO), employed interval sampling by approaching every third household to assess eligibility and obtain consent. Residents were briefed on the study and provided informed consent before completing the survey. When target numbers were unmet, additional residents were randomly recruited from non-health-related barangay departments.

Phase II: Thematic Analysis

Sampling size and technique

The minimum sample size considered by the researcher is eight residents, with no maximum number. This decision was based on the literature review conducted on qualitative studies on the topic, which had sample sizes ranging from eight to

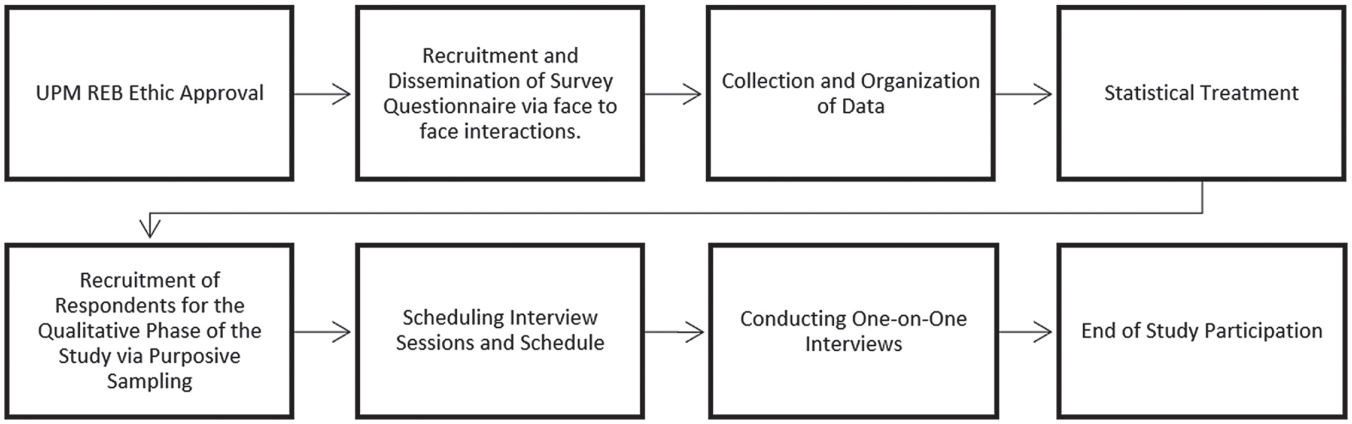

Figure 1. Flow of the quantitative and qualitative data collection process.

twenty-one residents. Purposive sampling was performed in the selection of residents.[34-38]

Data collection and recruitment

After scheduling residents for the in-depth interviews, the researcher met with residents either in person or via an audio broadcasting platform. Upon receiving their consent, interviews were recorded using a voice recorder, camera, or written notes and transcribed for thematic analysis in Word and Excel. Each session lasted approximately 30–60 minutes. All recordings and transcripts were securely stored in a Google Drive folder accessible only to the researcher and thesis adviser. Transcribers signed a non-disclosure agreement and were granted limited access to a separate folder, which was revoked one month after transcription completion, followed by permanent deletion of files. Raw data will be retained for five years after thesis completion for auditing before deletion.

Research Instrument and Data Collection

A validated questionnaire was adopted, with permission, from Karuniawati et al. for the first phase of the study.[6] The tool was developed through literature reviews, preliminary interviews, and expert evaluation by nine professionals. Content validity was established using the content validity ratio (CVR ≥0.78) and content validity index (CVI >80%), while construct validity was confirmed through exploratory and confirmatory factor analyses. Reliability testing over a two-week interval among 407 residents yielded Cronbach's α (0.827) and test–retest reliability (0.713). The finalized instrument met all validity and reliability criteria, ensuring its suitability for assessing knowledge, attitudes, and practices (KAP) regarding antibiotic use.[6]

The structured questionnaire consisted of closed-ended items divided into four sections: demographic profile, knowledge, attitude, and practice related to antibiotic use. The knowledge section comprised 20 dichotomous (yes/no) questions across six domains: identification, function, accessibility, consequences of misuse, side effects, and proper use of antibiotics. The attitude section included 12 items on a five-point Likert scale (Strongly Disagree–Strongly Agree) covering sources, leftovers, usage practices, and expectations regarding antibiotics. The practice section also employed a five-point Likert scale (Never–Always) across four domains: procurement, recommendations, course completion, and intentions for use of antibiotics.[6] A Filipino version of the instrument was prepared through back translation by two native speakers to ensure clarity. It is to be noted that knowledge item #2 was modified from "Supertetra is an antibiotic" to "Cephalexin is an antibiotic" to better reflect local context and familiarity.[26] The English and Filipino versions of the study instruments are included in the Appendices.

Knowledge responses were scored nominally, with correct answers assigned "1" and incorrect or "*I don't know*" responses "0" (maximum = 20). Attitude and practice items were rated from 1 to 5, with some inversely scored depending on the question structure. The possible score range was 12–60 for attitudes and 13–65 for practices.[6] Total scores were computed and converted to a 0–100 scale to standardize interpretation, where 0 represented the lowest and 100 the highest possible score (Figure 2).

$$\text{Total Score (\%)} = \frac{\text{Obtained score} - \text{least possible score}}{\text{Maximum score} - \text{least possible score}} \times 100$$

Figure 2. The formula used to compute the total score (%).

The total score will then be categorized as poor (<50%), moderate (50-70%), and excellent (>70%) knowledge, attitude, and practice, respectively.

For the second phase of the study, in-depth semi-structured interviews will be utilized due to their structure, flexibility, and flow during data collection, while allowing the researcher to address the research questions in their entirety, to acquire more information where necessary.[7,34] The construction of the interview questions was based on a review of literature on the topic and the results of the quantitative phase of the study.[6,23]

Data and Statistical Analysis

Phase I

Quantitative data were encoded in Microsoft Excel and analyzed using Stata version 17 at a 0.05 level of significance. Residents' total scores were recalculated using the formula and categorized accordingly. Descriptive statistics were applied to summarize demographic characteristics and responses for knowledge, attitude, and practice (KAP). Categorical variables were presented as frequency counts and percentages. Associations between demographic variables and KAP outcomes were examined using the Chi-square test for categorical data, with corresponding p-values reported. Ordinal logistic regression was performed for each demographic variable relative to each KAP outcome. Crude odds ratios (cOR) and 95% confidence intervals (CIs) were computed to assess associations. For model building, variables with p <0.25 in the bivariate analysis were entered sequentially, beginning with the smallest p-value. Only those maintaining statistical significance (p <0.05) were retained in the final model. Adjusted odds ratios (aOR) and corresponding 95% CIs were reported for the multivariable analysis.

Phase II

The qualitative data obtained from ISIs will be transcribed verbatim, and thematic analysis will be employed to analyze it. According to Braun & Clarke, there are six major phases involved in the process, namely: (a) familiarizing with the data; (b) constructing initial codes; (c) searching for themes; (d) re-evaluating the themes; (e) defining and naming the themes; and (f) making the report. Microsoft Excel will be primarily used for this phase of data analysis.[39]

Integration Process

With both data types, the quantitative findings served as the foundation of the study by generating measurable data that quantified the extent of the issue within the population. The subsequent qualitative phase complemented these results by addressing gaps and explaining unexpected trends observed in the survey. Both data strands were integrated during the discussion, with quantitative results given higher priority as the statistical backbone of the study. Qualitative insights provided explanatory depth by incorporating residents' lived experiences and perspectives, enriching the interpretation, and offering contextual understanding of the observed statistical patterns.

Ethical Considerations

The study was approved by the University of the Philippines Manila Review Ethics Board (UPMREB) (UPMREB CODE: 2023-0752-UND).

RESULTS

Phase I: Quantitative Results

Socio-demographic profile

Table 1 presents the demographic profile of the residents. Out of 384 residents who were surveyed, the majority (39.06%) were between 18 and 29 years. More than half (52.08%) were males. The majority of the residents (44.27%) reside in San Isidro, and completed their undergraduate degree (33.85%). Concerning family/individual monthly income, more than half of them (51.04%) earn less than PhP 10,957.

The prevalence rate of SMA among the residents was 68.23%, suggesting that most of the residents had used antibiotics without a doctor's prescription for self-medication at least once in their lifetime. Notably, 33% of the same population have admitted to having practiced it within the past year. When analyzed with other socio-demographic variables, the self-medication of antibiotic practice of the residents did not have a significant association with age, educational attainment, and socioeconomic status, and only varied significantly with sex (p = 0.002). Specifically, the proportion of SMA among men is significantly higher than the proportion of SMA in women (p = 0.002). In addition, Table 2 confirms that knowledge, attitude, and practice towards antibiotics are significantly correlated with SMA practice (p = 0.001).

Knowledge on antibiotics

Based on the results in Table 3, most residents (51.56%) have an excellent level of knowledge regarding antibiotics. This finding was further dissected in Table 4, where it was found that, in terms of identifying antibiotic medications, while 91.41% of residents correctly recognized amoxicillin, more than 30% of residents mistakenly identified paracetamol as an antibiotic. Concerning the "function of antibiotics," there is an apparent confusion among the residents about whether the target of elimination by antibiotics is either bacteria or viruses. Moreover, around 80% of the residents perceived antibiotics to be effective on both bacterial and viral infections. On another note, 51.04% of residents believed that antibiotics could reduce fevers. In terms of the "accessibility of antibiotics," 31.77% of residents agree that antibiotics can be bought in sari-sari stores, which is almost in equal proportion (27.34%) with the residents who also believe that antibiotics can be purchased without a doctor's prescription at a pharmacy. In addition, 32.03% of residents failed to recognize antibiotic resistance as a possible result of antibiotic misuse. Moreover, 27.34% of residents were also unaware of the side effects of antibiotics on the good bacteria. On the topic of "proper antibiotic use," the proportion of residents who believe that antibiotic intake can be stopped once they feel better (46.35%) is nearly equivalent to those who hold the opposite view (49.22%).

Attitude towards antibiotics

Table 3 also found that most residents (60.94%) have an excellent level of attitude towards antibiotics. Specifically, findings presented in Figure 3 highlighted that 23.44% of residents have expressed similar sentiments of being disappointed when they are not prescribed antibiotics after physician consultations. Similarly, 25.26% of residents showed a positive reception to the idea of keeping leftover antibiotics for future use. Only a slight difference in number was observed between residents who reported completing

Table 1. Socio-demographic Profile of Study Participants Stratified by Self-medication of Antibiotics (SMA) Practice

Characteristic	Total (n=384), n (%) [a]	Frequency (%) [b]		*p*-value [c]
		Has never practiced SMA (n = 122)	Has practiced SMA at least once (n = 262)	
Age (in years)				
18-29	150 (39.06)	47 (31.33)	103 (68.67)	0.993
30-39	71 (18.49)	22 (30.99)	49 (69.01)	
40-49	88 (22.92)	29 (32.95)	59 (67.05)	
50-59	75 (19.53)	24 (32.00)	51 (68.00)	
Sex				
Male	184 (47.92)	44 (23.91)	140 (76.09)	0.002**
Female	200 (52.08)	78 (39.00)	122 (61.00)	
Highest Educational Attainment				
No formal education	5 (1.30)	1 (20.00)	4 (80.00)	0.600
Elementary	29 (7.55)	6 (20.69)	23 (79.31)	
Junior high school	111 (28.91)	37 (33.33)	74 (66.67)	
Senior high school	71 (18.49)	20 (28.17)	51 (71.83)	
Undergraduate	130 (33.85)	43 (33.08)	87 (66.92)	
Postgraduate	38 (9.90)	15 (39.47)	23 (60.53)	
Monthly Household Income (PhP)				
Less than 10,957	196 (51.04)	56 (28.57)	140 (71.43)	0.673
10,957 – 21,194	92 (23.96)	34 (36.96)	58 (63.04)	
21,194 – 43,828	52 (13.54)	17 (32.69)	35 (67.31)	
43,828 – 76,669	29 (7.55)	9 (31.03)	20 (68.97)	
76,669 – 131,484	6 (1.56)	2 (33.33)	4 (66.67)	
131,484 – 219,140	4 (1.04)	1 (25.00)	3 (75.00)	
Greater than 219,140	5 (1.30)	3 (60.00)	2 (40.00)	

[a] *Presented in frequency (n) and column percentages*
[b] *Presented in frequency (n) and row percentages*
[c] *p-value from Pearson X2 test. Sig. at p <0.05*. p <0.01**. p <0.001***.*

Table 2. KAP Profile of Study Participants Stratified by Self-medication of Antibiotics (SMA) Practice

Characteristic	Total (n=384), n (%) [a]	Frequency (%) [b]		*p*-value [c]
		Has never practiced SMA (n = 122)	Has practiced SMA at least once (n = 262)	
Knowledge				
Low	32 (8.33)	4 (12.50)	28 (87.50)	<0.001***
Moderate	154 (40.10)	38 (24.68)	116 (75.32)	
High	198 (51.56)	80 (40.40)	118 (59.60)	
Attitude				
Low	26 (6.77)	3 (11.54)	23 (88.46)	0.004**
Moderate	124 (32.29)	31 (25.00)	93 (75.00)	
High	234 (60.94)	88 (37.61)	146 (62.39)	
Practices				
Low	26 (6.77)	4 (15.38)	22 (84.62)	<0.001***
Moderate	185 (48.18)	40 (21.62)	145 (78.38)	
High	173 (45.05)	78 (45.09)	95 (54.91)	

[a] *Presented in frequency (n) and column percentages*
[b] *Presented in frequency (n) and row percentages*
[c] *p-value from Pearson X2 test. Sig. at p <0.05*. p <0.01**. p <0.001***.*

their antibiotic regimen even after their symptoms subsided (48.18%) and those who did not (44.01%), indicating nearly equal adherence and non-adherence to prescribed courses. Additionally, 36.2% of residents agree that antibiotic use can be stopped once they feel better. Lastly, while only 16.67% of residents hope that they will be given antibiotics when they contract a cold, more than twice the proportion (36.72%) believe that taking antibiotics could speed up their recovery from colds (Figure 3).

Practices towards antibiotics

It was identified in Table 3 that most residents (48.18%) have a moderate level of practice towards antibiotics. Being further analyzed in Figure 4, under the domain of "procurement of antibiotics,', a significant majority of residents (92.97%) have never tried to purchase antibiotics online. Notably, 20.05% sometimes purchased antibiotics from sari-sari stores, 21.35% have bought non-prescription antibiotics from pharmacies, 21.35% have taken leftover antibiotics due to having symptoms similar to past experiences, and 20.32% have received antibiotics from non-

Table 3. The Number of Questions, Score, and Level of Knowledge, Attitude, and Practice

Variables	No. of Questions	Total Score (%) (Mean ± SD)	Level (%), N = 384		
			Poor (<50%)	Moderate (50–70%)	Excellent (>70%)
Knowledge	20	70.58 ± 3.2	32 (8.33)	154 (40.10)	198 (51.56)
Attitude	12	66.68 ± 8.7	26 (6.77)	124 (32.29)	234 (60.94)
Practice	13	59.44 ± 7.08	26 (5.77)	185 (48.18)	173 (45.05)

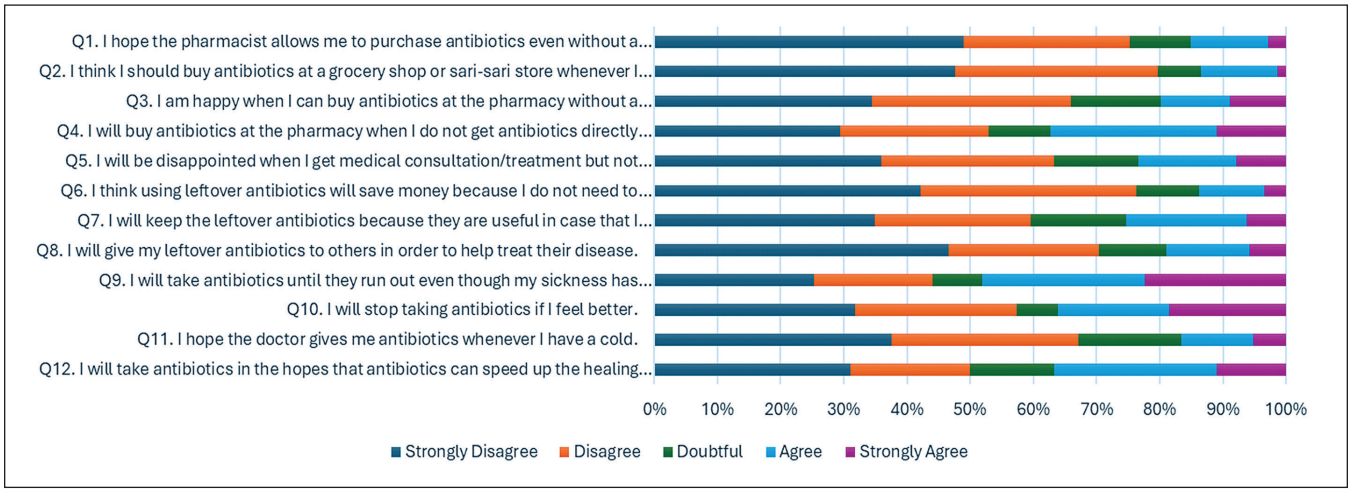

Figure 3. Responses to the Attitude section of the questionnaire on antibiotics (N = 384).

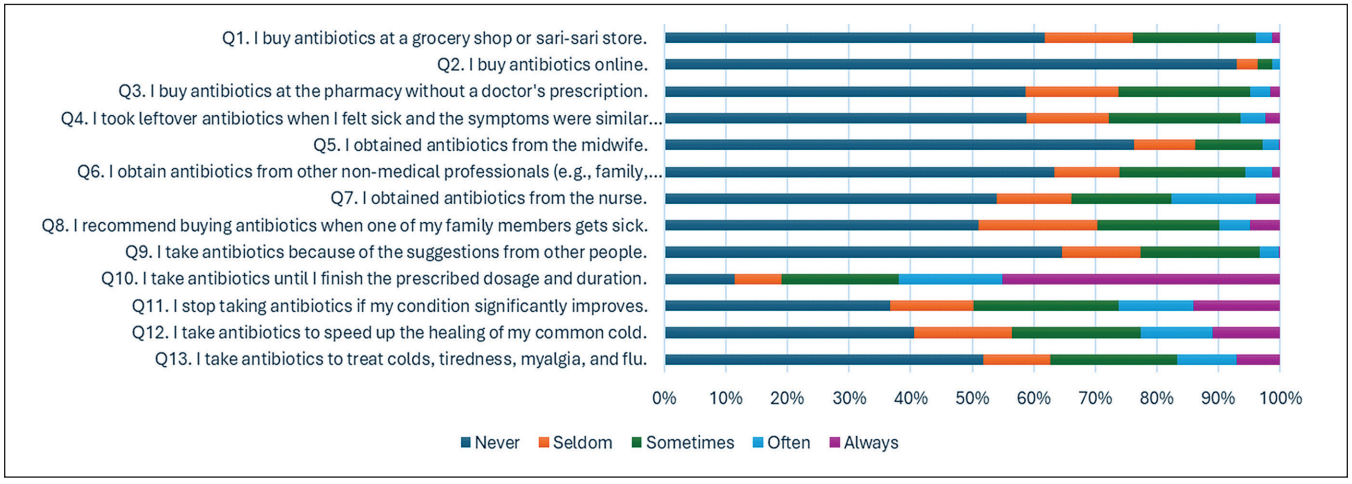

Figure 4. Responses to the Practices section of the questionnaire on antibiotics (N = 384).

Table 4. Responses to the Questionnaire on Antibiotic Knowledge (N = 384)

Domain		Statements	Expected Ideal Response	Residents' Answer N (%)		
				Correct	Incorrect	Don't know
Identification of Antibiotics	Q1.	Amoxicillin is an antibiotic.	Yes	351 (91.41)	12 (3.13)	21 (5.47)
	Q2.	Cephalexin is an antibiotic.	Yes	282 (73.44)	23 (5.99)	79 (20.57)
	Q3.	Paracetamol is an antibiotic.	No	264 (68.75)	97 (25.26)	23 (5.99)
Function of Antibiotics	Q4.	Antibiotics are used to kill bacteria.	Yes	353 (91.93)	14 (3.65)	17 (4.43)
	Q5.	Antibiotics can be used to treat infections due to viruses.	No	44 (11.46)	318 (82.81)	22 (5.73)
	Q6.	Colds and flu can be treated without antibiotics.	Yes	295 (76.82)	79 (20.57)	10 (2.6)
	Q7.	Antibiotics can reduce fever.	No	165 (42.97)	196 (51.04)	23 (5.99)
Accessibility of Antibiotics	Q8.	Antibiotics can be bought online.	No	300 (78.13)	63 (16.41)	21 (5.47)
	Q9.	Antibiotics obtained from other people may be taken.	No	293 (76.30)	56 (14.58)	35 (9.11)
	Q10.	Amoxicillin can be purchased at a pharmacy without a doctor's prescription.	No	262 (68.23)	105 (27.34)	17 (4.43)
	Q11.	Antibiotics can be purchased at a grocery shop or a sari-sari store.	No	249 (64.84)	122 (31.77)	13 (3.39)
Consequences of Misuse	Q12.	Inappropriate use of antibiotics will cause antibiotic resistance.	Yes	261 (67.97)	65 (16.93)	58 (15.1)
	Q13.	Inappropriate use of antibiotics will cause these antibiotics to be ineffective in the future.	Yes	300 (78.13)	53 (13.8)	31 (8.07)
	Q14.	Inappropriate use of antibiotics can cause more severe illness.	Yes	339 (88.28)	24 (6.25)	21 (5.47)
	Q15.	Inappropriate use of antibiotics increases the costs of treatment in the long-term.	Yes	328 (85.42)	33 (8.59)	23 (5.99)
Side Effects of Antibiotics	Q16.	Antibiotics can cause allergic reactions such as redness of the skin.	Yes	299 (77.86)	38 (9.9)	47 (12.24)
	Q17.	Antibiotics can kill good bacteria in the intestines.	Yes	206 (53.65)	73 (19.01)	105 (27.34)
Proper Antibiotic Use	Q18.	Antibiotics need to be stored in case of illness in the future.	No	240 (62.50)	125 (32.55)	19 (4.95)
	Q19.	Antibiotics that were left over from previous consultations can be used again if sick.	No	268 (69.79)	90 (23.44)	26 (6.77)
	Q20.	Antibiotics can be stopped if the person feels better already.	No	189 (49.22)	178 (46.35)	17 (4.43)

medical social relationships. In terms of "recommendations on antibiotic use," a similar percentage of residents have sometimes suggested to their sick family members to use antibiotics (19.79%) and, likewise, have taken antibiotics due to the recommendations of others (19.27%). In relation, while 45.05% of residents stated that they always finish the prescribed dosage and duration of their antibiotic regimen, a lower percentage of 36.72% expressed that they never stop their antibiotic intake even if their condition improves. In connection, 23.44% of the same residents have expressed that they sometimes stop their use of antibiotics once they feel significantly better, and more notably, 14.06% have always practiced this behavior. Lastly, concerning their intention behind using antibiotics, around a fifth of residents have expressed that they have used antibiotics in order to treat colds, tiredness, myalgia, and flu (Figure 4).

Associations between the socio-demographic variables and the KAP towards antibiotics

Age (p = 0.003), sex (p <0.001), highest educational attainment (p = 0.009), monthly income (p = 0.017), and practice of SMA (p <0.001) were significantly associated with the knowledge level of residents on antibiotics. Subsequently, only knowledge level (p <0.001) and practice of SMA (p = 0.004) were significantly associated with attitude towards antibiotics. Similarly, practice of SMA (p <0.001), knowledge level (p <0.001), attitude towards antibiotics (p <0.001), and family/individual monthly income (p = 0.015) were significantly associated with practice towards antibiotics.

Without adjusting for confounders, being 30-39 years [cOR: 1.89 (1.08, 3.32); p = 0.026], being 40-49 years [cOR: 2.75 (1.62, 4.66); p <0.001], being 50-59 years [cOR: 1.92 (1.12, 3.31); p = 0.018], being female [cOR: 2.44 (1.64, 3.64); p <0.001), being a junior high school [cOR: 6.80 (1.14, 40.51); p = 0.035], being an undergraduate student [cOR: 7.86 (1.32, 46.74); p = 0.023), being a postgraduate student [cOR: 14.77

(2.24, 97.48); p = 0.005), having a monthly individual/family income of PhP 131,484 – PhP 219,140 [cOR: 0.07(0.01, 0.48); p = 0.007], and practice of SMA [cOR: 0.42 (0.27, 0.65); p <0.001] were significantly associated with knowledge level on antibiotics. Meanwhile, practice of SMA [cOR: 0.47 (0.30, 0.74); p <0.001], moderate level of knowledge on antibiotics [cOR: 6.43 (2.86, 14.48); p <0.001], and high level of knowledge on antibiotics [21.46 (9.32, 49.44); p <0.001] were significantly associated with attitude on antibiotics. Whereas, being female [cOR: 2.12 (1.42, 3.15); p <0.001), practice of SMA [cOR: 21.46 (9.32, 49.44); p <0.001], having excellent knowledge [cOR: 5.56 (2.53, 12.23); p <0.001], having moderate level of attitude [cOR: 2.68 (1.08, 6.67); p = 0.034], and excellent attitude [cOR: 10.40 (4.22, 25.66); p <0.001] were significantly associated with practice towards antibiotics.

After adjusting for confounders, data in Table 5 revealed that being 40-49 years [aOR: 2.37 (1.26, 4.44); p = 0.007], and being 50-59 years [aOR: 1.94 (1.01, 3.73); p = 0.046] were significantly associated with knowledge on antibiotics. This implies that the older age groups were more likely to have a higher level of knowledge on antibiotics when compared to their younger (18-29 years old) counterpart. Additionally, the study revealed that females tend to have a higher knowledge level compared to males [aOR: 1.95 (1.28, 2.98); p = 0.002]. In terms of education, those having completed at least senior high school [aOR: 7.75 (1.17, 51.47); p = 0.034], undergraduate degree [aOR: 7.97 (1.26, 50.52); p = 0.028], and postgraduate degree [aOR: 14.65 (1.99, 107.95); p = 0.008) were more likely to have higher knowledge level compared to those with no formal education. Interestingly, only those earning between PhP 131,484 and PhP 219,140 a month or those belonging to the high-income (but not rich) income group were less likely to have a higher knowledge level compared to those who earn less than PhP 10,957 [aOR: 0.05 (0.01, 0.42); p = 0.005]. Lastly, those who have practiced SMA had significantly lower knowledge levels [aOR: 0.44 (0.28, 0.71); p = 0.001] compared to those who have not. Moreover, only the knowledge level was significantly associated with attitude towards antibiotics. Specifically, those with a moderate level of knowledge [aOR: 5.82 (2.56, 13.22); p <0.001] or excellent level of knowledge [aOR: 18.47 (7.82, 43.64); p <0.001] had significantly higher attitude scores compared to those with a poor level of

Table 5. Adjusted Analysis of Factors Associated with Knowledge, Attitude, and Practices on Antibiotic Misuse (n=384)

Variable	Knowledge		Attitude		Practice	
	aOR (95% CI)	*p*-value	aOR (95% CI)	*p*-value	aOR (95% CI)	*p*-value
Age group (vs. 18-29 years) (in years)						
30-39	1.70 (0.89, 3.24)	0.107	0.77 (0.42, 1.40)	0.389	-	-
40-49	2.37 (1.26, 4.44)	0.007**	1.20 (0.67, 2.13)	0.541	-	-
50-59	1.94 (1.01, 3.73)	0.046*	1.24 (0.63, 2.28)	0.491	-	-
Sex (vs. Male)						
Female	1.95 (1.28, 2.98)	0.002**	1.02 (0.65, 1.58)	0.942	1.56 (1.01, 2.41)	0.043*
Highest level of education completed (vs. no formal education)						
Elementary	4.43 (0.62, 31.38)	0.137	-	-	-	-
Junior high school	6.25 (0.98, 39.84)	0.052	-	-	-	-
Senior high school	7.75 (1.17, 51.47)	0.034*	-	-	-	-
Undergraduate	7.97 (1.26, 50.52)	0.028*	-	-	-	-
Postgraduate	14.65 (1.99, 107.95)	0.008**	-	-	-	-
Monthly individual/family income (vs. <PhP 10,957) (in PhP)						
10,957 – 21,194	1.21 (0.72, 2.03)	0.480	-	-	1.43 (0.84, 2.43)	0.184
21,194 – 43,828	0.97 (0.49, 1.92)	0.934	-	-	0.81 (0.43, 1.55)	0.530
43,828 – 76,669	0.53 (0.23, 1.20)	0.126	-	-	1.02 (0.45, 2.31)	0.963
76,669 – 131,484	0.87 (0.16, 4.78)	0.870	-	-	0.56 (0.09, 3.51)	0.532
131,484 – 219,140	0.05 (0.01, 0.42)	0.005**	-	-	0.35 (0.04, 2.93)	0.335
>219,140	0.23 (0.05, 1.15)	0.073	-	-	0.48 (0.07, 3.27)	0.449
Ever-used antibiotic without prescription (vs. No)						
Yes	0.44 (0.28, 0.71)	0.001***	0.63 (0.39, 1.03)	0.068	0.43 (0.27, 0.70)	0.001***
Knowledge status (vs. low)						
Moderate	-	-	5.82 (2.56, 13.22)	<0.001***	0.75 (0.31, 1.81)	0.529
High	-	-	18.47 (7.82, 43.64)	<0.001***	1.68 (0.67, 4.20)	0.265
Attitude status (vs. low)						
Moderate	-	-	-	-	2.21 (0.80, 6.06)	0.124
High	-	-	-	-	6.89 (2.44, 19.40)	<0.001***

aOR: adjusted odds ratio. 95% CI: confidence interval. Sig. at p <0.05. p <0.01**. p <0.001****

knowledge. In terms of practice, females tend to have better practices on antibiotics compared to males [aOR: 1.56 (1.01, 2.41); p = 0.043]. Similarly with knowledge, residents who practiced SMA [aOR: 0.43 (0.27, 0.70); p <0.001] were less likely to have better antibiotic use practices compared to those who did not. Additionally, residents who had better attitudes towards antibiotic use tend to have better practices [aOR: 6.89 (2.44, 19.40); p <0.001]. Subsequently, knowledge was not significantly associated with practices (p >0.05).

Associations between the Knowledge, Attitude, and Practice of Residents towards Antibiotics

From the correlations analyzed in Table 5, knowledge was determined to have a significant influence on the residents' attitude. However, only attitude has a significant influence on one's practice towards antibiotics

Phase II: Qualitative Results

Theme 1: Non-traditional sources of information on antibiotics

The residents interviewed mentioned three general sources of information, namely: (a) past prescriptions and personal experiences, (b) interpersonal relationships, and (c) publicly sourced information via the internet (Table 6).

Past prescriptions and personal experiences

This includes the experiences of individuals from previous antibiotic use and knowledge obtained from past prescriptions provided in consultations. One of the residents stated that upon contracting a disease he had previously experienced in the past, which also resulted in him being prescribed antibiotics, he knows what type of medication to use in order to treat it based on the given prescription.

Table 6. Resulting Themes and Subthemes Based on Thematic Analysis Conducted

Themes	Subthemes
1. ***Non-traditional Sources of Information on Antibiotics***	a. Past prescriptions and personal experiences b. Interpersonal relationships c. Publicly sourced information via the internet
2. ***Knowledge Gaps on the Dangers of Antibiotic Misuse***	a. Awareness of the risks and side effects associated with antibiotic use b. Understanding of antibiotic resistance
3. ***Driving Factors Behind Antibiotic Use***	a. Physical symptoms/ailments-based b. Outcome-based c. Cost efficiency-centered
4. ***Challenges to Proper Antibiotic Use Within the Healthcare System***	a. Physician-related concerns b. Patient-related issues
5. ***Informal Channels and Sources of Antibiotics***	a. Antibiotic procurement b. Antibiotic storage c. Antibiotic sharing
6. ***Non-Adherence to Prescribed Antibiotic Courses***	a. Personal modification of dosage b. Incomplete dosage of the antibiotic course
7. ***Attitude Towards the "No Prescription, No Dispensing" Policy***	a. Positive reception b. Concerns regarding limitations

Interpersonal relationships

Inferring from their own experiences and knowledge on the matter, one's family, friends, and colleagues serve as the most common source of antibiotic information. Among those, the first to come to mind are one's immediate family members. They serve as both an important source of support and a subjectively trustworthy source of information. Interestingly, one of the residents provided insight into this reliance on one's relationships in terms of seeking advice and information on antibiotic use. Specifically, she pointed out that this behavior is founded on our innate trait as a Filipino to trust our peers or "kapwa" more than most doctors, whom we perceive as impersonal connections. Resident CF28 mentioned that "*Syempre minsan- ay minsan na ano na nila-minsan naranasan na nila yung ganung sakit. Syempre yung, alam mo naman ang mga Pilipino kapag sinabing, "uy eto mas eto yung ininom kong gamot mas magaling 'yan." Ganun yung sabi-sabi ng mga tao, ganoon. Ganoon na tayong [mga] Pilipino.*"

Publicly sourced information via the internet

The residents commonly use the internet to gather information on antibiotics, primarily through popular search engines like Google. One respondent highlighted Google as a reliable source for information on diseases and necessary antibiotics. Another respondent mentioned using Facebook for sourcing information on essential antibiotics, medicines, and their side effects. YouTube was also frequently cited, with residents favoring vlogs from doctors, particularly Doc Willie Ong. These doctor vloggers often respond to comments and inquiries, providing immediate answers to health concerns, including topics related to antibiotics.

Theme 2: Knowledge gap on the dangers of antibiotic misuse

Findings showed that many of the residents have a significant lack of understanding of the topic of adverse drug reactions, specifically about (a) the risks and side effects associated with antibiotic misuse and (b) the phenomenon of antibiotic resistance (Table 6).

Awareness of the risks and side effects associated with antibiotic misuse

Although residents recognize the potential harmful consequences of antibiotic misuse, most only have a vague understanding. One respondent mentioned vague examples of physical impacts from overdosing on antibiotics and shared an experience of how misuse negatively affected someone's mental health, including loss of self-awareness, lack of recognition of peers, and harmful behavior. While specific

answers were rare, a common concern among residents was the impact of antibiotics on the kidneys. Many also noted the risk of worsening one's condition if antibiotics are misused.

Understanding of antibiotic resistance

None of the residents has ever mentioned the term "antibiotic resistance" throughout the interview sessions, and it was only brought up when the researcher mentioned it. When it was discussed, observably no one was able to provide a clear and correct definition of the term. However, they did show varying levels of understanding and exposure to the said concept. Some do not know at all about antibiotic resistance and have only heard of it for the first time during the interview with the researcher. Notably, other residents don't have an idea of what antibiotic resistance may entail, although having their own shares of misconceptions, which can be divided into two: (i) the body becoming "immune" to the effects of antibiotics and (ii) it is a positive phenomenon that benefits individuals who have it. For instance, MF40 stated that **"***Parang, pagna-overuse na ba yun, yung antibiotic resistance? Kunwari, ewan ko lang kung tama ah, parang naiimmune ka."*

Theme 3: Driving factors behind non-prescription antibiotic use

Based on the interviews, there were several major factors that contributed to the individuals' decision to use antibiotics even without a prescription. These factors can be divided into three categories, namely (a) physical symptoms/ailments-based, (b) outcome-based, and (c) cost efficiency-centered (Table 6).

Physical symptoms/ailments-based

Most residents consider the nature of their illness, specifically the type, severity, and duration, as key indicators for antibiotic use. Common ailments mentioned include severe coughs and fevers, which often occur together, especially in severe cases. Residents also noted that infected physical wounds require antibiotics. Less frequently cited conditions include colds, urinary tract infections (UTIs), allergies, and toothaches.

Outcome-based

Another consideration is the positive results that come from its use. In a way, the advantages experienced by the residents of this practice further strengthen its credibility and thereby serve as justification for continuous practice. A respondent expresses the same sentiments regarding the positive outcomes of the said practice, as she states that the immediate relief experienced by taking antibiotics proactively adds to the reasons why she does this practice.

Cost efficiency-centered

A major factor driving antibiotic misuse is the time and money saved by using non-prescription antibiotics instead of obtaining them legitimately. The latter involves more time, effort, and money, which may not be feasible for everyone. One respondent mentioned that financial difficulties led her to rationalize using non-prescription antibiotics, believing that the same medications would be prescribed during a consultation. She felt it was better to rely on her own knowledge and experience to use antibiotics. In connection, a respondent also touches upon the issue of disruptions in terms of employment. Considering that he is currently employed in an 8-to-4 job, which necessitates good physical and mental health to accomplish his roles and responsibilities, being ill for even a day has a significant impact on his performance. As this also affects his overall evaluation and salary, the practice of SMA becomes an attractive option. BM55 expounds on this by saying that *"Yung isa sa mga isyu na hindi ka puwedeng umabsent dahil bawas din sa sweldo, kaya naeengganyo ka na lang na kung ano yung ibigay ng kaibigan mo na may gamot siya doon, yun na ang iinom mo para makatipid sa oras, makatipid ka sa pera, hindi ka maaabala sa pagtatrabaho."*

Theme 4: Challenges to proper antibiotic use within the healthcare system

Notable barriers within the healthcare systems that either prevent or enable improper antibiotic use were also mentioned. Based on the residents' answers, these could be delineated as either: (a) issues indirectly caused by physician-related concerns, or (b) from the attitudes taken by patients during consultations (Table 6).

Physician-related concerns

In the physician-patient relationship, the former plays a significant role in mitigating practices of antibiotic misuse as they are perceived as a "reliable and credible source" for health-related information. As such, they often have the responsibility of bearing the expectations of patients in terms of helping them make the proper decisions towards their health. However, the issue arises when there is a lack of dialogue between the two, resulting in the consultation having less "consultation" and more "prescription." Less information is received, and more is given from one side, specifically the physician. MF40 effectively points out this issue in her statement on this issue: *"Sa doctors din. Di naman ganun kaexplained eh. Di masyado, parang, sa tingin ko kasi siguro nga sa dami ng patient, parang, kailangan matapos agad. Isang pasyente, isang ano, ganun tingin ko ah, based on experience ko. Sasabihin, "Oh, eto, inumin mo 3 times a day, tapusin mo morning, kunwari, di ba ganun?"*

Patient-related issues

Patient behavior during consultations significantly impacts their actions afterward, particularly regarding antibiotic misuse. Some residents expressed hesitancy to voice their thoughts or ask questions due to various reasons. For example, one respondent felt too shy to seek additional information about an antibiotic prescription, considering the

physician's time too valuable. Conversely, other residents were more assertive, actively seeking specific antibiotics during consultations. They justified their insistence on particular prescriptions with the concept of "hiyang," which refers to a medication that has effectively treated their condition in the past. One respondent, CF40, mentioned suggesting certain antibiotics to her doctor, explaining that these had worked for her previously and were therefore more suitable compared to other medications.

Theme 5: Informal channels and sources of antibiotics

The residents also discussed informal channels available that enable them to access and obtain antibiotics even without the prescription of a physician. Through the interviews conducted, the following were brought up: (a) procurement of antibiotics, (b) storage of antibiotics, and (c) sharing of antibiotics (Table 6).

Antibiotic procurement

The interviews revealed alternative channels for obtaining antibiotics beyond prescription-based purchases from large pharmaceutical companies. Residents frequently mentioned small local pharmacies as common sources for antibiotics, even without following proper procedures.

While obtaining antibiotics without a prescription is often difficult, some residents managed to bypass this issue based on their purchase volume. One respondent shared that she could buy batches of amoxicillin from a local pharmacy to send to her husband abroad. This pharmacy allowed her to purchase antibiotics without a prescription if she bought an entire box. Another respondent noted a small pharmacy in her barangay that sells antibiotics, such as "contrive," without a prescription if the buyer purchases an entire sheet. She described the seller as resembling an ordinary salesman rather than an authorized pharmacist, emphasizing the pharmacy's business-like approach that prioritizes profit over regulations. Specifically, she mentions, *"Kasi dito sa may amin, may bukod-tanging isang pharmacy dito ay makakabili ka talaga ng antibiotics… Kasi yung isang pharmacist dito, kapag bumili kami, pinakita ko, sinabi ko lang kung may contrive ba kayo or whatsoever or ganun na antibiotics. Pag sinabi oo, sabi ko pabili isa okay na, tapos. Minsan naman dito, nagbibigay ng mga antibiotics na may capsule. Kailangan ng isang banig bago kita bigyan. May mga ganun eh… Pero kailangan isang banig, hindi puwedeng tingi."*

The residents have also admitted to employing deceptive tactics and false information to acquire antibiotics. In the case of one respondent, he sometimes bribes the pharmacists by giving extra amounts of money in order to allow him to purchase the antibiotics he believes that he needs. He mentioned that the success of his actions often relies on the pity and concern of the pharmacists, which is sometimes effective and at times not.

Antibiotic storage

In the process of informally obtaining antibiotics, it is often expected that individuals purchase them in excess of what is medically required. As a result, these excess medications will be stored in the medicinal cabinets or refrigerators of individuals. In reference to the interviews conducted, one of the major motivations for this practice is the stockpiling for medical emergencies or future use. One respondent elaborates on this as she mentions that in situations wherein a person is traveling or in a location far away from healthcare professionals and centers, having an emergency supply of antibiotics is important, especially to prevent wound infections.

Antibiotic sharing

Antibiotic sharing is another prevalent practice that was noted by the residents. In this behavior, the individuals can be delineated as either the recipient or the provider of antibiotics in the relationship.

With the residents on the receiving side, they mentioned obtaining antibiotics from various individuals in their social circles, which may include their co-workers, friends, neighbors, family members, and most frequently, their connections with healthcare workers. In the case of one resident, she can informally request antibiotics from friends and relatives who are working as nurses or medical technicians. He mentions how they become access points to obtain antibiotics even without prescriptions, and at times, even suggest specific types based on their own knowledge and experience. Some residents admitted to providing antibiotics to others, even without a valid prescription. Their reasons for this practice vary. One respondent prefers sharing antibiotics over storing them at home to avoid waste due to expiration. He argues that giving them away is more cost-efficient. However, he has a specific criterion: the recipient must have experienced the same condition that the antibiotic was originally used to treat. WM30 states, *"Para sa akin, dapat di na tinatago. Shineshare na lang. Kasi may ano yan eh… Kasi pwedeng maano 'yan eh, pwedeng ma-expire, pwede rin mabulok, pwede rin lumambot."*

Theme 6: Non-adherence to prescribed antibiotic courses

Another notable point of discussion was the residents' acts of noncompliance in terms of the antibiotic regimen prescribed to them by a physician, which include: (a) personal modification of the antibiotic course and (b) incompleteness of antibiotic dosage (Table 6).

Personal modification of antibiotic dosage

Some residents have intentionally modified their dosage based on the perceived effectiveness and desired speed of recovery. This was apparent in one case, due to his desire to recover faster, he would argue with his doctor to be given a higher dosage. There was also another respondent who shared a similar experience, as she even requested from her doctor

to change her antibiotics to a higher strength to decrease the dosage from seven days to three days. From her perspective, both have an equal level of effectiveness, with the latter actually being more preferable as it means less time necessary to recover from her condition.

Incompleteness of antibiotic dosage

Another common practice of non-adherence involves discontinuing the course advised by physicians. Notably, all but one respondent admitted to not completing their antibiotic course at some point. The primary reason cited was forgetfulness. One respondent shared that she sometimes forgets to take her antibiotics on schedule and addresses this by either discontinuing the course, doubling the next dose, or adjusting the duration of the course to catch up. Another respondent shared a similar belief, adjusting the medication interval to ensure all the antibiotics are consumed, despite interruptions in the intake schedule.

Theme 7: Attitude towards the "No Prescription, No Dispensing" policy

Positive reception

Most residents have expressed a positive perception of the said policy and even encourage its strict implementation. The importance of this policy was best delineated by another respondent, who points out that its implementation will also ensure that there is a sufficient supply of antibiotics available to those who truly need them. Moreover, she also specifically mentions the possibility of overdosing if no prescriptions are present to provide information on the amount of antibiotics that are necessary to be taken.

Concerns regarding limitations

Some residents had concerns regarding the policy, as they believed there were instances in which it may actually be detrimental to individuals. One mentions this as she mentioned the issue of financial barriers in terms of availing healthcare check-ups or physician consultations. She further suggests that the policy can be altered by allowing "low-spectrum" antibiotics to not necessitate prescriptions during purchase and only including those with "high strength" instead. The concern regarding emergency cases was also brought up by another respondent, specifically pointing to possible health detriments of being unable to procure antibiotics in times of emergency, and no prescriptions can easily be obtained.

DISCUSSION

Prevalence of Antibiotic Misuse

The prevalence of self-medication with antibiotics (SMA) was found to be moderately high at 68.23%, slightly lower than the 78.8% reported in LMICs but higher than the estimated Philippine range of 31%–66%.[7,27] This rate is comparable to other Southeast Asian countries such as Indonesia (64%), Vietnam (83.3%), and Lao PDR (85%), reflecting the increasing trend noted by the WHO.[17,24,40] While their knowledge and attitudes toward antibiotics were predominantly excellent, their actual practices were moderate, and misconceptions continued to exist. These results highlight a disconnect between awareness, perceptions, and real-world behaviors regarding antibiotic use.

Among sociodemographic variables, only sex showed a significant association with SMA prevalence, with males having higher rates of self-use (76.09%) compared to women (61.00%), consistent with Jayawardhana et al.[5] Qualitative interviews provide context for this gender disparity: male residents often expressed confidence in self-diagnosis, relying on past experiences or peer advice when deciding to use antibiotics. Conversely, female residents more frequently exhibited caution and a preference for consulting healthcare professionals. This divergence highlights the influence of gender norms and attitudes on health behaviors, extending beyond mere knowledge levels.

Knowledge on Antibiotics

Residents demonstrated a mean knowledge score of 70.58%, with over half (51.56%) showing excellent knowledge, consistent with the findings of Nepal et al., but contrasting with other foreign and local studies.[10,25,41,42] Despite these favorable results, however, qualitative findings reveal certain discrepancies. Although most residents could identify antibiotics and describe their general purpose, their understanding was frequently shaped by incomplete or non-scientific sources. Limited two-way communication during physician–patient interactions, often constrained by time and hierarchical dynamics, left many residents seeking information elsewhere. Consequently, despite high scores on knowledge assessments, the qualitative data indicate that this understanding may not align with accurate biomedical concepts.

In line with this, misconceptions about antibiotic function remain widespread. While 91.41% of residents correctly identified amoxicillin as an antibiotic, a higher rate than those reported in Indonesia (70.51%) and Bhutan (67.6%), confusion persists regarding the scope of antibiotic use.[6,43] Although 91.93% recognized that antibiotics target bacterial infections, 82.81% also believed they were effective against viral illnesses, mirroring findings from Karuniawati et al., Yin et al., and other local studies.[6,8,25,28] Qualitative interviews help contextualize this pattern: many residents equated symptom relief with recovery, prompting the use of antibiotics for self-limiting conditions such as colds and influenza. These findings suggest that misconceptions are less a result of disregard for medical advice than of cultural learning patterns that prioritize experiential and social knowledge.

Further supporting this interpretation, residents consistently identified three main information sources guiding their antibiotic use—past experience, interpersonal networks,

and the Internet. Experiential knowledge strongly influenced decisions to self-medicate, as studies found that individuals often reused old prescriptions based on familiarity with previous illnesses.[34,35,44,45] Advice from family members, peers, and connections with healthcare professionals similarly shaped behavior due to the trust and credibility embedded within these relationships.[36,45,46] In the Philippine context, this social dynamic is reinforced by *Kapwa*, a cultural value emphasizing shared identity and collective decision-making, which often outweighs formal medical authority.[47] Finally, the Internet emerged as a major source of health information, with residents frequently consulting platforms such as Google and YouTube for guidance—echoing findings by Hlaing et al. and Rodrigues.[48,49] While this accessibility broadens health literacy opportunities, it also fosters misinformation, including practices like applying powdered antibiotics on wounds.

On the topic of ABR, about one-third (32.03%) of residents were unaware that antibiotic misuse contributes to the issue, consistent with findings by Tagum-Briones et al. and Al-Shibani et al.[14,50] Through interviews, it was found that some residents believed that the body—not bacteria—develops resistance, while others viewed it as a sign of improved health. Similar misunderstandings have been reported elsewhere.[51-53] These reflect partial health literacy, where awareness exists without an accurate understanding. Taken together, these findings underscore that while antibiotic knowledge among residents may appear high, it often coexists with deep-seated misconceptions reinforced by cultural norms, social trust, and unregulated digital content.

Attitudes towards Antibiotics

Compared with studies involving general populations, the residents exhibited comparable or even better results, although still lower than those reported among college students.[40,41,54,55] Notably, 23.44% expressed disappointment when not prescribed antibiotics, reflecting entrenched expectations linking medical consultations to antibiotic acquisition.[56] This aligns with Barber et al., wherein 82% of Filipinos anticipated receiving antibiotics when ill, but contrasts with Aceveda et al., who reported the opposite trend among medical students.[25,29] Moreover, 25.26% admitted to storing leftover antibiotics for future use, which was actually lower than local studies, where at least half of residents endorsed this practice.[14,25] In terms of adherence, 48.18% agreed with completing the prescribed antibiotic course even after symptoms subsided, comparable to rates in Kuwait (55%) and Indonesia (50%).[6,57] Additionally, adherence attitudes remain relatively positive, aligning with Vidad et al., who reported strong agreement among Metro Manila residents (mean = 4.25, "strongly agree").[10] Despite this favorable attitude score, interviews revealed limited awareness of antibiotic resistance as a long-term public health concern. Most residents regarded antibiotics simply as "strong medicines," focusing more on immediate factors such as cost and convenience rather than population-level implications. This disconnect may explain the coexistence of positive attitudes with problematic antibiotic practices.

There were two major factors shaping attitudes toward antibiotic use: enabling factors that promote self-medication and barriers that hinder proper use. Enabling factors primarily involved perceptions of illness severity and practical considerations. For "ailments-based" factors, many residents regarded common or recurrent ailments such as colds or fever as minor and self-manageable, a view consistent with Abdi et al. and Fereidouni et al.[34,45] This oversimplification of illness reinforced beliefs of self-sufficiency in treatment. Economic and logistical concerns were also brought up, including healthcare costs, overcrowded facilities, and long waiting times, which further encouraged non-prescription antibiotic use. Similar findings across Asian studies indicate that perceived cost- and time-efficiency often outweigh the perceived benefits of professional consultation.[3,24,44,45] Conversely, physician-related factors emerged as major barriers to proper antibiotic use. Residents frequently cited communication issues during consultations, describing interactions as brief, transactional, or authoritarian—discouraging dialogue and reducing trust.[45,49] The resulting dissatisfaction led individuals to rely on self-medication or demand antibiotics directly from physicians.[58] Such strained patient–physician relationships, combined with socioeconomic pressures and misperceptions of illness, perpetuate inappropriate antibiotic use and undermine rational prescribing practices.

Practices towards Antibiotics

Study results align with similar findings by Karuniawati et al., in which 45% of their population also achieved a moderate level of practice.[6] Interviews confirmed that common misuse methods—such as informal procurement, incomplete courses, and storing leftovers—were widespread. Most residents (92.97%) reported never purchasing antibiotics online, suggesting low trust or awareness of online pharmacies. However, one-fifth admitted obtaining non-prescription antibiotics from informal sources. About 20.05% purchased from *sari-sari* stores, echoing Barber et al., who found that 60% of roadside stores sold antibiotics.[25,31] Upon interview, it was revealed that this was possible because some small pharmacies permit non-prescription sales if customers buy full sheets or boxes. This means that sari-sari store owners purchase large volumes in order to resell in their stores for marked-up prices for individual pieces. Furthermore, several residents admitted to deceptive behaviors, such as fabricating prescriptions, to obtain antibiotics. These findings highlight the continued availability of antibiotics through informal and poorly regulated channels, underscoring the need for stronger policy enforcement and public education on responsible antibiotic access.

In the discontinuation of antibiotic regimens, the poor completion rate of a large portion of residents aligns with the systematic review of Nepal and Bhatta, which identified early

discontinuation following symptom relief as one of the most common inappropriate practices globally.[24] Similar trends, ranging from 28.7% to 67%, have been reported across various populations.[5,42,50,55] In the Philippines, Tagum-Briones et al. also described an "on-and-off" antibiotic use pattern based on symptom severity.[14] Residents admitted to stopping antibiotics once symptoms improved, often citing cost, or believing ongoing use was unnecessary. Some mentioned keeping antibiotics "for next time" or sharing them with family. These findings explain the gap between knowledge and practice: despite understanding that antibiotics should be completed, factors such as financial constraints, convenience, and cultural norms drive irrational behavior.

Associations between KAP and Socio-demographic Profile

Analysis of socio-demographic variables revealed significant associations between knowledge and age, sex, education, and socioeconomic status. Residents aged 40–59 years demonstrated higher knowledge scores, consistent with previous local findings, though contrasting reports from Mozambique suggested declining knowledge with age due to reliance on traditional beliefs.[14,28,42] Females exhibited greater knowledge than males, a pattern repeatedly observed in literature, likely reflecting their primary caregiving roles.[6,59] Higher education levels were likewise correlated with greater antibiotic knowledge, underscoring the importance of formal education in fostering health literacy.[6,14,41,54,57] Interestingly, higher socioeconomic status was associated with lower knowledge, opposite to trends in prior studies, which may be attributed to the small proportion of high-income residents.[6,10,42] No socio-demographic factors were significantly related to attitude levels, while practice was influenced only by sex, with females showing better antibiotic practices, which is in line with their high knowledge levels.[6,41] Correlational analysis indicated significant positive relationships between knowledge and attitude, and between attitude and practice, but not between knowledge and practice. This was explained by the residents as they consistently identified behavioral determinants that were independent of their knowledge levels. These included systemic barriers like long queues at public health facilities, high consultation fees, and reliance on informal markets. As such, possessing knowledge alone does not inherently lead to rational practice, as structural and cultural factors play a mediating role.

Limitations of the Study

The study has several limitations. First, the cross-sectional descriptive design restricts the findings to associations rather than causality, as data were collected that only reflect information from a single point in time. Second, generalizability is limited since the study was confined to the three most populous barangays of the municipality. Additionally, since it is a rural municipality, it may not reflect trends in neighboring urban populations. Third, the Filipino-translated survey and a revised knowledge item were not subjected to validity testing. Finally, reliance on self-reported KAP measures, while reliable, constrained the scope of variables assessed, leaving other relevant factors—such as awareness of antibiotic resistance, healthcare barriers, and physician-patient communication—unexplored.

CONCLUSION

Antimicrobial resistance remains a pressing public health concern, particularly in low- and middle-income countries such as the Philippines. In this study, quantitative and qualitative data were integrated to provide a comprehensive understanding of antibiotic misuse. It was found that misuse is not solely a result of limited awareness but is largely influenced by entrenched socio-cultural norms, economic constraints, and systemic barriers that shape daily health practices. In Rodriguez, Rizal, nearly 70% of residents reported self-medicating with antibiotics. Although awareness and attitudes toward proper antibiotic use were generally positive, actual practices remained inconsistent—often involving incomplete treatments, use for viral infections, or reliance on informal sources. Qualitative insights reveal that knowledge alone does not ensure rational antibiotic use; factors such as cultural trust in peers, prior experiences, social media influence, financial hardship, and limited healthcare access significantly contribute to these behaviors.

Overall, these findings show that antibiotic misuse in the community is caused by complex factors like incomplete knowledge, socio-cultural norms, and systemic issues, not just ignorance. This understanding highlights the need for multifaceted interventions beyond basic awareness campaigns. To effectively tackle the root causes of self-medication with antibiotics, it is crucial to enforce strict regulations on prescription-only policies, improve access to affordable healthcare, and create culturally sensitive health communication strategies. Physicians and pharmacists must also take active roles in patient education and rational prescribing practices.

Ultimately, mitigating antibiotic misuse and resistance demands a coordinated approach integrating education, regulation, and systemic reform. By elucidating the multifactorial causes of misuse, this study provides an evidence base for context-specific policies and community-focused interventions that promote rational antibiotic use and safeguard the effectiveness of antimicrobial therapies in the Philippines.

Disclaimer

The views expressed in this article are those of the authors and do not represent an official position of their institution.

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APPENDICES

Appendix A. Survey Questionnaire [ENGLISH]

Knowledge, Attitude, And Practices Towards Antibiotics Questionnaire (KAPAQ) [45 items]

Part I. Knowledge of antibiotics

Answer the following statement by marking (√) with the answer that you think is correct.

No.	Statement	Yes	No	Do not know
1	Amoxicillin is an antibiotic.			
2	Cephalexin is an antibiotic.			
3	Paracetamol is an antibiotic.			
4	Antibiotics are used to kill bacteria.			
5	Antibiotics can be used to treat infections due to viruses.			
6	Colds and flu can be treated without antibiotics.			
7	Antibiotics can reduce fever.			
8	Antibiotics can be bought online.			
9	Antibiotics obtained from other people may be taken.			
10	Amoxicillin can be purchased at a pharmacy without a doctor's prescription.			
11	Antibiotics can be purchased at a grocery shop or a sari-sari store.			
12	Inappropriate use of antibiotics will cause antibiotic resistance.			
13	Inappropriate use of antibiotics will cause these antibiotics to be ineffective in the future.			
14	Inappropriate use of antibiotics can cause more severe illness.			
15	Inappropriate use of antibiotics increases the costs of treatment in the long-term.			
16	Antibiotics can cause allergic reactions such as redness of the skin.			
17	Antibiotics can kill good bacteria in the intestines.			
18	Antibiotics need to be stored in case of illness in the future.			
19	Antibiotics that were left over from previous consultations can be used again if sick.			
20	Antibiotics can be stopped if the person feels better already.			

Part II. Attitude towards antibiotics

Please mark (√) in the box that best suits you. SD: strongly disagree, D: disagree, N: doubtful, A: agree, SA: strongly agree

No.	Statement	SD	D	N	A	SA
1	I hope the pharmacist allows me to purchase antibiotics even without a doctor's prescription.					
2	I think I should buy antibiotics at a grocery shop or a sari-sari store whenever I get sick.					
3	I am happy when I can buy antibiotics at the pharmacy without a physician's prescription.					
4	I will buy antibiotics at the pharmacy when I do not get antibiotics directly from the doctor.					
5	I will be disappointed when I get medical consultation/treatment, but not prescribed antibiotics.					
6	I think using leftover antibiotics will save money because I do not need to see a doctor then.					
7	I will keep the leftover antibiotics because they are useful in case I need them in the future.					
8	I will give my leftover antibiotics to others to help treat their disease.					
9	I will take antibiotics until they run out, even though my sickness has improved.					
10	I will stop taking antibiotics if I feel better.					
11	I hope the doctor gives me antibiotics whenever I have a cold.					
12	I will take antibiotics in the hopes that they can speed up the healing of my cold					

Part III. Practice using antibiotics

For each statement, please mark (√) that suits you (N: never, SD: seldom, S: sometimes, O: often, A: always).

No.	Statement	N	SD	S	O	A
1	I buy antibiotics at a grocery shop or a sari-sari store.					
2	I buy antibiotics online.					
3	I buy antibiotics at the pharmacy without a doctor's prescription					
4	I took leftover antibiotics when I felt sick, and the symptoms were similar to my past problems.					
5	I obtained antibiotics from the midwife.					
6	I obtain antibiotics from other non-medical professionals (e.g., family, relatives, peers, etc.).					
7	I obtained antibiotics from the nurse.					
8	I recommend buying antibiotics when one of my family members gets sick.					
9	I take antibiotics because of the suggestions from other people.					
10	I take antibiotics until I finish the prescribed dosage and duration.					
11	I stop taking antibiotics if my condition significantly improves.					
12	I take antibiotics to speed up the healing of my common cold.					
13	I take antibiotics to treat colds, tiredness, myalgia, and flu.					

Part IV. Demographic information

Answer the following questions by filling in the blanks (nos. 1 to 2) and marking (√) in the box provided following your conditions

1	***Name (Optional)***	
2	***Address***	
3	***Age***	
4	***Sex***	• Male • Female
5	***Highest educational attainment***	• No formal education • Elementary school • Junior high school • Senior high school • Undergraduate • Postgraduate
6	***Monthly household income***	• <PhP 10,957 • PhP 10,957 – PhP 21,194 • PhP 21,194 – PhP 43,828 • PhP 43,828 – PhP 76,669 • PhP 76,669 – PhP 131,484 • PhP 131,484 – PhP 219,140 • >PhP 219,140
7	***The last time used antibiotics (to self-medicate)***	• Less than 3 months • 3-6 months • 6-12 months • Forgot • Never

*Additional Questions:

Are you willing to be part of the in-depth interviews for the second phase of the study?	• Yes • No
If yes, please provide your contact information for future scheduling of interviews.	

Thank you very much for your participation!

Appendix B. Survey Questionnaire [FILIPINO]

Knowledge, Attitude, And Practices Towards Antibiotics Questionnaire (KAPAQ) [45 items]

Part I. Kaalaman ukol sa antibiotics

Para sa bawat pahayag, mangyaring lagyan ng (√) ang angkop sa iyong kaalaman.

No.	Statement	Oo	Hindi	Hindi Alam
1	Ang amoxicillin ay isang antibiotic.			
2	Ang cephalexin ay isang antibiotic.			
3	Ang paracetamol ay isang antibiotic.			
4	Ang mga antibiotic ay ginagamit para pumatay ng bacteria.			
5	Ang mga antibiotic ay maaaring panlunas sa mga impeksyon na dulot ng mga virus.			
6	Ang sipon at trangkaso ay maaaring malunasan kahit walang antibiotic.			
7	Ang antibiotic ay nakakababa ng lagnat.			
8	Ang antibiotic ay maaaring mabili mula sa online websites.			
9	Ang mga antibiotic na natanggap mula sa ibang tao ay maaaring inumin.			
10	Ang amoxicillin ay maaaring mabili mula sa botika kahit walang reseta ng doktor.			
11	Ang antibiotic ay maaaring mabili mula sa grocery shops o sari-sari stores.			
12	Ang di-angkop na paggamit ng antibiotic ay nagdudulot ng antibiotic resistance.			
13	Ang di-angkop na paggamit ng antibiotic ay maaaring maging sanhi ng pagkawala nito ng epektibo sa hinaharap.			
14	Ang di-angkop na paggamit ng antibiotic ay maaaring magdulot ng mas malubhang mga sakit.			
15	Ang di-angkop na paggamit ng antibiotic ay maaaring magdulot ng mas mataas na gastos ng pagpapagamot sa pangmatagalang panahon.			
16	Ang paggamit ng antibiotic ay maaaring magdulot ng mga allergic reactions tulad ng pamumula ng balat.			
17	Ang antibiotic ay kayang pumatay ng mababuting bacteria sa bituka.			
18	Ang tirang antibiotic ay tinatabi o tinatago upang may magamit sa susunod na may magkaroon ng sakit.			
19	Ang mga antibiotic na hindi nagamit mula sa mga nakaraang konsultasyon ay maaaring gamitin ulit kung may sakit.			
20	Ang paggamit ng antibiotic ay maaaring itigil kung maayos na ang pakiramdam ng tao.			

Part II. Saloobin tungo sa antibiotics

Para sa bawat pahayag, mangyaring lagyan ng (√) ang angkop sa iyo (SD: strongly disagree [Lubos na hindi sumasang-ayon], D: disagree [hindi sumasang-ayon], N: doubtful [nag-aalinlangan], A: agree [sumasang-ayon], SA: strongly agree [sumasang-ayon]).

No.	Statement	SD	D	N	A	SA
1	Sana payagan ako ng pharmacist na bumili ng antibiotic kahit walang reseta ng doktor.					
2	Sa palagay ko, dapat bumili ako ng mga antibiotic sa grocery shop o sari-sari store kapag ako'y nagkakasakit.					
3	Masaya ako kapag ako'y nakakabili ng antibiotic sa botika kahit wala akong reseta ng doktor.					
4	Bibili ako ng antibiotic sa botika kapag hindi ako makakuha ng antibiotic mula mismo sa doktor.					
5	Madidismaya ako kapag ako'y nagpakonsulta sa doktor pero hindi ako niresetahan ng antibiotic.					
6	Sa palagay ko, ang paggamit ng tirang antibiotic ay makakatipid sa akin ng pera dahil hindi ko na kailangan magpakonsulta sa doktor.					
7	Tinatabi ko ang mga natirang antibiotic dahil ito ay maaaring makatulong sakaling kailanganin ko ito sa hinaharap.					
8	Ibibigay ko ang natira kong antibiotic sa iba upang makatulong sa paggamot ng kanilang sakit.					
9	Ipagpapatuloy ko ang pag-inom ng antibiotic hanggang sa maubos ito kahit na umayos na ang aking sakit.					
10	Ititigil ko ang pag-inom ng antibiotic kapag maayos na ang pakiramdam ko.					
11	Sana bigyan ako ng doktor ng antibiotic tuwing mayroon akong sipon.					
12	Umaasa ako na kapag uminom ako ng antibiotic ay mapapabilis ang pagpapagaling ko mula sa aking sipon.					

Part III: Kagawian gamit ng antibiotics

Para sa bawat pahayag, mangyaring lagyan ng (√) ang angkop sa iyo (N: never [hindi kailanman], SD: seldom [bihira], S: sometimes [minsan], O: often [madalas], A: always [palagi]).

No.	Statement	N	SD	S	O	A
1	Bumibili ako ng antibiotic sa grocery shop o sari-sari store.					
2	Bumibili ako ng antibiotic sa online websites.					
3	Bumibili ako ng antibiotic sa botika kahit walang reseta ng doktor.					
4	Umiinom ako ng tirang antibiotic kapag sa tingin ko yung sakit at mga sintomas ko ay katulad ng mga dati kong naging karanasan.					
5	Nakakakuha ako ng antibiotics mula sa mga midwife					
6	Nakakakuha ako ng antibiotic mula sa ibang tao na hindi doktor (tulad ng pamilya, kaibigan, etc.).					
7	Nakakakuha ako ng antibiotics mula sa mga nars.					
8	Inirerekomenda ko ang pagbili ng antibiotic kapag may isa sa mga miyembro ng pamilya ko ang nagkasakit.					
9	Umiinom ako ng antibiotic dahil sa mga mungkahi ng ibang tao.					
10	I take antibiotics until I finish the prescribed dosage and duration. Iniinom ko ang antibiotic hanggang makumpleto ko ang dami at araw na rineseta ng doktor.					
11	Ititigil ko ang pag-inom ng antibiotic kapag naging mabuti na ang pakiramdam ko.					
12	Umiinom ako ng antibiotic upang mapabilis ang paggaling ng aking ubo o sipon.					
13	Umiinom ako ng antibiotic upang gamutin ang sipon, pagod, myalgia, at trangkaso ko.					

Part IV. Demographic information

Sagutin ang mga sumusunod na tanong sa pamamagitan ng pagsulat ng sagot (no. 1 at 2) at paglagay ng tsek mark (√) sa mga kahon na nakalagay sa kanan (no. 3 hanggang 7).

1	Pangalan	
2	Pook na tinitirhan	
3	Edad	
4	Kasarian	• Lalake • Babae
5	Pinakamataas na narating na antas ng edukasyon	• No formal education • Elementary school • Junior high school • Senior high school • Undergraduate • Postgraduate
6	Buwanang kita ng household	• <PhP 10,957 • PhP 10,957 – PhP 21,194 • PhP 21,194 – PhP 43,828 • PhP 43,828 – PhP 76,669 • PhP 76,669 – PhP 131,484 • PhP 131,484 – PhP 219,140 • >PhP 219,140
7	Huling pagkakataon na gumamit ng antibiotic (para mag-self-medicate)	• Hindi hihigit ng 3 months • 3-6 months • 6-12 months • Nakalimutan • Hindi kailanman

*Karagdagang mga tanong:

Interesado ka bang lumahok bilang interviewee para sa second phase ng pag-aaral?	• Oo • Hindi
Kung oo, pakibigay ang contact number ninyo para makapag-schedule ng interview sa hinaharap.	

Maraming salamat sa paglahok!

Appendix C. Interview Guide Questions [ENGLISH]

Semi-structured Interview Guide Question on Self-Medication of Antibiotics [14 Items]

Demographic Profile:

1. Name
2. Age
3. Gender
4. Highest Educational Attainment
5. Income Group

Main Questions:

1. What do you know about antibiotics?
    a. What is your definition?
    b. What is its purpose?
    c. How long does it take before antibiotics become effective?
    d. What do you think are their advantages and disadvantages?
2. Are you currently using antibiotics? If not, when was the last time you used antibiotics?
    a. What type of antibiotics do you commonly use?
    b. Generic, branded, or a mix of both? Explain why?
    c. How many milligrams do you usually purchase?
3. What were the common reasons for using these antibiotics?
4. From whom/where do you get information on self-medication with antibiotics?
    a. Do you get advice and information about using antibiotics from doctors, pharmacists, or other health professionals? Tell us about your experience.
    b. Are there other people in your social circles whom you rely on for advice on antibiotic medication? Who are they usually?
5. How do you procure these antibiotics? Prompts:
    a. Where did you get antibiotics?
    b. Who did you receive these antibiotics from?
    c. How many milligrams do you usually purchase?
        i. 250 or 500 milligrams? If 250, ask if they decreased from 500? If 500, ask if the reason for this is that they had 250 in the first place.
    d. Have you ever bought antibiotics at a pharmacy/drug store/grocery store without a prescription?
    e. Have you ever asked your doctor to prescribe antibiotics? What prompted you to ask for antibiotics?
6. How do you use antibiotics? Prompts:
    a. What is the basis for the dosage, frequency, and duration of antibiotic use?
    b. Did you read the label/etiquette on the antibiotic packaging and follow the instructions written on the label? What motivated you to do that?
    c. Do you search it up online? What sites do you commonly refer to?
7. Do you always finish the antibiotics you take? Explain. Prompts:
    a. When do you stop taking antibiotics? Why?
    b. Have you ever stopped taking antibiotics when you felt better, when the antibiotics were not over? Why?
    c. Have you ever forgotten to take antibiotics, and what do you do when you remember? Why?
    d. How do you store antibiotics? Why?
    e. Have you ever saved antibiotics just in case one day you are sick of using them? Why?
    f. Have you ever shared antibiotics with other people? Tell us about your experience.
8. What do you think is the importance of following the doctor's prescription in using antibiotics?
    a. What prevents you from complying with the prescription?
9. What do you think are the negative effects of the inappropriate use of antibiotics (e.g., taking them when not prescribed, not finishing the prescription, using different drug brands).
    a. What do you think are the side effects of using antibiotics?
    b. Do you think it causes allergies?

Appendix D. Interview Guide Questions [FILIPINO]

Semi-structured Interview Guide Question on Self-Medication of Antibiotics [14 Items]

Demographic Profile:

1. Pangalan
2. Edad
3. Kasarian
4. Pinakamataas na narating na antas ng edukasyon
5. Buwanang Kita ng Household

Main Questions:

1. Ano ang alam mo tungkol sa mga antibiotic?
    a. Ano ang iyong depinisyon?
    b. Para saan ito ginagamit?
    c. Gaano katagal bago ito magkaroon ng epekto?
    d. Ano sa palagay mo ang mga benepisyo at panganib ng paggamit nito?
2. Ikaw ba ay kasalukuyang gumagamit ng mga antibiotic? Kung hindi, kailan ang huling pagkakataon na iyong gumamit ng antibiotic?
    a. Anong uri ng antibiotic?
    b. Generic, branded, o halo? Paki-paliwanag?
    c. Ilang milligrams ang kadalasan mong binibili?
        i. 250 o 500 milligrams? Kung 250, itanong kung dahil ba ito ay ibinaba mula sa 500? Kung 500, tinanong kung ito ay dahil sa kanilang unang ginamit na 250?
3. Ano ang mga karaniwang dahilan para sa paggamit ng mga antibiotic na ito?
4. Mula kanino/saan ka nakakakuha ng impormasyon tungkol sa paggamit ng antibiotics upang gamutin ang sarili?
    a. Nakakakuha ka ba ng payo o impormasyon ukol sa paggamit ng antibiotics mula sa mga doktor, mga parmasyutiko, o iba pang mga propesyonal sa kalusugan? Ikuwento mo ang iyong karanasan.
    b. May iba ka bang mga kakilala sa iyong mga kaibigan o pamilya na inaasahan mo rin para sa payo tungkol sa gamot na antibiotics? Sino-sino?
5. Paano ka nakakakuha ng mga antibiotics na ito? Mga Prompt:
    a. Saan ka nakakakuha/bumubili ng mga antibiotics?
    b. Sino ang nagbigay sa iyo ng mga antibiotics na ito?
    c. Nasubukan mo na bang bumili ng antibiotics mula sa botika nang walang reseta ng doktor? Ipaliwanag.
    d. Nasubukan mo na bang tanungin ang doktor na resetahan ka ng antibiotics kahit hindi niya ito plano nung una? Ipaliwanag.
6. Paano mo ginagamit ang mga antibiotics? Mga Prompt:
    a. Ano ang naging basehan mo para sa dosage, dami ng gamot, at tagal ng paggamit ng antibiotics?
    b. Binasa mo ba ang label/etiketa sa antibiotic packaging at sinunod ang mga nakasaad na instruksyon sa etiketa? Ano ang nag-udyok sa iyo na gawin iyon?
    c. Naghahanap ka ba ng impormasyon online? Anong mga website ang karaniwang iyong tinitingnan?
7. Palagi mo bang tinatapos ang mga antibiotics na iyong iniinom? Ipaliwanag ang naging sagot? Mga Prompt:
    a. Kailan ka tumitigil sa pag-inom ng antibiotics? Bakit?
    b. Nakalimutan mo na ba ang pag-inom ng antibiotics at ano ang iyong ginagawa kapag naalala mo? Bakit?
    c. Nagkaroon ka na bang karanasan ng pagtigil sa pag-inom ng antibiotics dahil bumuti na ang pakiramdam mo kahit hindi pa tapos ang rineseta? Bakit?
    d. Nagtatabi ka ba ng tirang antibiotics? Bakit?
    e. Nagbigay ka na ba ng antibiotics sa iba? Bakit?
8. Ano sa palagay mo ang kahalagahan ng pagsunod sa reseta ng doktor sa paggamit ng antibiotics?
    a. Ano ang mga pumipigil sa iyo na sumunod sa reseta?
9. Ano sa palagay mo ang mga negatibong epekto ng hindi wastong paggamit ng antibiotics (halimbawa, pag-inom nito kahit walang reseta ng doktor, hindi pagtatapos ng reseta, paggamit ng iba't ibang brand ng gamot)?
    a. Ano sa palagay mo ang mga side effect ng antibiotics?
    b. Sa palagay mo ba ito nagiging sanhi ng mga allergy?