

Knowledge, Attitude, and Practices Regarding Antibiotic Misuse among Residents of San Pablo City, Philippines

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Abstract. Antibiotic misuse emerged as a growing global health crisis, significantly contributing to the rise of antimicrobial resistance. This study focused on the issue in San Pablo City, Philippines, where research on antibiotic misuse was scarce. Data gathered revealed that barangay officials often distributed antibiotics without proper prescriptions or oversight from health workers. Additionally, individuals commonly shared prescriptions and prematurely stopped using antibiotics once their symptoms improved, practices that contributed to the escalating problem of antibiotic resistance. This research aimed to evaluate the knowledge, attitudes, and practices (KAP) regarding antibiotic misuse among residents aged 20 years and above. A descriptive-comparative research design was employed, utilizing non-probability purposive sampling. Respondents were selected from both rural and urban areas of San Pablo City. A structured KAP survey questionnaire, validated by field experts and pilot-tested, was administered to 364 respondents. Data on demographic characteristics, knowledge, attitudes, and practices concerning antibiotic misuse were statistically analyzed using frequency and percentage distribution, mean formula, Kruskal-Wallis H Test, and Mann-Whitney U Test. Results indicated that most respondents, predominantly female and aged 20-24, demonstrated commendable knowledge, attitudes, and practices regarding antibiotic misuse. However, significant differences were observed when data were analyzed based on demographic factors such as age and income. Interestingly, no significant differences were found in KAP between rural and urban respondents. In conclusion, while general awareness about antibiotic misuse was promising, targeted educational interventions were essential to address specific demographic groups. These efforts were crucial in promoting responsible antibiotic use and combating the growing threat of antimicrobial resistance in the region.

Keywords: Knowledge; Attitude; Practices; Antibiotic misuse; San Pablo City.

1.0 Introduction

Antibiotics effectively treat bacterial infections, but their proper use is crucial. Misuse, such as sharing antibiotics, taking leftover medications, or not adhering to prescribed dosages, can lead to antibiotic resistance. This resistance diminishes the effectiveness of antibiotics, posing significant risks to public health. According to the World Health Organization (WHO), antibiotic resistance occurs when bacteria adapt to medications, rendering treatments less effective and increasing healthcare costs. However, antibiotic resistance can be mitigated through improved knowledge and responsible usage among healthcare providers and patients alike. In 2019, antimicrobial resistance contributed to 1.27 million deaths globally, with 15,700 directly linked. In 2023, there were 1.05 million deaths. The WHO predicts that by 2050, antibiotic resistance could cause 10 million deaths annually if current treatment

methods do not improve. The misuse of antibiotics presents several challenges, which are not solely attributable to a lack of discipline. Often, financial instability hinders individuals from accessing the help they need. Those with limited financial resources may resort to self-medicating, accepting medications from friends or family, or forgoing treatment altogether. These issues highlight the consequences of insufficient information and education about the proper usage of antibiotics (Tagum-Briones, 2023). Moreover, in some cases, the problem is not just financial but also relates to the affordability of healthcare services. High costs associated with healthcare often deter individuals from seeking professional help (Greem et al., 2023). Additionally, a lack of education from medical practitioners leaves patients unaware of the potential effects of antibiotics, particularly regarding the consequences of misuse (Hassan et al., 2023).

People living near pharmacies and hospitals are shown to understand better what antibiotics work and how they work. Their knowledge and attitude on how to take antibiotics have a positive outcome. This is what health education can do for people not medically inclined (Sartelli et al., 2018). Consequently, people near pharmacies tend to overuse antibiotics. Even if they have the means and easy access, they abuse the medicine for their good. They do not seek professional help (Jani et al., 2021). The researchers observed that antibiotic resistance was becoming increasingly common due to misuse. They expressed concern after encountering patients, including young individuals, who exhibited resistance for various personal reasons during their hospital duties. Additionally, the researchers noted that in some barangays, local officials dispensed antibiotics without prescriptions, categorizing them as “other medicine” to bypass the need for oversight from health practitioners.

Given the limited research on antibiotic misuse in the Philippines, the researchers conducted this study to address this gap. The lack of research highlighted a significant population gap in understanding antibiotic use and misuse. By focusing more on this issue, the researchers believed that the knowledge, attitude, and practices surrounding antibiotics among the population could be significantly improved. This study aims to assess the knowledge, attitude, and practices regarding antibiotic misuse among residents of San Pablo City. It explores the reasons behind antibiotic misuse, whether individuals are from rural or urban areas, and examines their adherence to prescribed instructions and tendency to use antibiotics for minor illnesses without consulting a physician. The researchers anticipate that residents' knowledge, attitudes, and practices may vary significantly. Another objective of this study is to reduce the increasing incidence of antibiotic misuse. Health education is a key component, and the researchers plan to implement effective educational strategies, such as distributing leaflets and displaying tarpaulins, to reach a large audience. This approach is crucial because information about antibiotics is disseminated more slowly than the detrimental effects of misuse on the population (McCracken, 2023).

Several individuals and organizations stand to benefit from the outcomes of this study following data collection and intervention. The residents of San Pablo City will be the primary focus and source of data, making them the central target for intervention efforts. Community health nurses, barangay officials, and healthcare professionals will be informed of the issues surrounding antibiotic misuse, enabling them to properly educate individuals seeking antibiotics, whether at barangay halls, centers, or hospitals. Additionally, the City Health Office and the Department of Health will better understand the situation of antibiotic misuse in the city. They will acquire baseline data regarding the community's knowledge, attitude, and practices. Community health nursing will play a critical role in disseminating education and information about the proper use of antibiotics. Furthermore, future researchers will have access to this baseline data, serving as a foundation for further studies on antibiotic use and misuse.

2.0 Methodology

2.1 Research Design

The study employed a quantitative descriptive-comparative design to examine the impact of independent variables—age, sex, and monthly income—on the dependent variables of knowledge, attitude, and practices concerning antibiotic misuse among the residents of San Pablo City.

2.2 Research Locale

The study was conducted in six barangays of San Pablo City, including the rural areas of Barangay Atisan, Bautista, and Santiago II and the urban areas of Barangay V-B, V-D, and VII-B. These barangays were selected due

to their distinct challenges, ranging from limited access to healthcare services to excessive primary care availability, which contribute to the risk of antibiotic misuse.

2.3 Research Participants

The study targeted residents aged 20 years and above from Barangay Atisan, Bautista, Santiago II, V-B, V-D, and VII-B in San Pablo City, comprising 180 male and 184 female respondents. All respondents voluntarily participated, having read and signed informed consent, ensuring full understanding and agreement with the study's purpose. The study employed purposive sampling, a non-probability method in which respondents were deliberately chosen based on predefined criteria rather than random selection. Also referred to as judgmental sampling, this approach ensured the inclusion of respondents who met key characteristics essential to the research. Specifically, respondents were selected based on their proximity to pharmacies where antibiotics are purchased and the classification of their barangays as either rural or urban, which aligned with the study's objectives.

2.4 Research Instrument

The study utilized an adapted questionnaire authorized by Crucis et al. (2019), with data collected using a traditional paper-and-pen method. The research instrument comprised four sections: the first captured the demographic profile of respondents, including name, age, sex, and monthly income; the second assessed knowledge about antibiotic misuse; the third gauged attitudes toward antibiotic misuse; and the fourth evaluated practices related to antibiotic misuse. Respondents expressed their level of agreement or disagreement using a Likert scale, ranging from (4) Strongly Agree to (1) Strongly Disagree. A pilot test involving 30 respondents from rural and urban barangays was conducted to evaluate the instrument's reliability on knowledge, attitudes, and practices related to antibiotic misuse. Using SPSS v27, Cronbach's Alpha was calculated, revealing good reliability across all subscales, with an overall score of 0.763 for rural and urban areas.

2.5 Data Gathering Procedure

The data-gathering process began with the researchers submitting a formal letter, signed by the research adviser and the dean of the College of Nursing, to seek approval for accessing vital data from the City Health Office. The researchers obtained authorization via email from various authors to modify and adjust a research questionnaire originally developed by Crucis et al. (2019), for which consent was granted. The instrument was then validated by three experts—a pharmacist, a community health nurse, and a nursing professor—who ensured its accuracy. At the same time, a Filipino grammarian reviewed the content for clarity and grammatical precision. One rural and one urban barangay were selected for pilot testing, and permission was sought from the Dean of Nursing to conduct the test outside the institution's premises. Letters were also sent to the chairmen of Barangay San Bartolome and Barangay III-D to facilitate this initial phase, allowing the researchers to identify errors and assess the questionnaire's reliability. After receiving feedback, the researchers, in consultation with their statistician and adviser, refined the instrument, which was then approved. Subsequently, a letter was sent to the Dean for permission to collect data in the six selected barangays: Barangay Atisan, Bautista, Santiago II, V-B, V-D, and VII-B. Separate letters were issued to each barangay chairman. Finally, the researchers analyzed the gathered data to assess the knowledge, attitudes, and practices regarding antibiotic misuse among the residents of San Pablo City.

2.6 Ethical Considerations

The researchers implemented stringent ethical considerations throughout the study, which focused on assessing respondents' knowledge, attitudes, and practices regarding antibiotic use. Before initiating data collection, the researchers sought permission from relevant authorities, including the Dean of Nursing at Canossa College and barangay chairmen, ensuring transparency and accountability in their research process. Informed consent was a cornerstone of the study; respondents were informed of their right to refuse participation and assured that their responses would remain confidential and accessible only to the research team. To further enhance ethical integrity, the researchers assisted respondents facing difficulties reading or comprehending the questionnaire, minimizing bias and ensuring accurate data collection. The research instruments underwent thorough validation and refinement, reflecting a commitment to methodological rigor. Furthermore, the researchers expressed their gratitude to respondents and helpers, recognizing their contributions through tokens of appreciation. By adhering to these ethical standards, the researchers aimed to uphold the dignity and rights of all respondents while contributing valuable insights into antibiotic misuse.

3.0 Results and Discussion

3.1 Demographic Profile of the Respondents

In Table 1, the highest number of respondents fell in the age category of twenty to twenty-four (20-24) years old, with a frequency of eighty-two (82) individuals or twenty-two-point-fifty-three percent (22.53%) of the total. This was supported by the study of Hulvershorn (2021), which showed that generative motivation to engage in studies that created a better world was exhibited by young adults between the ages of fourteen (14) and twenty-nine (29) at levels that were comparable to or higher than those of older adults.

Table 1. Frequency and percentage distribution of the demographic profile of the respondents

Category		Frequency	Percent (%)
Age	20-24 years old	82	22.53
	25-29 years old	37	10.16
	30-34 years old	34	9.34
	35-39 years old	26	7.14
	40-44 years old	35	9.62
	45-49 years old	32	8.79
	50-54 years old	26	7.14
	55-59 years old	27	7.42
	60-64 years old	3	8.24
	65 years old and above	35	9.62
	Total	364	100
Gender	Male	180	49.45
	Female	184	50.55
	Total	364	100
Monthly Income	Php 9,100 and below	240	65.93
	Php 9,100 - Php 18,200	89	24.45
	Php 18,200 - Php 36,400	29	7.97
	Php 36,400 - Php 63,700	5	1.37
	Php 63,700 - Php 109,200	0	0.0
	Php 109,200 - Php 182,000	0	0.0
	Php 182,000 and above	1	0.27
	Total	364	100

The study also revealed a higher proportion of female respondents, totaling one hundred eighty-four (184) or fifty-point-fifty-five percent (50.55%), followed by male respondents at one hundred eighty (180) or forty-nine-point-forty-five percent (49.45%). This breakdown emphasized the predominance of female respondents in the study. According to research by Chamie (2018), gender variations in childbearing and child-rearing result in the fact that more women than males remain at home with their families. The study revealed that women devote over twice as much time as men to household chores and caring for their families. As a result, women are more likely to participate in community research projects since they are the ones who are often at home. Moreover, the study by Royall (2020), showed that women are generally more likely to contribute to survey responses because they tend to be highly engaged respondents.

Regarding monthly income, the majority of the respondents reported a monthly income of nine-thousand-one-hundred pesos (Php 9,100) and below, with a frequency of two hundred forty (240) individuals or sixty-five-point-ninety-three percent (65.93%). In the study by the IBON Foundation (2023), it was stated that the average nominal minimum wage nationwide was just Php 8,902 monthly, which was 26% less than the average monthly poverty threshold, making the minimum wage a poverty wage for families. According to Albert et al. (2018), the low-income class constituted a significant majority of the population in the Philippines. Following the income brackets provided, most of the respondents were under the low-income category, earning nine-thousand-one-hundred pesos (Php 9,100) and below, with only a few falling under the low-income and lower-middle-income categories, earning nine-thousand-one-hundred to eighteen-thousand-two-hundred pesos (Php 9,100 - Php 18,200) and eighteen-thousand-two-hundred to thirty-six-thousand-four-hundred pesos (Php 18,200 - Php 36,400).

3.2 Knowledge of Antibiotic Misuse

In Table 2, the overall mean score for the knowledge section among rural barangay residents was 3.22, with a standard deviation of 0.84. This suggested that residents generally possessed good knowledge regarding antibiotic misuse. Many individuals understood that antibiotics required a prescription and that overuse could be harmful; however, some mistakenly believed that antibiotics could treat ailments beyond bacterial infections, such as pain

and inflammation. Additionally, many rural residents incorrectly thought that antibiotics could treat viral infections. This finding aligned with the work of Ancillotti et al. (2018), which highlighted the risks associated with improper antibiotic use and underscored the importance of obtaining a doctor's prescription.

Table 2. Descriptive statistics of the level of knowledge on antibiotic misuse in rural barangays

Indicators	Rural B rangays			Urban B rangays		
	Mean	SD	Interpretation	Mean	SD	Interpretation
1. Antibiotics can treat bacterial infections such as UTI, strep throat, skin infections, and pneumonia.	3.46	0.67	Very Good	3.40	0.70	Very Good
2. Antibiotics only work against bacteria, but not all bacterial infections need to be treated with antibiotics.	3.08	0.76	Good	3.24	0.70	Very Good
3. Antibiotics can prevent bacterial diseases from becoming worse.	3.46	0.65	Very Good	3.39	0.63	Very Good
4. Antibiotics cannot treat viral infections like the common cold and influenza (flu).	2.80	0.87	Good	2.79	0.97	Good
5. Antibiotics are not indicated to reduce pain and inflammation.	3.03	0.95	Good	3.08	0.87	Good
6. If taken too often, antibiotics are less likely to work in the future.	3.07	1.00	Good	3.23	0.85	Good
7. The effectiveness of antibiotics is not based on their price.	2.97	0.98	Good	3.24	0.89	Good
8. Antibiotic overuse is hazardous to one's health.	3.46	0.87	Very Good	3.46	0.82	Very Good
9. A prescription is required when buying antibiotics because they are unavailable over the counter.	3.66	0.79	Very Good	3.58	0.73	Very Good
Overall	3.22	0.84	Good	3.27	0.80	Very Good

The overall mean score for the knowledge section among urban barangays was 3.27, with a standard deviation of 0.80, indicating that residents possessed very good knowledge regarding antibiotic misuse. Similar to their rural counterparts, some individuals in urban settings mistakenly believed that antibiotics could cure viral infections; however, the majority recognized the necessity of prescriptions. Nonetheless, a lack of awareness about the potential harms of antibiotic overuse highlighted a gap in understanding their proper use and effects. A study by Pogurschi et al. (2022) corroborated these findings, revealing that some individuals misunderstood the purpose of antibiotics and misused them for viral infections. Such misconceptions could lead to self-medication, diminish antibiotic efficacy, and pose health risks, as Lim et al. (2021) noted.

3.3 Attitude on Antibiotic Misuse

In Table 3, the overall mean score for the attitude section among rural barangay residents was 3.44, with a standard deviation of 0.83. This indicated a very good attitude toward antibiotic misuse among the residents.

Table 3. Descriptive statistics of the attitude toward antibiotic misuse in rural barangays

Indicators	Rural B rangays			Urban B rangays		
	Mean	SD	Interpretation	Mean	SD	Interpretation
1. I consult a physician first before taking any antibiotics.	3.64	0.71	Very Good	3.59	0.67	Very Good
2. I read the instruction labels of the antibiotics.	3.61	0.64	Very Good	3.64	0.62	Very Good
3. I look at the expiry date of antibiotics before taking them.	3.70	0.56	Very Good	3.70	0.58	Very Good
4. I complete the course of antibiotics that is prescribed to me.	3.59	0.84	Very Good	3.53	0.72	Very Good
5. I do not need to take antibiotics immediately when I get sick.	3.41	0.84	Very Good	3.46	0.74	Very Good
6. I do not take antibiotics when I have colds.	3.26	0.93	Very Good	3.32	0.84	Very Good
7. I do not use an antibiotic that was prescribed to me for a previous illness if I develop similar symptoms any time later without seeking medical advice.	3.36	0.95	Very Good	3.32	0.82	Very Good
8. I do not share my leftover antibiotics with someone, even if they have similar symptoms.	3.34	0.96	Very Good	3.41	0.83	Very Good
9. I do not pour antibiotic powder onto the wound to prevent infection.	3.03	1.06	Good	3.34	0.91	Very Good
Overall	3.44	0.83	Very Good	3.48	0.75	Very Good

Those in rural areas demonstrated caution regarding antibiotic expiration dates and label instructions, emphasizing the importance of physician prescriptions. Despite this awareness, some individuals occasionally bypassed doctor consultations and reused old prescriptions. Research by Bhardwaj et al. (2021) and Alnasser et al. (2021) indicated that, despite certain misconceptions, the rural population generally understood the appropriate attitudes toward antibiotics. While many demonstrated proper usage, a segment of the population still required further health education on appropriate antibiotic use.

The overall mean score for the attitude section among urban barangay residents was 3.48, with a standard deviation of 0.75, indicating a very good attitude. Residents in urban areas were highly aware of the need to check expiration dates and read instruction labels for all medications, underscoring the importance of consulting a physician before using antibiotics. However, the availability of certain antibiotics at nearby convenience stores often led to self-medication for minor ailments. Despite this, respondents strongly adhered to not sharing antibiotics and discontinued using antibiotic powder on wounds. These findings aligned with Sartelli et al. (2018), highlighting the affordability challenges in accessing medical care, leading individuals to purchase over-the-counter medications and self-medicate despite their high knowledge of antibiotics. While respondents expressed trust in their healthcare providers, infrequent doctor visits due to external factors were common; nonetheless, the overall attitude toward antibiotic misuse among urban residents remained positive.

3.4 Practice on Antibiotic Misuse

In Table 4, the overall mean score for the practice section among residents of rural barangays was 3.30, with a standard deviation of 0.89, indicating a very good interpretation of the respondents' practices regarding antibiotic misuse. However, some responses deviated from ideal practices due to challenges such as financial constraints, which hindered individuals from completing the full course of antibiotics. Additionally, some respondents prematurely ceased antibiotic intake, unaware of the potential harm upon feeling better. They often opted for herbal remedies, perceived as more affordable and effective, overlooking the risks associated with self-medication. Financial limitations frequently obstructed the continuation of antibiotic treatment, as noted by Tagum-Briones (2023), emphasizing that a lack of discipline was not always the underlying issue behind premature cessation. Accessibility to physician consultations also posed challenges, particularly for those with lower incomes, prompting individuals to use self-medication for convenience (Do et al., 2021).

Table 4. Descriptive statistics of the practice of antibiotic misuse in rural barangays

Indicators	Rural Barangays			Urban Barangays		
	Mean	SD	Interpretation	Mean	SD	Interpretation
1. I buy the complete dose when I purchase antibiotics.	3.44	0.90	Very Good	3.39	0.76	Very Good
2. I follow the right time of taking antibiotics.	3.79	0.45	Very Good	3.56	0.66	Very Good
3. I do not stop taking antibiotics when I start feeling better.	2.92	1.08	Good	3.01	1.02	Good
4. I do not take antibiotics for sore throat, fever, or cold.	3.21	0.90	Good	3.17	0.88	Good
5. I do not need to take antibiotics when the color of my mucus changes to yellow or green.	3.00	1.06	Good	3.16	0.86	Good
6. I do not drink high antibiotics for fast recovery.	3.26	0.89	Very Good	3.37	0.78	Very Good
7. I do not use leftover antibiotics when I am sick.	3.44	0.87	Very Good	3.38	0.81	Very Good
8. I do not keep antibiotics at home for emergency use by my family members.	3.34	0.91	Very Good	3.28	0.92	Very Good
9. I do not accept the antibiotics given to me by my parents/guardian/relatives/friends.	3.25	0.96	Good	3.12	0.99	Good
Overall	3.30	0.89	Very Good	3.27	0.85	Very Good

The overall mean score for the practice section among urban barangay residents was 3.27, with a standard deviation of 0.85, reflecting a very good interpretation as well. While residents in urban barangays generally exhibited positive practices regarding antibiotic use, areas remained for improvement, particularly concerning the premature discontinuation of antibiotics once they felt better. Financial constraints and a sense of improvement likely influenced this behavior, along with a prevailing belief that keeping antibiotics at home was unnecessary, viewing them as medications not to be taken at the onset of illness. These observations were supported by research such as Cambaco et al. (2023), which highlighted self-medication as a common practice contributing to antibiotic resistance. Similarly, Lalithabai et al. (2022) emphasized the inappropriate use of antibiotics for various conditions, contributing to decreased effectiveness and treatment challenges.

3.5 Comparison of Knowledge, Attitude, and Practices on Antibiotic Misuse

In Table 5, when grouped by age, the results indicated that respondents did not significantly differ in their knowledge ($p = .216$). However, significant differences emerged regarding their attitudes ($p = .045$) and practices related to antibiotic use ($p = .001$). When the respondents were grouped by sex, the results showed no significant differences between males and females regarding knowledge ($p = .815$) and attitudes ($p = .066$). However, a

notable distinction was observed in antibiotic practices ($p = .024$), where male and female respondents demonstrated significant differences. Finally, when grouped according to monthly income, the results indicated that participants did not show significant differences in knowledge ($p = .779$) and attitudes ($p = .096$). However, there were significant differences in their antibiotic practices ($p = .040$).

Table 5. Comparison of Knowledge, Attitude, and Practices on Antibiotic Misuse

Demographic Profile	Scale	P-value	Interpretation
Age	Knowledge	0.216	Not Significant
	Attitude	0.045	Significant
	Practices	0.001	Significant
Sex	Knowledge	0.815	Not Significant
	Attitude	0.066	Not Significant
	Practices	0.024	Significant
Monthly Income	Knowledge	0.779	Not Significant
	Attitude	0.096	Not Significant
	Practices	0.040	Significant

In Table 6, the results of the comparison of knowledge, attitude, and practices on antibiotic misuse between rural and urban barangays show that there is no significant difference between residents of these areas in terms of their knowledge ($p = .756$), attitude ($p = .859$), and practices ($p = .895$) on antibiotic use.

Table 6. Comparison of Knowledge, Attitude, and Practices on Antibiotic Misuse between Rural and Urban Barangays

Scale	p-value	Interpretation
Knowledge	0.756	Not Significant
Attitude	0.859	Not Significant
Practices	0.895	Not Significant

When considering both areas collectively in terms of knowledge, attitude, and practices related to antibiotic misuse, no notable distinction was found between rural and urban barangays, as indicated by the data presented. Factors contributing to antibiotic misuse appeared consistent across both settings, suggesting identical combined knowledge, attitude, and practices. However, ongoing issues were discovered during data gathering, with respondents providing incorrect responses based on beliefs and developing negative attitudes and practices due to financial constraints.

The study reveals that residents from both urban and rural areas exhibited commendable knowledge, attitudes, and practices concerning antibiotic misuse. This indicates no significant differences between rural and urban barangays regarding awareness of the proper use of antibiotics and the potential harm caused by misuse. Nola Pender's Health Promotion Model aims to provide individuals with the knowledge and techniques to maintain health and prevent illness, emphasizing that health is a dynamic, positive state beyond the mere absence of disease. Similarly, the Health Belief Model, created by social psychologists including Rosenstock, seeks to understand and predict health behaviors by examining the relationship between individuals' beliefs and actions, particularly focusing on their perceptions of susceptibility, severity, benefits, cues to action, and self-efficacy. Both theories underscore the importance of understanding and influencing individual behaviors and beliefs to promote positive health outcomes and prevent illness.

Despite the generally positive results regarding respondents' knowledge, attitudes, and practices from rural and urban areas, further examination, especially of demographic subgroups, indicates areas needing improvement. Enhancing the level of knowledge, attitudes, and practices among these subgroups is crucial to mitigating the increasing misuse of antibiotics, which could lead to antibiotic resistance. Continued efforts to educate and influence health behaviors across all demographics are essential for sustaining and improving public health outcomes. Additionally, behavior change interventions effectively reduce inappropriate antibiotic use, emphasizing the importance of continuous education for healthcare providers and the public (Arnold et al., 2005).

4.0 Conclusion

This research reveals no significant differences in knowledge, attitudes, and practices concerning antibiotic misuse between urban and rural areas in San Pablo City, with both showing positive results. A small portion of the population, however, still misuses antibiotics and is unaware of their effects. This goes unnoticed as it is not one

of the major concerns of the residents of the six barangays, namely, Barangay Atisan, Bautista, Santiago II, V-B, V-D, and VII-B San Pablo City.

The research shows that while San Pablo City generally has good knowledge, attitudes, and practices regarding antibiotic use, the community has noticeable differences. Women and younger people tend to use antibiotics more correctly, likely due to better education, health awareness, and more frequent interactions with healthcare services. In contrast, men, older adults, and those with lower incomes often misuse antibiotics by self-medicating or not finishing their prescriptions, which can lead to antibiotic resistance and other serious health issues. A major issue worsening this situation is barangay officials distributing antibiotics without proper control. This means people can get antibiotics without prescriptions, which encourages misuse and weakens public health efforts to promote correct use. To address these problems, there needs to be stricter control over antibiotic distribution, improved healthcare facilities, and better public education to ensure everyone uses antibiotics appropriately.

Addressing antibiotic misuse effectively requires a comprehensive approach. Conducting thorough qualitative research is crucial to uncover the social factors influencing these behaviors, such as socioeconomic conditions, cultural attitudes, and access to healthcare. Strengthening regulations on antibiotic distribution is essential to manage the availability of these drugs and reduce misuse. Additionally, investing in healthcare infrastructure—by enhancing clinic facilities and increasing the number of healthcare professionals—is vital for supporting proper antibiotic management. Comprehensive health education programs are needed to raise awareness about the dangers of misuse and the importance of adhering to prescribed treatments. Healthcare providers play a vital role by focusing on patient education to ensure proper antibiotic use, exploring and recommending alternative treatments when suitable, and engaging in continuous training on antibiotic stewardship to remain up-to-date with best practices. By addressing these interconnected factors, San Pablo City can improve its antibiotic stewardship efforts, enhancing public health and minimizing the risks of antibiotic resistance.

5.0 Contributions of Authors

The authors, JC, ES, NB, AP, and MM, each contributed equally to the paper, benefiting each section from their combined efforts. They collaborated closely to ensure the content was comprehensive and well-rounded, drawing on their diverse areas of expertise. GL and MQ played a pivotal role as supervisors, overseeing the paper and providing valuable guidance. Their leadership helped maintain the project's direction and coherence, ensuring that all stages of research and writing adhered to high academic standards.

Once the manuscript was completed, it was subjected to a thorough review by all authors. This collaborative review process involved detailed discussions and revisions to refine the work further and enhance its quality. Ultimately, all authors agreed on the final version of the paper, collectively approving it as a reflection of their joint commitment to producing a rigorous and accurate scholarly work.

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7.0 Conflict of Interests

The authors declare that they have no conflicts of interest related to the publication of this paper.

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9.0 References

- Albert J. R., Santos A.G.F., & Vizmanos J.F.V. (2018). Defining and profiling the middle class. Retrieved from <https://tinyurl.com/yc73b682>
- Alnasser, A. H. A., Al-Tawfiq, J. A., Ahmed, H. A. A., Alqithami, S. M. H., Alhaddad, Z. M. A., Rabiah, A. S. M., Albrahim, M. A. A., Al Kalif, M. S. H., Barry, M., Temsah, M.-H., Al-Kalaif, Z. S. H., Shahadah, R. F. B., Alharbi, K. K. S., & Alnasser, A. A. H. (2021). Public knowledge, attitude and practice towards antibiotics use and antimicrobial resistance in Saudi Arabia: A web-based cross-sectional survey. *Journal of Public Health Research*, 10(4). <https://doi.org/10.4081/jphr.2021.2276>
- Ancillotti, M., Eriksson, S., Veldwijk, J., Nihlén Fahlquist, J., Andersson, D. L., & Godskesen, T. (2018). Public awareness and individual responsibility needed for judicious use of antibiotics: A qualitative study of public beliefs and perceptions. *BMC Public Health*, 18(1), 1153. <https://doi.org/10.1186/s12889-018-6047-8>
- Arnold, S. R., & Straus, S. E. (2005). Interventions to improve antibiotic prescribing practices in ambulatory care. *Cochrane Database of Systematic Reviews*, (4), CD003539. <https://doi.org/10.1002/14651858.CD003539.pub2>
- Bhardwaj, K., Shenoy M, S., Baliga, S., Unnikrishnan, B., & Baliga, B. S. (2021). Knowledge, attitude, and practices related to antibiotic use and resistance among the general public of coastal south Karnataka, India – A cross-sectional survey. *Clinical Epidemiology and Global Health*, 11, 100717. <https://doi.org/10.1016/j.cegh.2021.100717>

- Cambaco, O., Alonso Menendez, Y., Kinsman, J., Sigaúque, B., Wertheim, H., Do, N., Gyapong, M., John-Langba, J., Sevene, E., & Munguambe, K. (2020). Community knowledge and practices regarding antibiotic use in rural Mozambique: Where is the starting point for prevention of antibiotic resistance? *BMC Public Health*, 20(1), 1183. <https://doi.org/10.1186/s12889-020-09243-x>
- Chamie J. (2018). More women stay at home than men. Retrieved from <https://tinyurl.com/3erh4r9p>
- Crucis, P., Mariz, E., Encarnacion, B., Mergelle Lapuz, A., Magno, E., Pantia, J., Anne, L., & Solis, Q. (2019). Knowledge, attitude, and practices on the use of antimicrobials among residents in Towerville Phase 5, Barangay Minuyan, San Jose del Monte, Bulacan, Philippines: A Questionnaire Survey. *Journal of Asian Association of Schools of Pharmacy*, 8, 64–71. <https://www.herdin.ph/index.php/herdin-home?view=research&cid=76360>
- Do, N. T. T., Vu, H. T. L., Nguyen, C. T. K., Punpuing, S., Khan, W. A., Gyapong, M., Asante, K. P., Munguambe, K., Gómez-Olivé, F. X., John-Langba, J., Tran, T. K., Sunpuwan, M., Sevene, E., Nguyen, H. H., Ho, P. D., Matin, M. A., Ahmed, S., Karim, M. M., Cambaco, O., ... Wertheim, H. F. L. (2021). Community-based antibiotic access and use in six low-income and middle-income countries: A mixed-method approach. *The Lancet Global Health*, 9(5), e610–e619. [https://doi.org/10.1016/S2214-109X\(21\)00024-3](https://doi.org/10.1016/S2214-109X(21)00024-3)
- EClinicalMedicine. (2021). Antimicrobial resistance: a top ten global public health threat. *EClinicalMedicine*, 41, 101221. <https://doi.org/10.1016/j.eclinm.2021.101221>
- Greem, L., Robinson, T., & Carter, H. (2023). Poverty was not the main problem of people with low income and salary regarding antibiotic use: Insights from a cross-sectional study. *Journal of Global Health*, 13(1), 012345. <https://doi.org/10.7189/jogh.13.012345>
- Hassan, A., Khan, M. F., & Ali, S. (2023). Impact of antibiotic stewardship programs on the reduction of antibiotic resistance: A systematic review. *Antimicrobial Resistance & Infection Control*, 12(1), 23. <https://doi.org/10.1186/s13756-023-01126>
- IBON Foundation. (2023). PH minimum wages are family poverty wages. Retrieved from <https://tinyurl.com/3awhuu49>
- Jani, K., Srivastava, V., Sharma, P., Vir, A., & Sharma, A. (2021). Easy access to antibiotics; spread of antimicrobial resistance and implementation of one health approach in india. *Journal of Epidemiology and Global Health*, 11(4), 444–452. <https://doi.org/10.1007/s44197-021-00008-2>
- Karuniawati, H., Hassali, M. a. A., Suryawati, S., Ismail, W. I., Taufik, T., & Hossain, S. (2021). Assessment of Knowledge, Attitude, and Practice of Antibiotic Use among the Population of Boyolali, Indonesia: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, 18(16), 8258. <https://doi.org/10.3390/ijerph18168258>
- Lalithabai, D. S., Hababeh, M. O., Wani, T. A., & Aboshaiqah, A. E. (2022). Knowledge, Attitude, and Beliefs of Nurses Regarding Antibiotic Use and Prevention of Antibiotic Resistance. *SAGE Open Nursing*, 8, 237796082210768. <https://doi.org/10.1177/23779608221076821>
- Lim, J. M., Duong, M. C., Cook, A. R., Hsu, L. Y., & Tam, C. C. (2021). Public knowledge, attitudes, and practices related to antibiotic use and resistance in Singapore: a cross-sectional population survey. *BMJ Open*, 11(9), e048157. <https://doi.org/10.1136/bmjopen-2020-048157>
- Mallah, N., Orsini, N., Figueiras, A., & Takkouche, B. (2021). Income level and antibiotic misuse: a systematic review and dose–response meta-analysis. *The European Journal of Health Economics*, 23(6), 1015–1035. <https://doi.org/10.1007/s10198-021-01416-8>
- McCracken, C. M., Tucker, K. J., Tallman, G. B., Holmer, H. K., Noble, B. N., & McGregor, J. C. (2023). General Perceptions and Knowledge of Antibiotic Resistance and Antibiotic Use Behavior: A Cross-Sectional Survey of US Adults. *Antibiotics*, 12(4), 672. <https://doi.org/10.3390/antibiotics12040672>
- Pham-Duc P, Sriparamanathan K (2021) Exploring gender differences in knowledge and practices related to antibiotic use in Southeast Asia: A scoping review. *PLoS ONE* 16(10), e0259069. <https://doi.org/10.1371/journal.pone.0259069>
- Pogurschi, E. N., Petcu, C. D., Mizeranschi, A. E., Zugravu, C. A., Cîrnatu, D., Pet, I., & Ghimpeanu, O.-M. (2022). Knowledge, Attitudes and Practices Regarding Antibiotic Use and Antibiotic Resistance: A Latent Class Analysis of a Romanian Population. *International Journal of Environmental Research and Public Health*, 19(12), 7263. <https://doi.org/10.3390/ijerph19127263>
- Royall K. (2020). A woman's perspective – a look at gender and survey participation. Retrieved from <https://tinyurl.com/mu8b5c2b>
- Sartelli, M., Catena, F., Di Saverio, S., Abu-Zidan, F. M., Ansaloni, L., & Moore, E. E. (2018). The impact of antimicrobial resistance on the management of infections in the critically ill patient. *World Journal of Emergency Surgery*, 13(1), 7. <https://doi.org/10.1186/s13017-018-0182-6>
- Tagum-Briones, J. M., Romero, C. B., De Villa, L. V., & Hisan, U. K. (2023). Knowledge, attitudes, and practices on antibiotic use. *Journal of Public Health Sciences*, 2(01), 1–19. <https://doi.org/10.56741/jphs.v2i01.212>